



AN ISO 9001 & 14001 COMPANY

TENDER DOCUMENT

NIT No: EPI/WRO/CON/968/342

FOR

Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

VOLUME – I

**NIT, Annexures & Bidder Registration and Bid Submission
Module**



TENDER INVITING AGENCY

**Engineering Projects (India) Limited
Contracts Division, Western Regional Office,
6A, Bakhtawar, Nariman Point
Mumbai – 400021**

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ENGINEERING PROJECTS (INDIA) LTD.

(A Govt. of India Enterprise)
Western Regional Office, Mumbai

NIT No: EPI/WRO/CON/968/342

Date: 30.05.2025

NOTICE INVITING e-TENDER (NIT)

1. Engineering Projects (India) Ltd. invites online e-tender **on EPC mode** from the eligible contractors/firms who fulfill the eligibility criteria as per the brief particulars of scope for **for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”** in single stage two bid system (Techno-commercial bid & Price Bid):

S. No.	Name of Work	Completion Period	Earnest Money Deposit (EMD) in ₹	Tender fees in ₹
1.	Tender for “ Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”	10 Months	17,34,000.00 (Rupees Seventeen Lakh Thirty Four Thousand Only)	2360.00 (Rupees Two Thousand Three Hundred Sixty only) including GST @ 18%

2. A) BRIEF SCOPE OF WORK:

The scope of work under this contract shall in general include (but not limited to) Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and Associated Works in all respect along with, Cabling & termination, Cable Tray, as per the detailed scope of work & technical specifications given in Vol-III.

Apart from above, any other services required for completeness of the DCS based control system as per direction of EPI/ GSECL are deemed to be included in the scope of work.

For detailed scope of work refer to the tender document.

B) PROJECT SITE INFORMATION UKAI TPS:

The nearest railway station is Songadh, 10 kms away. The station has siding facilities suitable for handling project equipment. The railway track is broad gauge. The site is easily approachable by National Highway NH-08 at a distance of about 90 Kms.

The nearest town is Songadh which is about 6-8 Kms away from Ukai. Nearest Airport is Surat at a distance of about 100 KM from site. Nearest Sea Port are Mumbai and Kandla.

3. Time Schedule of Tender Activities:

i	Start Date & Time for Downloading of tender documents	30.05.2025 from 1700 hrs
ii	Last Date of Submission of Pre-bid Queries	06.06.2025 at 1500 hrs
iii	Date of Pre-bid Meeting through VC	10.06.2025 at 1500 hrs
iv	Last Date & Time of Submission of online Tender	20.06.2025 at 1500 hrs
v	Date & Time of online opening of tender (Technical Bid)	23.06.2025 at 1500 hrs
vi	Last Date & Time of Submission of offline EMD	23.06.2025 upto 1500 hrs

All pre-bid queries must be sent to Tender Inviting Authority as given in clause 13 of NIT

Link for VC shall be shared as corrigendum. Interested bidders are requested to follow the portal for this corrigendum.

4. Tender Fee:

Bidders can download the bid documents from the portal. However, interested bidders must pay tender fees to participate in the tender of **₹ 2360.00 (Rupees Two Thousand Three Hundred Sixty Only)**. The tender fee is inclusive of GST @ 18%. The tender fee is non-refundable. Bidders must submit a scanned copy of proof of tender fee paid online. EPIL bank account details for RTGS/NEFT as mentioned below;

1. Name of Beneficiary : Engineering Projects (India) Ltd
2. Account No. : 040802000002246
3. Name of Bank : Indian Overseas Bank R K Puram, New Delhi – 110066
4. IFSC Code : IOBA0000408
5. GST No of EPI : 07AAACE0061C2ZE

Bid submitted without or prescribed Tender Fees shall be summarily rejected.

5. Earnest Money Deposit

The bid must be accompanied by scanned copy of Earnest Money Deposit (EMD) of **₹ 17,34,000.00 (Rupees Seventeen Lakh Thirty-Four Thousand Only)**.

Earnest Money Deposit (EMD) in the form of online payment or Demand Draft/Bankers Cheque in favour of 'Engineering Projects (India) Limited' or Bank Guarantee as per the enclosed format issued from any Nationalized bank/ Scheduled bank or Insurance Surety Bond.

The EMD shall be valid for minimum period of 150 days (one hundred fifty days) from the last date of submission of tender.

The scanned copy of EMD shall be submitted by the bidders with their online bid. The scanned copy of Bid security as mentioned in the NIT (Insurance surety bond, Bank Guarantee, DD, Bankers Cheque etc.) shall be submitted by the bidders with their online bid. **However, Original physical form of EMD shall be submitted by bidders within the due date & time of opening of technical bid. In case the EMD/Bid security in original physical form does not reach EPIL within the cut-off date & time, the bid shall be rejected will not be considered for evaluation,** irrespective of their status/ranking in tender and notwithstanding the fact that a copy of EMD/Bid security was earlier uploaded by the bidder on the mentioned Portal (online bid).

In case EMD/Bid security is submitted through net banking, submission of Original physical form of EMD / Bid Security within the bid due date shall not be required. However, transaction details / proof of submission of EMD / bid security through net banking shall be uploaded in designated place in Tendering Portal (Online)

Note: Performa for Bank Guarantee and Insurance Surety Bond in lieu of Earnest Money Deposit is enclosed with the NIT. “The EMD BG must be submitted by the bidder with Structured Finance Managing System (SFMS) issued by beneficiary Bank. In case, the bidders do not submit the requisite SFMS with EMD BG, their bid shall be considered as unresponsive bid”. EPI’s bank detail is mentioned above.

EMD may be forfeited:

- a) If the bidder withdraws the bid after bid opening during the period of validity;
- b) Any revision in the offer made by the Bidder during the validity of the offer.
- c) If any bidder furnishes any incorrect or false statement/information/document.

Return of EMD: The EMD of all unsuccessful Bidders shall be returned within 30 (Thirty) days of the opening of price bid. EMD of the successful bidder shall be returned after receipt of Security Deposit cum Performance Guarantee.

Note: Being a works contract, MSME benefits i.e. Exemption of Tender Fee & EMD is not applicable.

6. Qualifying Criteria:

Bidders fulfilling the following requirements are eligible to participate in this tender.

6.1 Technical Criteria

- a) The bidders must have experience of having successfully completed following “**similar works**” during the last Seven (7) years ending last day of the month previous to the one in which applications invited should be either of the following:

One similar completed work costing not less than the amount equal to **₹.6,93,60,000.00**

OR

Two similar completed work costing not less than the amount equal to **₹.4,33,50,000.00**

OR

Three similar completed work costing not less than the amount equal to **₹3,46,80,000.00**

The 'similar work' shall mean **“Design, Supply, Erection, Testing and Commissioning of Plant Control & Monitoring of System by DCS/PLC system in any Steel/Power/Coal/Mining/Cement/Water Industries.**

If any bidder has executed the same work for the same client through two orders i.e. one for supply and other for erection, then the credential for the combined value of the work may be considered as one similar work”.

In case the Bidder has executed Composite Works which includes the qualifying work(s) as per the definition of “Similar Work”, then the value of such qualifying work(s) out of the total value of Composite Works shall be considered for the purpose of qualification.

For arriving at the cost of similar work, the value of work executed shall be brought to current costing level by enhancing the actual value of work at a simple rate of 7% (seven) percent per annum, calculated from the date of completion to the date of Bid opening. Value of work shall be excluding GST.

The completion certificates issued by

- a) Government / semi-government organisations, state/central government, public works departments, public sector undertakings/ Autonomous Govt. bodies/Municipal bodies along with copy of work order/ agreement.
 - b) In case the work experience is of private sector the completion certificate shall be supported with work order and copies of corresponding TDS certificates. The value of work will be considered equivalent to the amount received as per the TDS certificates. FORM 26AS (TDS) and work order must be duly certified by Chartered Accountant with valid UDIN issued by ICAI.
- ☐ Completion certificate must clearly mention tax component.
 - ☐ The cost of free issue materials shall not be included in the completed value of works.

6.2 Joint-Venture/ Consortium is not eligible to bid

6.3 Financial Criteria

a) Turnover

Should have Average Annual Financial Turnover (Audited) on works amounting at least **₹.4,33,50,000.00** during the last three consecutive financial years ending on 31st March 2024 with duly Certified from Chartered Accountant with UDIN issued by ICAI is also to be submitted.

In case of Companies/Firms less than 3 years old, the Average annual financial turnover shall be worked out for the available period only.

b) Profit & Loss

Should not have incurred losses in more than two consecutive years during the immediate last five financial years, ending March 2024. Copies of Annual report including balance sheet, statement of profit & loss for last 5 years along with schedules duly Certified from Chartered Accountant with UDIN issued by ICAI is also to be submitted.

In case of Companies/Firms less than 3 years old, the bidder should not have incurred any losses since its formation.

c) Banker's Certificate / Net Worth:

Should have a Banker's Certificate from a National / Schedule Bank of the amount equal to **₹3,46,80,000.00**. The Banker's Certificate should not have been issued earlier than three (03) months of last date of submission of tender.

OR

Net Worth Certificate of minimum **₹86,70,000.00** issued by certified Chartered Accountant with Unique Document Identification Number (UDIN). The Net Worth certificate shall be of the last financial year ending on 31st March 2024 with schedules duly certified from Chartered Accountant with UDIN issued by ICAI is also to be submitted.

The Banker's Certificate & Net Worth Certificate shall be in the format prescribed given in Annexure VII.

NOTE: The Chartered Accountant who certifies any document (technical or financial) for the bidder shall not be an employee/ Director and not having any interest in the Bidder's company/ firm.

7. Documents required for meeting Qualification Criteria

a) Bidder's past experience as Consortium/ Unincorporated Joint Venture (JV):

While evaluating the Bids, Bidder's past experience as a leader or member of a Consortium/ Unincorporated Joint Venture (JV) shall be considered acceptable, provided his scope in that Consortium/JV meets the requirement stipulated in the Experience Requirement.

In the event that the experience of the Consortium/Unincorporated Joint Venture (JV) submitted by the Bidder is deemed to meet the 'similar work' criteria, it is necessary to indicate the division of the scope of work in terms of specific activities and the associated value of work between the Consortium/Unincorporated Joint Venture (JV) members.

In the event that the members of the incorporated joint venture (IJV) are indicated, but the division of scope in terms of percentage share is not specified in the documents submitted by the bidder, the completed value shall be arrived at after

considering the percentage share of each member as per the shareholding pattern of IJV available in the Ministry of Corporate Affairs, Government of India database for the purpose of techno-commercial evaluation.

b) Certificates of Subsidiary / Parent / Group Company / Own works:

Any company/ firm while submitting a tender cause the work experience of its subsidiary company to the extent of its ownership in the subsidiary company.

In case of a Company/firm, formed after merger and/ or acquisition of other companies / firms, past work experience and financial parameters like turnover, profitability, net worth etc. of the merged / acquired companies / firms will be considered for qualification of such Company / firm provided such Company / firm continues to own the requisite assets and resources of the merged / acquired companies / firms.

c) Foreign Certificate

In case the work experience is for the work executed outside India, the bidders have to submit the completion /experience certificate issued by the owner duly signed & stamped and affidavit to the correctness of the completion/experience certificates. The contractor shall also get the completion / experience certificates attested by the Indian Embassy / Consulate / High Commission in the respective country.

In the event of submission of completion / experience certificate/ other documents by the Bidder in a language other than English, the English translation of the same shall be duly authenticated by the Chamber of Commerce of the respective country and attested by the Indian Embassy/Consulate/High Commission in the respective country.

Note: Provided further that bidder from member countries to the HAGUE convention, 1961 are permitted to submit requisite documents with "Apostille stamp" affixed by Competent Authorities designated by the government of respective country which would be acceptable in lieu of attestation from the Indian Embassy / Consulate / High Commission in their respective countries.

For the purpose of evaluation of Bid, the Exchange rate of currency into INR shall be exchange rate published by the IMF or RBI as on the Date of opening of tender.

Note: Sub-Contractor Approval: All the technical details/Credentials submitted by L-1 bidder will be forwarded to GSECL for their approval, after approval from GSECL, Letter of Acceptance (LOA) will be placed.

8. General

8.1 Constitution of firm:

Bidders have to submit an affidavit as per prescribed format in **Annexure IV** along with the supporting documents viz. Partnership deed (notarized), Registration Certificates in Ministry of Corporate Affairs, Memorandum and Articles of Association of the firm and Board Resolutions to prove the authorisation for submitting the bid.

- a) In case of Sole Proprietorship, an affidavit of Sole Proprietorship and if the tender is signed by any other person, Power of Attorney by the Sole Proprietor in favour of signatory.
- b) In case of Partnership, if document is not signed by all the partners, Power of Attorney in favour of the Partner/person signing the documents authorizing him to sign the documents. The person signing the documents should also have a specific authority to refer disputes with the partnership firm to arbitration.
- c) In case of Company, copy of the Board Resolution authorizing the signatory to sign on behalf of the Company.

Bidders have to submit undertakings regarding details of the Constitution of the firm/Company along with the details of its directors as per enclosed **Annexure V**. In case the bidder fails to submit Constitution of firms with the bid along with the details of its firm Directors as per Annexure their bid will be rejected.

8.2 Conditions for the bidders belongs to the countries sharing borders with India:

Bidder should follow the circular for Restrictions on Public Procurement from certain countries by Ministry of Finance vide press note posted on: 12/04/2023 by PIB Delhi. The Bidder should provide the undertaking in the format as given in **Annexure VIII**.

8.3 Site visit declaration:

It is desired that the bidder shall visit the site before submitting the bid to assess the Ground and working conditions. EPI will not entertain any claims against these conditions. If they choose not to, they bear all consequences. A self-declaration must be submitted with the bid as per **Annexure IX**.

8.4 Verification of Credentials:

Submission of authentic documents is the prime responsibility of the bidder. EPI shall carry-out verification of the documents submitted towards meeting the Qualification Criteria. Wherever EPI has concern or apprehension regarding the authenticity/correctness of any document, EPI reserves the rights of getting the document cross verified from the document issuing authority

8.5 Tender Documents constituents and its publishing:

Complete bidding documents consisting of the following can be viewed/ downloaded from the website of CPP Portal: <https://etenders.gov.in/eprocure/app> till the Bid Due Date & Time. However, information about the location of the Bidding Document shall also be available on the websites of EPI: www.engineeringprojects.com

Volume 1:	Notice Inviting Tender (NIT) with all Annexures
Volume 2:	Additional Conditions of Contract (ACC), General Conditions of Contract (GCC)
Volume 3:	Scope of Work, Technical Specifications, Drawings and other relevant documents
Volume 4:	Price Bid

9. Bid Participation Procedure:

9.1 General

Interested bidders have to enrol themselves in CPP Portal: <https://etenders.gov.in/eprocure/app> (hereinafter referred to as the 'portal') to participate in the bidding under this invitation for bids. Also, Tender documents consisting of the following are available on the website of EPI: www.epi.gov.in

They may obtain further information regarding this tender from the Inviting Authority at the address given in NIT from 9:00 hours to 17:00 hours on all working days till the last date of online submission of Bidding Documents.

The intending bidders not registered on the portal mentioned above with CPP/ Govt. of India are required to get registered beforehand. If needed they can be imparted training on online tendering process as per details available on the portal. The intending tenderer must have class-III digital signature to submit the tender.

For proper uploading of the bids on the portal, it shall be the sole responsibility of the bidders to apprise themselves adequately regarding all the relevant procedures and provisions as detailed at the portal as well as by contacting the Portal, as and when required, for which contact details are mentioned above. The EPI in no case shall be responsible for any issues related to timely or properly uploading/submission of the bid in accordance with the relevant provisions of Section Instruction to Bidders of the Bidding Documents.

9.2 Validity of Tender:

The Tender for the works shall remain open for acceptance for a period of ninety (90) days from the date of opening of Price Bid of Tenders. The earnest money will be forfeited without any prejudice to any right or remedy, in case the bidder withdraws his Tender during the validity period or in case he changes his offer to his benefits, which are not acceptable to EPI. The validity period may be extended on mutual consent.

9.3 Disputes in submission:

Bidders in their own interest are requested to upload/submit their bid well in time. In the event of failure in the bidder's connectivity with the above-mentioned CPP Portal during the last few hours, the bidder is likely to miss the deadline for bid submission. Due date extension request due to above reason may not be entertained.

No Manual Bids/Offeres shall be permitted. The offers submitted through the designated e-tendering system shall only be considered for evaluation & ordering. Bids submitted

in physical form or sent in any other form such as through Fax / E-Mail / CD/DVD/Pen Drive etc. shall not be accepted.

9.4 Corrigendum / Addendum:

Bidding Document along with NIT, all corrigendum, addendum, time extension, clarifications, pre- bid queries, etc. to the NIT / bid documents shall be uploaded in the website <https://eprocure.gov.in/eprocure/app> only. Bidders should regularly visit the above website to keep themselves updated and submit their Bids based on latest information. All Corrigendum and addendum are to be uploaded duly signed & stamped with tender documents as bid Annexure. No extension in the bid due date / time shall be considered on account of delay in receipt of any document by mail/post.

9.5 Extension of Tender:

EPI reserves the right to extend the date of submission of the tender or cancel the tender or accept any tender or reject any or all tenders or annul this tendering process without assigning any reason and liability whatsoever and to re-invite tender at its sole discretion.

9.6 Date of opening if on holiday:

In case of any unscheduled holiday taking place on the last day of submission of tender, the next working day will be treated as scheduled day and time for submission of Tender.

9.7 Post-opening Procedure:

E-Bids must be submitted/ uploaded along with scanned copies of relevant documents pertaining to **Clause no. 12** under Single Stage Two Envelope Bidding Procedure on the CPPP Portal on or before the last date and time of online bid submission. Late bids will not be accepted. Under the above procedure, only the first envelope (Technical Part) shall be opened in the presence of the bidders' representatives who choose to attend in person at the address given below on schedule date and time of bid opening or may be viewed by the bidders by logging in to the portal as per features available to them. Second envelope i.e., Price part shall be opened of technically qualified bidders.

9.8 Rates to be firm:

The rates quoted by the bidder shall be firm and fixed for the entire period of completion and till handing over of the work. No revision to rates or any escalation shall be allowed on account of any increase in prices of materials, labour, POL and Overheads etc during the entire contract period or extended contract period.

9.9 Tie Tender:

In case of tie-tender, where two firms are bidding lowest, EPI reserves the right to split the work among these bidders and / or EPI will reserve the right to award the tender to any one of such bidders.

9.10 Authentication:

Bidder shall furnish an affidavit in the prescribed format of Annexure IV towards the authenticity of submitted documents. The affidavit should be duly signed by the authorized signatory of Bidder holding Power of Attorney for signing of Bid.

Proprietorship/ Partnership firms shall submit the undertaking, duly signed by Proprietor or any two Partners.

9.11 Rejection of Bid:

- a) Notwithstanding anything stated in the tender, EPI reserves the right to assess the capabilities and capacity of the Bidder to perform the contract using in-house information and past performance, in the overall interest of EPI. In case, Bidder capabilities and capacities are not found satisfactory, EPI reserves the right to reject the tender.
- b) The Tenders shall be strictly as per the conditions of contract. Tenders with any additional condition(s)/modification(s) shall be rejected.
- c) The acceptance of Tender will rest with EPI. Tenders in which any of the prescribed conditions are not fulfilled or found incomplete in any respect are liable to be rejected.

9.12 Disqualification:

The Bidders may note that they are liable to be disqualified and not considered for the opening of Price Bid if;

- a) Representation in the forms, statements and attachments submitted in the pre-qualification document are proved to be incorrect, false and misleading.
- b) They have submitted incompletely filled in formats without attaching certified supporting documents and credentials to establish their eligibility to participate in the Tender.
- c) If the Bidder attempts to influence any member of the committee. EPI reserves its right to take appropriate action including disqualification of Bidder(s) as may be deemed fit and proper by EPI at any time without giving any notice to the contractor in this regard. The decision of EPI in the matter of disqualification shall be final and binding on the Bidder.
- d) In case, any document, information and/or certificate submitted by Bidder is found to be incorrect/false/fabricated or the Bidder has breached the terms and conditions of Integrity Pact, EPI at its discretion may disqualify /reject / terminate the Bidder, forfeit the EMD and the Bidder shall also be liable to be suspended/ debarred for a period which shall be not less than one year extending till maximum for a period of three years.
- e) In case any bidder is found to be involved in cartel formation, his bid will not be considered for evaluation/ placement of order. Such a bidder will be debarred from bidding in future.
- f) Canvassing in any form by the Bidder or by any other Bidder on their behalf may lead to disqualification of their Bid.
- g) In case of existing contractors of EPI, if progress is not satisfactory in any of the project their bid will be rejected.
- h) For any addition, deletion or alteration to the content of the tender document downloaded from the portal/website, bid will be rejected.

9.13 Declaration on Blacklisting status:

The Bidder should not be currently declared ineligible/ suspended/ blacklisted/ banned debarred by EPIL or by any Central/ State Government Department/ public undertaking or Enterprise of Central/ State Government and such ban should not be in force at the time of submission of the Bid or extended deadline for submission of bid.

9.14 Suspension of Business Dealings:

EPI shall be bound to suspend/ban any business dealing with any such bidder who defaults/ deviates from the terms of tender/contract without any reasonable cause, is responsible for loss of business/money/reputation to EPI, indulges in malpractices, cheating, bribery, fraud or any other misconduct or formation of cartels so as to influence the tendering process or influence the price. Suspension of business dealing involves putting a bidder on bench or banning a bidder for business with EPI for particular periods not less than one (1) year extending utmost till (3) years.

9.15 Hiring of Skilled Workforce under Skill India Campaign:

Bidders must submit documentary evidences of having formally certified skilled workforce or commitment by the bidders/ service providers to the effect that they would ensure that all their workers would be skilled through Recognition of Prior Learning (RPL) within two months from the date of commencement of work under the project, at the cost of the service provider/vendor.

9.16 Public Procurement (preference to Make in India) Policy:

- a) For Promotion of Public Procurement (Preference to Make In India) order 2017 (Revised Order dated 16.09.2020) GOI Guideline for procurement, the equivalent Indian makes of materials conforming to requisite quality in addition to List of Makes/Brands may be considered subject to approval of Client/Engineer.
- b) All the bidders (Class-I local supplier, Class-II local Supplier, Non-Local Supplier) shall provide the percentage of local content in their bid as per as per the **Annexure – X**.
- c) Definitions of the terms used in this regard shall be as follows:
 - i. "Local content" means the amount of value added in India in the total value of the item procured) excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.
 - ii. "Class-I local supplier" means supplier or services provider, whose goods, services or works offered for procurement, meets the minimum local content i.e., 50% of total value of the goods, services or works.
 - iii. "Class-II local supplier" means supplier or services provider, whose goods, services or works offered for procurement, meets the minimum local content i.e., 20% of total value of the goods, services or works.
 - iv. "Non- Local supplier" means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than that prescribed for "Class-II Local Supplier" as mentioned above.

- d) Purchase preference will be given to Class-I local supplier as the case may be as detailed below:
- i. Among all qualified bids the lowest bid will be termed as L1. If L1 is Class-I Local Supplier the contract for full quantity will be awarded to L1.
 - ii. If L1 is not Class-I Local Supplier, the lowest bidder among the Class-I Local supplier, will be invited to match the L1 price subject to Class-I Local supplier's quoted price falling within the margin of purchase preference (L1+20%) and the contract shall be awarded to such Class-I Local supplier subject to matching the L1 price.
 - iii. In case such lowest eligible Class-I Local supplier fails to match the L1 price, the Class-I Local supplier with the next higher bid within the margin of purchase (L1+20%) preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the Class-I Local supplier within the margin of purchase preference (L1+20%) matches the L1 price, the contract may be awarded to the L1 bidder.
 - iv. Class-II Local Supplier will not get purchase preference in any procurement, undertaken by procuring entities.
- e) In case of false declarations by a bidder which is found in later stage, the bidder can be debarred for up to two years as per rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law. A supplier / vendor who have been debarred by any procuring entity for violation of Public Procurement order shall not be eligible for preference under this order for procurement by any other procuring entity for the duration of the debarment.

10. Tendering Restrictions Due to Relatives in EPI Positions:

The tenderer shall not be permitted to Tender for works if his near relative is posted as an Assistant Manager or any higher ranks in the concerned Regional Office of EPI. The bidder shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any of the officers in EPI. Any breach of this condition by the tenderer would render him liable to the withdrawal of the work awarded to him and forfeiture of Earnest Money and Security Deposit. This may also debar the bidder from tendering for future works under EPI.

No employee of EPI of the rank of Assistant Manager and above is allowed to work as a Contractor or as an employee of a Contractor having interest in EPI for a period of two years after his retirement/relief from the service of EPI, without the prior permission of EPI in writing. In such cases contract is liable to be cancelled if either the Contractor or any of his employee is found at any time to be such a person who had not obtained the permission of EPI as aforesaid before submission of the Tender or engagement in the Contractor's service.

11. List of Documents to be submitted:

Bidders shall submit the following documents duly signed and stamped with proper indexing and pagination as the technical bid. Only online mode will be accepted for tender submission. Requisite original documents may be asked from bidders as and when required by EPI i.e. power of attorney (if required), affidavit, undertaking etc.

MANDATORY DOCUMENTS

S. No.	Document Details	Proforma No.	NIT Clause	To be given in
1	Documentary evidence with regards to deposition of Tender Fees.		4	
2	Documentary evidence with regards to deposition of Earnest Money Deposit (EMD) as per NIT. In case, the bidder submits EMD in form of Bank Guarantee, DD, Bankers Cheque, etc. then physical submission of Original EMD is to be ensured within the due date & time of opening of technical bid	Annexure XIV/ Annexure XV	5	
3	Letter of Undertaking	Annexure - I		Company Letterhead
4	Form of Tender	Annexure - II		Company Letterhead
5	Memorandum	Annexure - III		As mentioned in the clause
6	Affidavit along with supporting Power of Attorney/ Board Resolution/ Company Registration Certificate/ Memorandum and Articles of Association/ Partnership Deed.	Annexure - IV	8.1	Rs.100/- Stamp paper
7	Experience/ Completion/ performance certificates of completed similar works with work order/ Letter of Award/ Letter of Intent, Certified final bill/ proof of payment as per clause(s) of Technical Criteria.		6.1	Self-attested
8	Financial Details with documents as per clause(s) of Financial Criteria.	Annexure - VI	6.3	As mentioned in clause
9	Self-certified Copy of Bankers certificate OR Net Worth Certificate.	Annexure - VII	6.3 (c)	As mentioned in clause

OTHER DOCUMENTS REQUIRED WITH BID FOR QUALIFICATION

S. No.	Document Details	Proforma No.	NIT Clause	To be given in
10	Director's details	Annexure - V	8.1	Company Letterhead
11	Undertaking for Procurement from Border Sharing Countries	Annexure - VIII	8.2	Company Letterhead
12	Site Visit Declaration	Annexure - IX	8.3	Company Letterhead

S. No.	Document Details	Proforma No.	NIT Clause	To be given in
13	Declaration in respect of local content for Public Procurement (Preference to Make in India) order 2017 (Revised Order dated: 16.09.2020) GOI Guideline	Annexure - X	9.15	As mentioned in the Clause
14	Valid PF and ESI Registration.			Self-attested
15	Copy of Permanent Account Number (PAN) and GST Registration Certificate.			Self-attested
16	All pages of the Tender document along with Addendum/ Corrigendum (if any) duly signed by the authorized signatory.			Self-attested
17	General Information	Annexure - XI		Company Letterhead
18	Declaration of Blacklisting Status	Annexure - XII	9.13	Company Letterhead
19	Documentary evidences of having formally certified skilled workforce or commitment by the bidders / service providers to the effect that they would ensure that all their workers would be skilled through Recognition of Prior Learning (RPL) within two months from the date of commencement of work under the project.	Annexure - XIII	9.15	Company Letterhead

12. Bidders may obtain further information regarding this tender at the address given below from 10:00 hours to 17:00 hours on all working days till the last date of online submission of Bidding Documents.

Additional General Manager (Contracts),

Engineering Projects (India) Limited,
6A Bakhtawar
Nariman Point
Mumbai – 400021
Tel No. 022-22026347
E-mail – wro-contracts@epi.gov.in

13. Contact details for site related Queries/ Visit:

Sh. S.N. Maharana, Addl. General Manager

Engineering Projects (India) Limited
Opposite Ramji Mandir, Junagram
Fort Songardh – 394670

E-mail: epi-fgdukai@epi.gov.in

Mob. No. 9348317133

LETTER OF UNDERTAKING
(TO BE ENCLOSED IN ENVELOPE-1 ALONG WITH EMD) (TO BE TYPED ON LETTER
HEAD)

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”.

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

UNDERTAKING FOR ACCEPTANCE OF TENDER CONDITIONS

1. The Tender Documents for the work as mentioned in “Memorandum” to “Form of Tender” have been issued to me/ us by ENGINEERING PROJECTS (INDIA) LIMITED and I/ We hereby unconditionally accept the tender conditions and Tender Documents in its entirety for the above work.
2. The contents of clause of the Tender Documents have been noted where in it is clarified that after unconditionally accepting the tender conditions in its entirety, it is not permissible to put any remark(s)/condition(s) (except unconditional rebate on price, if any) in the ‘Price-Bid’ and the same has been followed in the present case. In case this provision of the Tender is found violated at any time after opening ‘Price-Bid’, I/ We agree that my/our tender shall be summarily rejected and EPI shall, without prejudice to any other right or remedy be at liberty to forfeit the full said Earnest Money absolutely.
3. The required Earnest Money for this work is enclosed herewith.

Yours faithfully,

Authorized Signatory
Seal of Tenderer

Dated:

FORM OF TENDER
(TO BE TYPED ON LETTER HEAD)

SUB: Tender for “**Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works**” on EPC mode for the project **Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS**”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

1. We hereby tender for execution of work as mentioned in “Memorandum” to this “Form of Tender” as per Tender Documents within the time schedule of completion of work as per separately signed and accepted rates in the Bill of Quantities quoted by us for the whole work in accordance with the Notice Inviting Tender, Conditions of Contract, Specifications of materials and workmanship, Bill of Quantities Drawings, Time Schedule for completion of jobs, and other documents and papers, all as detailed in Tender Documents.
2. It is agreed that the time stipulated for jobs and completion of work in all respects and in different stages mentioned in the “Time Schedule for completion of jobs” and signed and accepted by us is the essence of the contract. We agree that in case of failure on my/ our part to strictly observe the time of completion mentioned for jobs and the final completion of work in all respects according to the schedule set out in the said “Time schedule for completion of jobs” and stipulations contained in the contract, the recovery shall be made from us as specified therein. In exceptional circumstances extension of time which shall always be in writing may, however be granted by EPI at its entire discretion for some items, and We agree that such extension of time will not be counted for the final completion of work as stipulated in the said “Time schedule of completion of jobs”.
3. We agree to pay the Earnest Money, Security Deposit cum Performance Guarantee, Retention Money and accept the terms and conditions as laid down in the “Memorandum” to this “Form of Tender”.
4. Should this Tender be accepted, We agree to abide by and fulfill all terms and conditions referred to above and as conditioned in Tender Documents elsewhere and in default thereof, allow EPI to forfeit and pay EPI, or its successors or its authorized nominees such sums of money as are stipulated in the Tender Documents.
5. We hereby pay the earnest money amount as mentioned in the “Memorandum” to this “Form of Tender” in favour of Engineering Projects (India) Limited payable at place as mentioned in the “NIT/ITT”.
6. If I/we fail to commence the work with issue of Letter for Commencement of Work and / or I/We fail to sign the agreement as per Clause 84 of General Conditions of Contract

and/or I/We fail to submit Security Deposit cum Performance Guarantee as per Clause 9.0 & 9.1 of General Conditions of Contract, I/We agree that EPI shall, without prejudice to any other right or remedy, be at liberty to cancel the Letter of Acceptance (LOA) and to forfeit the said earnest money as specified above.

7. We are also enclosing herewith the Letter of Undertaking on the prescribed proforma as referred to in condition of NIT.

Date theday of

SIGNATURE OF TENDERER

NAME (CAPITAL LETTERS)

OCCUPATION

ADDRESS

SEAL OF TENDERER

**MEMORANDUM
(ENCLOSURE TO FORM OF TENDER)**

SUB: Tender for “**Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works**” on EPC mode for the project **Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS**”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

S. No.	Description	Cl. No.	Values/Description to be applicable for Relevant clause(s)
i)	Name of work	NIT	Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”
ii)	Name of Owner/ Client	NIT	Gujarat State Electricity Corporation Limited (GSECL)
iii)	Type of Tender	NIT	Lumpsum Tender
v)	Earnest Money Deposit	NIT	Rs. 17,34,000.00 (Rupees Seventeen Lakh Thirty Four Thousand Only)
vi)	Time for completion of work	NIT	Total work to be completed in 10 (Ten) in accordance with the time schedule of completion of work in the Tender Documents.
vii)	Mobilization Advance	ACC	NA
viii)	Interest Rate on Mobilization Advance	ACC	NA
ix)	Recovery of Mobilization Advance	ACC	NA
x)	Validity of Tender	NIT	90 (Ninety) Days
xi)	Security Deposit cum Performance Guarantee	ACC	10% (Ten Percent only) of the contract value of the accepted tender within 21 (twenty one) days from the date of issue of Purchase Oder (PO)/ Letter of Acceptance (LOA). If required, any extension of time beyond 21 days and up-to 60 days may be granted by the Competent Authority. However, a penal rate of interest @ 12% per annum shall be charged for the delay in submission of Security Deposit after 21 (twenty one) days i.e. from 22nd day to the date of submission of Security Deposit but within 60 days after the date of issue of PO/ LOI. Further, if 60th day happens to be declared holiday in the concerned office of EPI, submission of Security Deposit can be

S. No.	Description	Cl. No.	Values/Description to be applicable for Relevant clause(s)
			<p>accepted on the next working day.</p> <p>The SDPG shall be submitted in the form of Bank Guarantee (format enclosed), from any Nationalized bank / Scheduled Bank / Commercial Bank or in the form of Insurance Security Bonds or Account Payee Demand Draft or Fixed Deposit Receipt or online Payment in an acceptable form. This SDPG shall be initially remain valid upto 90 (ninety) days after the end of Defect Liability Period (DLP). In case, the time for completion of work gets extended, the contractor shall get the validity of SDPG extended to cover such extended time for completion of work plus DLP plus 90 days.</p> <p>In case, even after 60 days from the date of issue of PO/ LOI, the Bidder fails to submit the Security Deposit of the requisite amount, PO/ LOI will stand withdrawn and EMD of the Bidder shall be forfeited.</p>
xii)	Retention Money	ACC	NA
xiii)	Time allowed for starting the work	ACC	The date of start of contract shall be reckoned within 10 days from the date of issue of letter of Acceptance.
xiv)	Defect Liability Period	ACC	12 (Twelve) Months from the date of Successful commissioning or 18 (Eighteen) Months from date of completion of supply whichever is earlier.
xv)	Arbitration	ACC	Arbitration shall be as per provisions of ACC. The Venue of Arbitration shall be Mumbai.
xvi)	Jurisdiction	ACC	Courts in Mumbai

SIGNATURE OF TENDERER
NAME (CAPITAL LETTERS)
OCCUPATION
ADDRESS

SEAL OF TENDERER

Annexure – IV

(To be submitted by bidder on non-judicial stamp paper of ₹ 100/- (Rupees Hundred only)

duly attested by Notary Public)

(To be submitted in Envelop-1 i.e. Technical bid)

AFFIDAVIT

Affidavit of Mr ----- So ----- R/o -----.

I, the deponent above named do hereby solemnly affirm and declare as under:

1. That I am the Proprietor/Authorized signatory of M/s ----- having its Head / Regd. Office at -----.

2. That the information/documents/Experience certificates submitted by M/s ----- along with the tender for ----- (Name of work) ----- To EPI are genuine, true and nothing has been concealed.

3. I shall have no objection in case EPI verifies them from issuing Authority (ies). I shall have no objection in providing the original copy of the document (s), in case EPI demand so for verification.

4. I hereby confirm that in case, any document, information & / or certificate submitted by me found to be incorrect / false / fabricated, EPI at its discretion may disqualify / reject / terminate the bid / contract and also forfeit the EMD / All dues.

5. I shall have no objection in case EPI verifies any or all Bank Guarantee (s) under any of the provision of bid/Contract including those issued towards EMD and Performance Guarantee from the Zonal Branch/ office issuing Bank and I / We shall have no right or claim on submitted EMD before EPI receives said verification.

6. That any credentials/documents and the Bank Guarantee (s) submitted against the EMD issued by (name and address of the Bank) are genuine and if found at any stage to be incorrect / false / fabricated; in such case EPI is free to reject our bid/cancel pre-qualification and debar us from participating in any future tender for three years.

I, -----, the Proprietor / Authorised signatory of M/s ----- do hereby confirm that the contents of the above Affidavit are true to my knowledge and nothing has been concealed there from ----- and that no part of it is false.

Verified at ----- this ----- day of -----

DEPONENT

ATTESTED BY (NOTARY PUBLIC)

UNDERTAKING

(To be submitted in company Letter Head)

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

This is to confirm that the following persons are the present Directors of the company/ firm:

1.

2.

.

It is further confirmed that none of the above Directors is associated with any other company/firm which is quoting for the above referred tender of EPI.

The details of constitution of M/s is submitted alongwith this Annexure.

In case, at any later stage the above information is found incorrect, EPI can cancel our BID/ LOI/ Contract Agreement and may take any suitable action deemed fit against our company.

Authorised Signatory

Date

Name & Seal of the Company

FINANCIAL DETAILS

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

MANDATORY INFORMATION DOCUMENTS:

		1 st FY ₹ (In Lakh)	2 nd FY ₹ (In Lakh)	3 rd FY ₹ (In Lakh)	4 th FY ₹ (In Lakh)	5 th (& last) FY ₹ (In Lakh)
		A	B	C	D	E
i)	Profit/Loss					
ii)	Gross Annual Turnover of Previous 5 financial years ending as on last day of the preceding Financial Year.					
iii)	Average Annual Turnover for previous 3 financial years (₹ in Lakh) = $(a+b+c)/3$					
iv)	Net Worth (paid up capital +reserves) as on last day of the preceding Financial Year.					
v)	Bank Solvency amount as mentioned in the Bank Solvency Certificate.					

1. Summarized page of Audited Profit & Loss Account of previous five Financial Years duly certified by the chartered account, is to be submitted.
2. Summarized page of Audited Balance Sheet of last Financial Year (ending on last day of the preceding Financial Year) duly certified by the chartered is to be submitted.

Signature of Chartered Accountant with Seal
Unique Document Identification Number (UDIN)

Seal and Signature of bidder

BANKERS' CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s./Sh..... having marginally noted address,.....as a Customer of our bank are/ is respectable and can be treated as good for any engagement upto a limit of Rs. (Rupees.....)

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature) For the Bank

NOTE:

1. Bankers Certificates should be on letter head of the Bank, addressed to tendering authority.
2. In case of Partnership firm, certificate should include names of all partners as recorded with the Bank.

OR

FORM FOR CERTIFICATE OF NET WORTH FROM CHARTERED ACCOUNTANT

"It is to certify that as per the audited balance sheet and profit & loss account during the financial year

....., the Net Worth of M/s (Name &Registered Address of individual/firm/ company), as on (the relevant date) is ₹ after considering all liabilities. It is further certified that the Net Worth of the company has not eroded by more than 30 % in the last three years ending on (the relevant date)."

Unique Document Identification Number (UDIN)

Signature of Chartered Accountant
Name of Chartered Accountant
Membership No. of ICAI Date and Seal

Undertaking for Procurement from Border Sharing Countries

[In Company's letterhead]

SUB: Tender for "Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works" on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS"

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or if from such a country, has been registered with EPI and will not sub-contract any work to a contractor from such countries unless such contractor is registered with EPI.

I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered.

Authorized Signatory

Date:

Name & Seal of the Company

Site Visit Declaration

(To be given in Company Letterhead)

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

Dear Sir,

I/We ----- Undersigned visited the project site on -----
----- and collected all the required information and data regarding the site conditions and existing facilities.

Yours faithfully,

(Signature of the Tenderer)
Seal of Tenderer

Dated

Public Procurement (Preference to Make in India)

[For Contracts with Estimated Cost above ₹ 10.00 Cr., certificate is to be given by Statutory Auditor in his letterhead]

UNDERTAKING

LOCAL CONTENT CERTIFICATE

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

"We the statutory auditor (or as the case may be) of M/s. (Name of the bidder) hereby certify that M/s.....(Name of the bidder) meet the mandatory local content requirements of the tender as per Public Procurement (Preference to Make in india) - Local Content policy quoted vide offer no.....dated..... against EPI NIT No..... dated..... by M/s.....(Name of the bidder). The percentage of local content in the bid is.....% and the items offered in the bid meets the minimum local content and party shall give details of the location (s) at which the local value addition is made".

Name & Seal of the Statutory Auditor

BIDDERS INFORMATION

(All the bidders must submit the document with filled in data with their offer in Technical bid)

Company Name*	
Registration Number*	
Registered Address*	
Name of Partners/Directors	
Bidder type* Indian/Foreign	
City*	
State*	
Country*	
Postal code*	
PAN/TAN Number*	(PAN/TAN number must have 10 characters. e.g. AESTG2458A) For bidders who do not have PAN/TAN number may enter TEMPZ9999 as the PAN/TAN number.
Company's Establishment Year	
Company's Nature of business*	
Company's Legal status* Limited company/ Undertaking/ Joint venture/ Partnership/ others	
Company Category* Micro unit as per MSME/ Small unit as per MSME/ Medium unit as per MSME/ Ancillary unit/ Project of affected person of this company/ SSI/ other	
Contact Details	
Enter Company's Contact Person Details	
Title * Mr/Mrs/Dr/Shree/Ms	
Contact Name*	
Date of Birth* (DD/MM/YYYY)	
Correspondence Email*	(Correspondence Email ID can be same as your Login ID. All The mail correspondence will be sent only to the Correspondence Email ID.)
Designation	
Phone *	(Phone details eg: +91 044 22272449)
Mobile*	

BANKER DETAILS

PAN NO*	
GST No*	
ACTIVE BANK A/C DETAILS*	
A/C NO*	
A/C TYPE*	
BRANCH ADDRESS*	
IFSC *	

***Mandatory information (must be filled by the bidders)**

Declaration for Non - Blacklisting Status
(To Be Enclosed in Letter Head)

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

I/We ----- hereby certify that we are not declared ineligible/ suspended/ blacklisted/ banned/ debarred by EPIL or by any Central/state Government Department/public undertaking or Enterprise of Central/state Government at the date of submission of our bid.

Yours faithfully,

(Signature of the Tenderer)
Seal of Tenderer

Dated:

DECLARATION FOR CERTIFIED SKILLED WORKFORCE

SUB: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation , Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

NIT No: EPI/WRO/CON/968/342 dated: 30.05.2025

We, certify that we shall submit documentary evidence of having formally certified skilled workforce within two months from the date of commencement of work under the project.

OR

We, undertake that all our workers would be skilled through Recognition of Prior Learning (RPL) within two months from the date of commencement of work under the project.

(Signature of the Tenderer)

BANK GUARANTEE IN LIEU OF EARNEST MONEY DEPOSIT

In consideration of Chairman & Managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, Lodhi Road, New Delhi Pin- 110003. (Hereinafter called the EPI) having agreed to accept bank Guarantee of ₹..... in lieu of EARNEST MONEY DEPOSIT from (Hereinafter called the Supplier/ Contractor/ Sub-Contractor, which expression shall include its heirs, successors and assignees) in respect of the Tender for

We, bank having its registered/head office at (hereinafter referred to as the Bank) do hereby agree and undertake to pay to EPI without demur or protest an amount not exceeding ₹ on demand by EPI.

We the above said Bank further agree and undertake to pay the said amount of ₹..... without any demur on demand within 48 hours. Any demand made on the Bank by EPI shall be conclusive as regards the amount due and payable by the Bank under this guarantee.

We the above said Bank further agree that the guarantee herein contained shall be in full force and in effect until date Unless a demand or claim under this guarantee is made on us in writing on or before..... date, we shall be discharged from all liabilities under this guarantee thereafter.

We, the above said Bank, further agree that EPI shall have full liberty, without our consent and without affecting in any manner our obligation to verify, modify or delete any of the conditions. We, the above said Bank, lastly undertake not to revoke this guarantee during its currency except with the prior consent of EPI in writing.

Dated.....this day of.....202x.

For and on behalf of the Bank

NOTE: on a Non-Judicial stamp paper of ₹ 100/- (Rupees One hundred only)

INSURANCE SURETY BONDS IN LIEU OF EARNEST MONEY DEPOSIT

In consideration of Chairman & Managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, Lodhi Road, New Delhi Pin- 110003. (Hereinafter called the EPI) having agreed to accept Insurance Surety Bond of ₹..... in lieu of EARNEST MONEY DEPOSIT from (hereinafter called the Bidder, which expression shall include its heirs, successors and assignees) in respect of the Tender for.....

We, (name of Surety Insurer) having its registered/head office at(hereinafter referred to as the Surety Insurer) do hereby agree and undertake to pay to EPI without demur or protest an amount not exceeding ₹..... on demand by EPI.

We the above said Surety Insurer further agree and undertake to pay the said amount of ₹..... without any demur on demand within 48 hours. Any demand made on the Surety Insurer by EPI shall be conclusive as regards the amount due and payable by the Surety Insurer under this Insurance Surety Bond.

We the above said Surety Insurer further agree that the guarantee herein contained shall be in full force and in effect until date unless a demand or claim under this guarantee is made on us in writing on or before..... date, we shall be discharged from all liabilities under this Insurance Surety Bond thereafter.

We, the above said Surety Insurer, further agree that EPI shall have full liberty, without our consent and without affecting in any manner our obligation to verify, modify or delete any of the conditions. We, the above said Bank, lastly undertake not to revoke this Insurance Surety Bond during its currency except with the prior consent of EPI in writing.

Dated.....this day of.....20XX.

For and on behalf of the Surety Insurer

NOTE: on a Non-Judicial stamp paper of ₹ 100/- (Rupees One hundred only)

Bidder Registration Module

To enroll as a bidder click on the **Online Bidder Enrollment** link.

The screenshot displays the Government E-Procurement System (Demo) website. The header features the Government of India emblem, the system name, and navigation links. A sidebar on the left contains various menu items. The main content area includes a welcome message, a table of latest tenders, a table of latest corrigendums, and a section for the certifying agency. The right sidebar contains user login fields, a captcha, and links for bidder enrollment and password management.

Government E-PROCUREMENT System (Demo)

02-Apr-2020 | Search | Active Tenders | Tenders by Closing Date | Corrigendum | Results of Tenders | Home | Contact Us | SiteMap

Government eProcurement System

MIS Reports

Tenders by Location

Tenders by Organisation

Tenders by Classification

Tenders in Archive

Tenders Status

Cancelled/Retendered

Downloads

Debarment List

Debarment List

Announcements

Recognitions

Site compatibility

Welcome to eProcurement System

The eProcurement System enables the Tenderers to download the Tender Schedule free of cost and then submit the bids online through this portal.

Latest Tenders

Tender Title	Reference No	Closing Date	Bid Opening Date
1. OCB_CKICP_MC_1_EPC_12_01	OCB/ CKICP/ MC-1/EPC-12/01	13-May-2020 02:00 PM	13-May-2020 03:00 PM
2. Triple cell RCC Box culvert	Tender14201920CMDPDODated 03.03.2020	13-Apr-2020 03:00 PM	15-Apr-2020 03:00 PM

Latest Tenders updates every 15 mins.

Latest Corrigendums

Corrigendum Title	Reference No	Closing Date	Bid Opening Date
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Latest Corrigendum updates every 15 mins.

Certifying Agency

STQC

User Login

Login ID *

Captcha *

Login

Online Bidder Enrollment

Generate / Forgot Password?

Find My Nodal Officer

Search with ID/Title/Reference no

Tender Search

Go

Advanced Search

Help For Contractors

Information About DSC

FAQ

Feedback

Bidders Manual Kit

The system leads to the page where the details of the bidders are to be filled in. There are preferential categories for the preferential bidders who can avail the privileges that are provided. The Preferential categories are Make in India, MSME and STARTUP. The bidders first has to click on the check box of Preferential Bidder to select the Preferential Category.

The screenshot displays the Government E-Procurement System (Demo) interface. The header includes the system name, date (02-Apr-2020), and navigation links. The left sidebar contains various menu items. The main content area is titled "Online Enrollment of Corporate/Bidder" and contains a form with several sections:

- Login Information:** Fields for Login Id, Correspondence Email, and Mobile number.
- Email ID and Mobile No Policy:** A box containing two points: 1. As Mobile and Email are the modes of correspondence, ensure that mobile no and email id provided are correct. 2. The verification codes are valid for 900 seconds from the time Send Verification Code is clicked.
- Company Details:** A section with a blue border containing:
 - Company Name *
 - Preferential Bidder: ☒ Yes
 - Preference Category * (Dropdown menu with options: Make in India, -Select-, Make in India, MSME, STARTUP)
 - Registration Number *
 - Registered Address *
- Other Fields:** Name of Partners / Directors, BidderType (radio buttons for Indian and Foreign), City *, State * (dropdown), and Postal Code *.

The details of the bidder are entered in the Online Enrollment of Corporate/Bidder page. The Correspondence Email id and the Mobile Number should be a valid email id and a valid mobile number because further contacts will be only through this mobile number and correspondence email id.

Online Enrollment of Corporate/Bidder

Login Id * biddertest2@gmail.com

Enter email address for login id. eg: abc@nic.com
(Care may be taken to enter valid e-mail ID. This information will be kept confidential. The login ID cannot be modified once registered.)

Correspondence Email* biddertest2@gmail.com

(Correspondence Email ID can be same as your Login ID.)

Mobile* IND (91) 99

Email ID and Mobile No Policy

Email and mobile must comply following requisites,

1. As **Mobile** and **Email** are the modes of correspondence, ensure that mobile no and email id provided are correct.
2. The verification codes are valid for **900** seconds from the time **Send Verification Code** is clicked.

Company Details

Company Name * Sai Private Limited.

Preferential Bidder: ☒ Yes

Preference Category* Make in India

Registration Number * A123456Z

Registered Address* Chennai

Name of Partners / Directors

BidderType* ☒ Indian ☐ Foreign

City * Chennai

State* Tamil Nadu

Postal Code* 123456

PAN/TAN Number * AESTG2458A

PAN/TAN number must have 10 characters. For eg: AESTG2458A

Page
1

Once after filling the details, the bidder enters the Captcha and clicks on the **Submit** Button to submit the provided details.

For Bidders who do not have PAN/TAN number may enter TEMPZ9999Z as the PAN/TAN number.

Establishment Year

Nature of Business*

Legal Status*

Company Category *

Contact Details

Enter Company's Contact Person Details

Title *


Contact Name*

Date Of Birth (DD/MM/YYYY)*

Designation

Phone Details eg: +91 044 22272449

Phone*

Enter Captcha 8 N J S 8 V  Refresh

Page
2

The Bidder enrollment Acknowledgement is displayed on the screen. The bidder Clicks on the **Send Verification Code** button to receive the verification code in the provided mobile number and the correspondence email id.

Bidder Enrollment AcknowledgementPrint

Login ID :	biddertest2@gmail.com
User Type :	Corporate Tenderer
Correspondence Email :	biddertest2@gmail.com
Mobile :	91-9[REDACTED]8

Company Details

Company Name :	Sai Private Limited.
Preferential Bidder :	Yes
Preference Category :	Make in India
Registration Number :	A123456Z
Registered Address :	Chennai
Name of Partners / Directors :	Nil
City :	Chennai
State :	Tamil Nadu
Postal Code :	123456
PAN/TAN Number :	AESTG2458A
Company's Establishment Year :	2010
Company's Nature of Business :	Nature of Business
Company's Legal Status :	Limited Company
Company Category :	Regd. with District Industries Centre(DIC)

Contact Details

Title :	Mr
Contact Name :	Praveen Rawat
DOB (Date Of Birth) :	12-Sep-1989
Designation :	CEO
Phone :	91 044 2[REDACTED]49

Note: The verification codes are valid for **900** seconds from the time Send Verification code is clicked

Send Verification Code

The bidder enters the Mobile Verification Code, Mail Verification Code, enters the New Password, confirms the same, enters the Captcha and clicks on the **Submit** button to submit the entered details.

Generate password

Generate password

Generate password for the login id **biddertest2@gmail.com**

Provide the verification code received through Correspondence Email/
Registered Mobile Number.

Mobile Verification Code *


Mail Verification Code *

New Password *

Confirm Password *

Enter Captcha

AAUDXC

 Refresh

New User who have not received Verification code, please click on 'Update Email ID/Mobile No' button provided in 'Generate/Forgot Password' link in the home page and ensure the provided email id and mobile no are correct.

Cancel

Submit

Email ID and Mobile No Policy

Verification code must comply following requisites,

1. Provide verification code sent to mobile in Mobile Verification code.
2. Provide verification code sent to email in Mail Verification code.

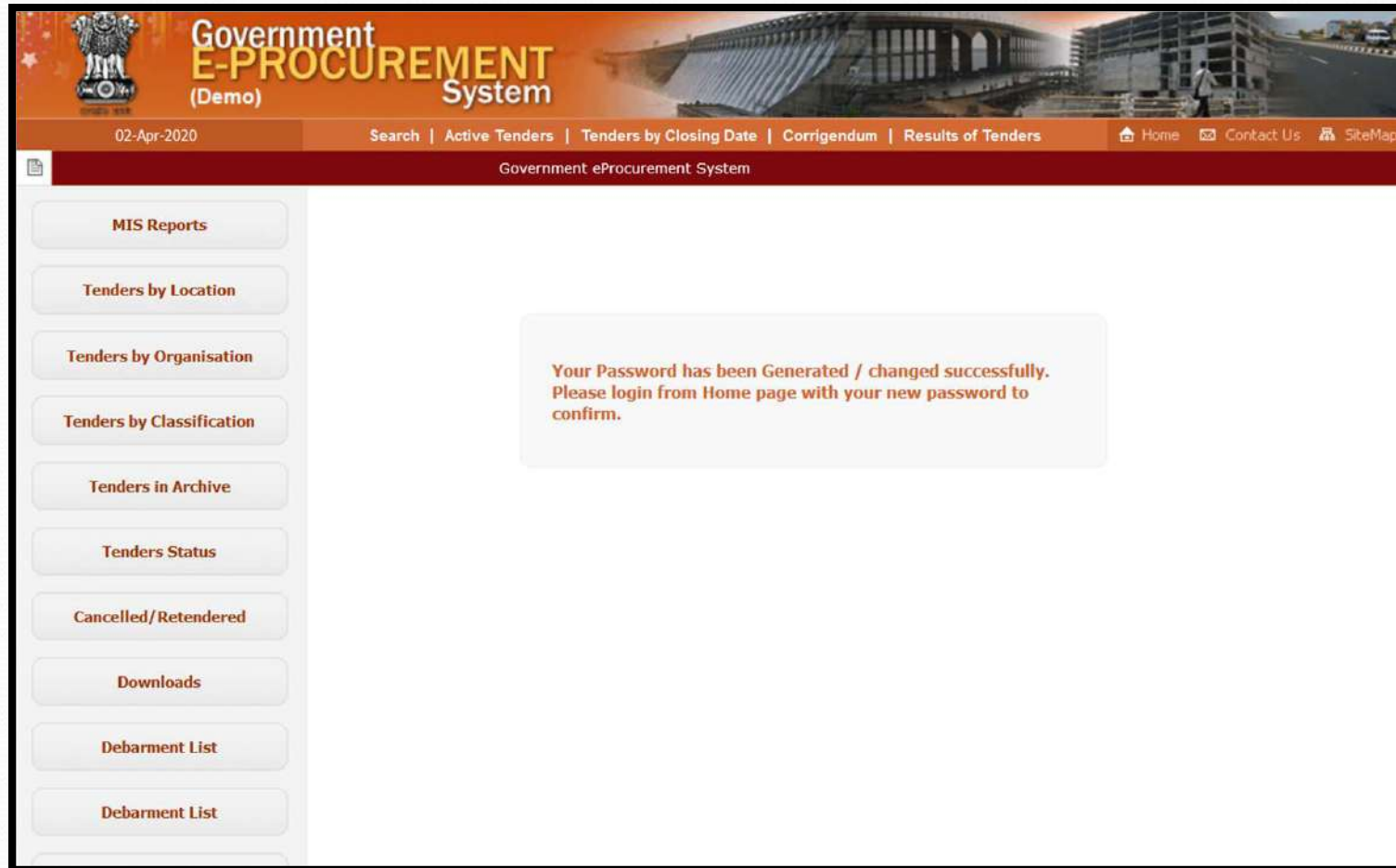
Password Policy

Your password must comply following requisites,

1. Length must be within **8 to 32** characters
2. Any **English lowercase and uppercase (a-z and A-Z)** characters
3. Any numbers between 0-9
4. Any special characters from the bracket **[! @ # \$ ^ * _ ~]**

Good eg: Cric\$2009
Bad eg: cric2009

The success message is displayed on the screen.



The bidder enters the Login Id, Captcha and clicks on the **Login** button to login to the portal.

Government E-PROCUREMENT System (Demo)

02-Apr-2020 | Search | Active Tenders | Tenders by Closing Date | Corrigendum | Results of Tenders | Home | Contact Us | SiteMap

it System

MIS Reports

Tenders by Location

Tenders by Organisation

Tenders by Classification

Tenders in Archive

Tenders Status

Cancelled/Retendered

Downloads

Debarment List

Welcome to eProcurement System

The eProcurement System enables the Tenderers to download the Tender Schedule free of cost and then submit the bids online through this portal.

Latest Tenders

Tender Title	Reference No	Closing Date	Bid Opening Date
2. Supply of Computers	03.03.2020	10-Apr-2020 09:00 AM	13-Apr-2020 09:00 AM
3. Supply of Computers	NIT/IT/2020/1234	10-Apr-2020 09:00 AM	13-Apr-2020 09:00 AM

Latest Tenders updates every 15 mins.

Latest Corrigendums

Corrigendum Title	Reference No	Closing Date	Bid Opening Date
No active corrigendums available.			

User Login

Login ID *

Captcha *

Login

Online Bidder Enrollment

Generate / Forgot Password?

Find My Nodal Officer

Search with ID/Title/Reference no

Tender Search

Go

Advanced Search

The bidder enters the password, captcha and clicks on the **Proceed** button to proceed further.

The screenshot shows the Government E-Procurement System (Demo) interface. The header includes the Government of India emblem, the system name, and a date of 02-Apr-2020. A navigation bar contains links for Search, Active Tenders, Tenders by Closing Date, Corrigendum, Results of Tenders, Home, Contact Us, and SiteMap. A sidebar on the left lists various menu items: MIS Reports, Tenders by Location, Tenders by Organisation, Tenders by Classification, Tenders in Archive, Tenders Status, Cancelled/Retendered, Downloads, and Debarment List. The main content area is titled 'User Login' and displays a welcome message for 'Sai Private Limited,'. It contains a login form with fields for Login ID (biddertest2@gmail.com), Password (masked with dots), and a Captcha (E7S4NS). Below the Captcha field is a text input for 'Captcha Text' containing 'E7S4NS'. At the bottom of the form are 'Cancel' and 'Proceed' buttons. A link for 'Generate / Forgot Password?' is also present.

Government E-PROCUREMENT System (Demo)

02-Apr-2020

Search | Active Tenders | Tenders by Closing Date | Corrigendum | Results of Tenders

Home | Contact Us | SiteMap

Government eProcurement System

MIS Reports

Tenders by Location

Tenders by Organisation

Tenders by Classification

Tenders in Archive

Tenders Status

Cancelled/Retendered

Downloads

Debarment List

User Login

Welcome Sai Private Limited,,

Login ID biddertest2@gmail.com

Password*



Captcha E7S4NS

Captcha Text* E7S4NS

Cancel Proceed

Generate / Forgot Password?

The Bidder registers the DSC by clicking on the **Signing Certificate** icon to register the signing certificate.

**Government
eProcurement
System**


Welcome : biddertest2@gmail.com
Last login : 02-Apr-2020 02:11 PM

Server Time
02-Apr-2020 14:12:06

[Home](#) [Logout](#)


Government eProcurement System


USER MANAGEMENT

 **User DSC Enrollment**

Login Id : biddertest2@gmail.com
Roles : Tenderer

You have not registered with Digital Signature Certificate yet. Please click on Signing Certificate link below.

 [Signing Certificate](#)

 [View Existing Certificates](#)

Active Certificates Information

S.No	Certificate	Certificate Type	Type	Validity	Enroll Date	View
No certificates have been enrolled.						


The Bidder selects the Signing certificate and clicks on the **OK** button to map the signing certificate.

USER MANAGEMENT

DSC Enrollment

Login Id : biddertest2@gmail.com
Roles : Tenderer

Please go through the below points before registering the DSC card / e-Token:



1. User needs to properly install drivers for the DSC smart card or USB Token in the system before clicking the DSC enrollment menu (Signing Certificate).
2. DSC once registered to the login cannot be removed or reassigned.
3. User can access the 'Information about DSC' tab on the Homepage of the application to view the DSC certificate issuing authorities.
4. This screen lists the signing certificate available in the inserted DSC card / e-token, user needs to select the relevant DSC to register.
5. DSC registered user only can perform any action in the application.

Please insert your e-Token to read your Digital Signature Certificate information.

Refresh

Digital Certificate : Signing

DSC Enrollment			
Certificate	Issued By	Type	Expiry Date
Praveen Rawat	SafeSign2020	Signing	23-Jan-2022 04:32 PM

Ok

Back


The success message is displayed on the screen.

USER MANAGEMENT

DSC Enrollment


Login Id : biddertest2@gmail.com
Roles : Tenderer

Please go through the below points before registering the DSC card / e-Token:



1. User needs to properly install drivers for the DSC smart card or USB Token in the system before clicking the DSC enrollment menu (Signing Certificate).
2. DSC once registered to the login cannot be removed or reassigned.
3. User can access the 'Information about DSC' tab on the Homepage of the application to view the DSC certificate issuing authorities.
4. This screen lists the signing certificate available in the inserted DSC card / e-token, user needs to select the relevant DSC to register.
5. DSC registered user only can perform any action in the application.


Please insert your e-Token to read your Digital Message

 Refresh

Digital Certificate : Signing

DSC Enrollment			
Certificate	Issued By	Type	Expiry Date
Praveen Rawat	SafeSign2020	Signing	23-Jan-2022 04:32 PM

Ok

 DSC is enrolled successfully.
OK

Back


The successful enrollment of DSC is displayed on the screen. The Bidder clicks on the **Next** button to proceed further.

USER MANAGEMENT


User DSC Enrollment

Login Id : biddertest2@gmail.com
Roles : Tenderer

✓ DSC is enrolled successfully.

 View Existing Certificates

Active Certificates Information

S.No	Certificate	Certificate Type	Type	Validity	Enroll Date	View
1.	Praveen Rawat	Signing	Class 0	23-Jan-2022 04:32 PM	02-Apr-2020 02:15 PM	

Next >

The Dash Board of the Bidder is loaded where the Bidder can change the Mobile Number, E-Mail Address and clicks on the **Save** button to save the provided details. If the Bidder does not want to change the Mobile Number, E-Mail Address he/she can just click on the **Skip** button to proceed further.

The screenshot shows the 'Government eProcurement System' dashboard. The header includes the system logo, a map of India, and user information: 'Welcome : biddertest2@gmail.com' and 'Last login : 02-Apr-2020 02:16 PM'. The server time is '02-Apr-2020 14:16:30'. Navigation links for 'Home' and 'Logout' are present. The main content area is titled 'DASHBOARD' and welcomes 'Sai Private Limited.' as a 'Tenderer'. It contains instructions to update mobile and email details for SMS alerts. A list of events (User Enrollment, Tender events, Bid submission, Block/Debarred Notification) is shown. Below, there are input fields for 'Mobile Number' (with a country code dropdown set to 'IND (91)' and a masked number) and 'E-Mail Address' (containing 'biddertest2@gmail.com'). A note explains that clicking 'Save' will trigger an OTP via SMS or email. At the bottom right, there are 'Skip' and 'Save' buttons, with the 'Save' button highlighted by a red rectangle.

Government eProcurement System

Welcome : biddertest2@gmail.com
Last login : 02-Apr-2020 02:16 PM

Server Time : 02-Apr-2020 14:16:30 | [Home](#) | [Logout](#)

Government eProcurement System

DASHBOARD

Welcome Sai Private Limited.,
Roles : Tenderer

In order to enable International SMS alerts facility, the eProcurement Application requires all the users to update their Mobile Number along with the Country Code.

In addition, the users are also required to update their email address

This is a one-time updation only. The benefits for the users include receipt of mobile and email alerts to the events such as;

- User Enrollment / Registration
- Tender related events
- Bid submission events
- Block / Debarred Notification

Mobile Number: *

E-Mail Address: *

By clicking on "Save" button, you would receive an OTP by SMS / e-mail on above number / e-mail within 10 seconds. If you have not received the messages on time, please recheck your details or contact help desk.


Click on "Skip" button to complete the activity later.

[Skip](#) [Save](#)

Once the Bidder clicks on the Save button, the system navigates to the page where OTP is to be entered, received through the changed E-Mail Id. The bidder enters the OTP and clicks on the **Verify** button to verify the entered OTP.

DASHBOARD

Welcome Sai Private Limited.,
Roles : Tenderer

 OTP has been sent to the entered Email ID and Mobile No.

Entered Email ID : biddertest2@gmail.com
Entered Mobile No : 91 - 9[REDACTED]8

OTP*


OTP will Expire in 04:44 minutes!

Verify

Resend OTP

The bidder enters the 15 digit GSTN Number, Name as registered in GSTN Portal and clicks on the **Save** button to save the provided details.

DASHBOARD

 **Goods and Service Tax Network (GSTN) Registration Information**


Welcome Sai Private Limited.,
Roles : Tenderer

Goods and Service Tax Network (GSTN) Registration Information

Do You have a GSTN Registration Number * ☒ Yes ☐ No

GSTN Number eg: 99 AAAA9999A 9 Z Z

Please enter the 15 digit GSTN Number *

37  AAAA9999A 9 Z Z

Name as Registered in GSTN Portal *

Praveen Rawat

Clear

Save

GePNIC
Simplified Procurement

NIC
National Informatics Centre

The bidder clicks on the **Next** button to proceed further.

DASHBOARD

Goods and Service Tax Network (GSTN) Registration Information

Welcome Sai Private Limited.,
Roles : Tenderer

Goods and Service Tax Network (GSTN) Registration Information

Do You have a GSTN Registration Number * ☒ Yes ☐ No

GSTN Number eg: 99 AAAAA99999A 9 Z Z

Please enter the 15 digit GSTN Number * .. Z

Name as Registered in GSTN Portal *

Clear Save

Bidder GSTN Registration Details

S.No	GSTN Number	GSTN Name	Created Date	Select
1	37AAAAA99999A9ZZ	Praveen Rawat	02-Apr-2020 02:21 PM	<input type="checkbox"/>

Delete **Next**

The system navigates to the page where Startup India Registration Details page, where the bidder can click on the Registered radio button to provide the registration details or click on the Not Registered radio button and click on the **Next** button to proceed further.

DASHBOARD

Startup India Registration Details

Startup India Registration

EProcurement portal is now integrated with Startup India. Bidders are now required to declare themselves, if they are registered/not registered as Startup India. If you are registered as Startup India, provide your Registration number and Mobile number as registered with the Startup India.

Consent from User
EProcurement portal will not share or disclose the Startup India Registration details with third party and will be used solely to establish and authenticate the details received from Startup India portal.

Startup * ☐ Registered ☒ Not Registered

Next

Once the process is over the left Menu for the Bidder is loaded. Click on the **My Accounts** left menu to view the account details.

The screenshot displays the Government eProcurement System interface. The top header includes the system logo, a map of India, and user information: 'Welcome : biddertest2@gmail.com' and 'Last login : 02-Apr-2020 02:11 PM'. The server time is shown as '02-Apr-2020 14:22:39', with links for 'Home' and 'Logout'. The main navigation menu on the left is organized into three sections: 'User Management' (containing 'My Accounts' and 'My Documents'), 'Auction Management' (containing 'My Auctions', 'Live Auctions', and 'View Auction History'), and 'Bid Management' (containing 'Search Active Tenders', 'My Tenders', 'Clarification', 'My Active Bids', 'Bid Opening (Live)', 'Bidder Turnover Details', 'Awarded Bid Document', 'Techno Commercial Query', 'Confirmatory Documents', 'Techno Commercial Query History', and 'Short fall Documents'). The main content area, titled 'DASHBOARD', displays a welcome message 'Welcome Sai Private Limited.,', the role 'Roles : Tenderer', and an 'Announcements' section with a megaphone icon.

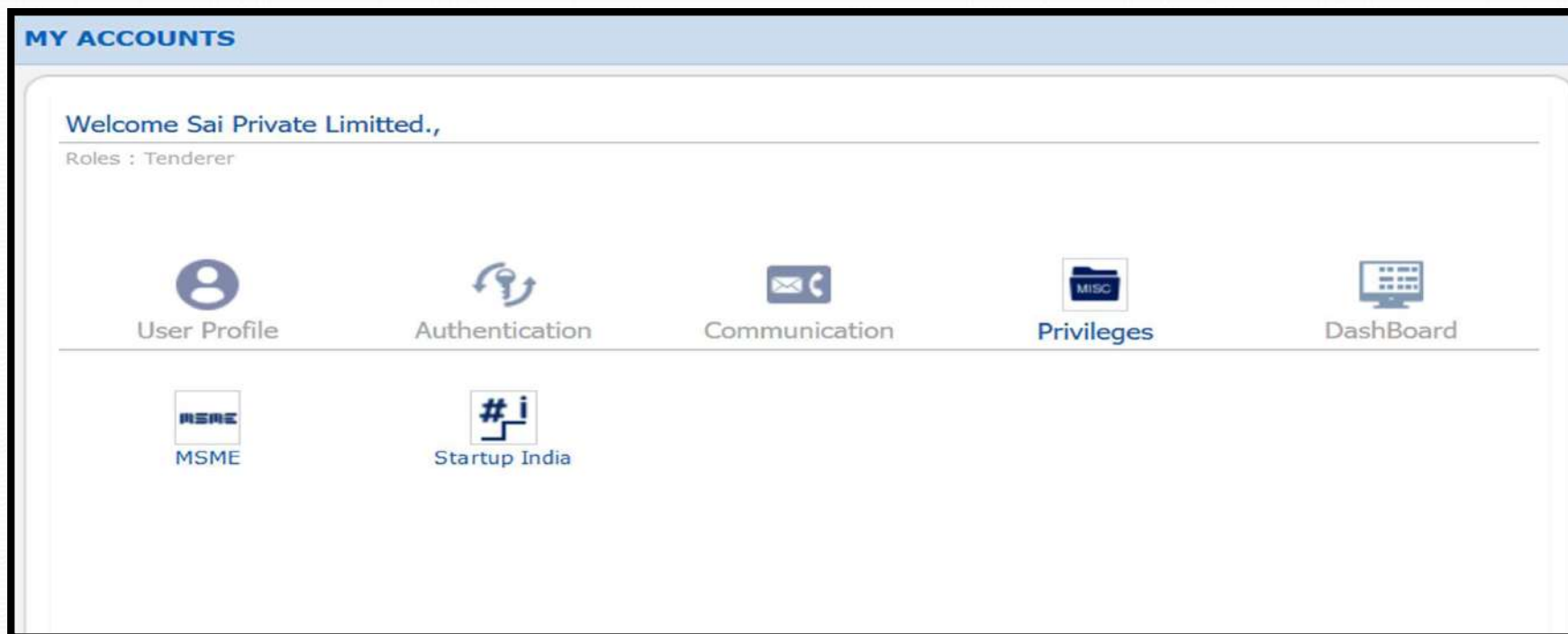
1.By Clicking the **User Profile** icon, The bidder can view the profile, Edit the profile, set the profile password which would be asked for editing the profile, the bidder can change the Email id & Mobile number and change the profile image.

2.By Clicking the **Authentication** icon, the bidder can change the password and activate & inactivate the active DSC.

3.On Clicking the **Communication** Ion, the bidder can select the product category for which the SMS and mail can be triggered if tenders are published under the selected product category and also the SMS and mail Notification can be selected by the bidder.

3.On selecting the **Privileges** icon, a provision for registering MSME and Startup India are provided.

4. On Clicking the **DashBoard**, the bidder can view the User Dash board.



Thank you

Bid Submission Module



Government E-PROCUREMENT (Demo) System

19-Jul-2017

[Search](#) | [Active Tenders](#) | [Tenders by Closing Date](#) | [Corrigendum](#) | [Results of Tenders](#)

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« Web based training on Government eProcurement System is being conducted on various topics on a regular basis. The Web based training will

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The national portal of India
india.gov.in

**MMP on
eProcurement**
(Tender information for States and UT's)

Welcome to eProcurement System

The eProcurement System enables the Tenderers to download the Tender Schedule free of cost and then submit the bids online through this portal.



Latest Tenders

Tender Title	Reference No	Closing Date	Bid Opening Date
8.0m psc poles	08/2017-18		
3. Installation of Minimast Lights	A3-2111/17	20-Jul-2017 03:00 PM	22-Jul-2017 04:00 PM
4. chk flow wilson Service	chk flow wilson		
5. chk flow wilson Service	chk flow wilson		
6. Supply of raw materials	G.2017		

Latest Tenders updates every 15 mins.



Latest Corrigendums

Corrigendum Title	Reference No	Closing Date	Bid Opening Date
3. extention of date	45/17/G3/SN	27-Jul-2017 09:00 AM	01-Aug-2017 09:00 AM

Latest Corrigendum updates every 15 mins.

Certifying Agency



User Login

Login ID *

Password *

Login

[Online Bidder Enrollment](#)
[Generate / Forgot Password?](#)

Enter Login Id & Password
, Click on Login Button

Search with ID/Title/Reference no



Tender Search

Go

[Advanced Search](#)

[Help For Contractors](#)

[Information About DSC](#)

[FAQ](#)

[Feedback](#)

[Bidders Manual Kit](#)

Contents owned and maintained by respective tender inviting organisation / department



Government E-PROCUREMENT (Demo) System

18-Jul-2017

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< Web based training on Governr

MIS Reports

Tenders by Location

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Tenders by Classification

Tenders in Archive

Tenders Status

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Downloads

Announcements

Recognitions

Digital Certificate Authentication

Welcome Wipro [rbidder5@nic.in],



1. You have registered with DSC. Please insert your DSC card / e-Token for authentication.
2. Click the 'Login' button to proceed.

S.No	Alias Name	Serial No.	Certificate Type	Expiry Date	Status
1.	M RAMA AMIRTHAM	53 3b 3b 69	Signing	26-Dec-2017 03:29 AM	Live



Logout

If the 'Log' button is not appearing in this screen, perform the following checks:

1. Java on Time Environment (JRE) 1.6 or above should be installed.
2. DSC should be installed from the resource CD.
3. The smart card / e-Token must be plugged in with the system's USB port / smart card reader.

Click on Login Button



Government E-PROCUREMENT (Demo) System

18-Jul-2017

[Search](#) | [Active Tenders](#) | [Tenders by Closing Date](#) | [Corrigendum](#) | [Results of Tenders](#)

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« Web based training on Government eProcurement System is being conducted on various topics on a re

MIS Reports

Tenders by Location

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Cancelled/Retendered

Downloads

Announcements

Recognitions

Digital Certificate Authentication

Welcome Wipro [rb]



Authentication

Authenticating... Please wait

Cancel

S.No	Alias Name	Serial No.	Certificate Type	Expiry Date	Status
1.	M RAMA AMIRTHAM	53 3b 3b 69	Signing	26-Dec-2017 03:29 AM	Live



Logout

If the 'Login' button is not appearing in this screen, perform the following steps:

1. Java Run Time Environment (JRE) 1.6 or above should be installed.
2. DSC drivers should be installed from the resource CD.
3. The DSC smart card / e-Token must be inserted into the smart card reader.

Authenticating the DSC pin



Government E-PROCUREMENT (Demo) System

18-Jul-2017

[Search](#) | [Active Tenders](#) | [Tenders by Closing Date](#) | [Corrigendum](#) | [Results of Tenders](#)

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conducted on various topics on a regular basis. The Web based training will be conducted on all Central Government working days from 2.30 PM to 4.30 PM in English only.

MIS Reports

Tenders by Location

Tenders by Organisation

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Digital Certificate Authentication

Welcome W



S.No	Alias Name
1.	M RAMA

LOGIN

Verify User PIN



Now verify your User PIN:

User PIN:

☐ Enable soft keyboard

Change User PIN

Login

Cancel

Cancel

Type	Expiry Date	Status
	26-Dec-2017 03:29 AM	Live

Logout

If the 'Login' button is not appearing in this screen, please do the following checks:

1. Java Run Time Environment (JRE) 1.6 or above should be installed.
2. DSC drivers should be installed from the resource.
3. The DSC smart card / e-Token must be plugged into the system's USB port / smart card reader.

Enter DSC Pin and click on
Login Button



DASHBOARD

User Management

- My Accounts
- My Documents

Auction Management

- My Auctions
- Live Auctions
- View Auction History

Bid Management

- Search Active Tenders
- My Tenders
- Clarification
- My Active Bids
- Bid Opening (Live)
- Techno Commercial Query History
- Confirmatory Documents
- Short fall Documents
- My Bids History
- Confirmatory Documents History
- Short Fall Documents History
- Archived Clarification

Welcome Wipro,
Roles : Tenderer

Dashboard

Announcements

Web based training on Government eProcurement System is being conducted on various topics on a regular basis. The Web based training will be conducted on all Central Government working days from 2.30 PM to 4.30 PM in English only.

Click on Search Active
Tenders

- User Management
 - My Accounts
 - My Documents
- Auction Management
 - My Auctions
 - Live Auctions
 - View Auction History
- Bid Management
 - Search Active Tenders
 - My Tenders
 - Clarification
 - My Active Bids
 - Bid Opening (Live)
 - Techno Commercial Query History
 - Confirmatory Documents
 - Short fall Documents
 - My Bids History
 - Confirmatory Documents History
 - Short Fall Documents History
 - Archived Clarification
 - Tender Status
 - My Withdrawn Bids

Search Tenders

Search Active Tenders

Organisation	-Select-	Tender ID	
Department	-Select-	Keyword #	surgical
Division	-Select-	Tender Category	-Select-
Sub Division	-Select-	Product Category	-Select-
Org Chain			
Location/City			
Tender Type	-Select-	Form of Contract	-Select-
Value Criteria	-Select-	-Select-	
Date Criteria	-Select-	From	To

- Keyword finds the match in tender title, work description and technical description

Cancel

Submit

Search Active Tenders from the above given option and click on **Submit**



BID MANAGEMENT

User Management

- My Accounts
- My Documents

Auction Management

- My Auctions
- Live Auctions
- View Auction History

Bid Management

- Search Active Tenders
- My Tenders
- Clarification
- My Active Bids
- Bid Opening (Live)
- Techno Commercial Query History
- Confirmatory Documents
- Short fall Documents
- My Bids History
- Confirmatory Documents History

Active Tenders

Select the check Box

Open Tenders

S.No	Tender ID	Tender Title	Tender Reference Number	Product Category	Value in ₹	Favorite
1.	2017_NIC_49820_1	Tender for supply of surgical disposable and dressing items	XX-97/SO(DO)/Surgical Disposable items/2017-18/St	Medical Equipments/Waste	0	<input checked="" type="checkbox"/>

Back

Set Open Tender as Favorite

Click on **Open Tender as favorite**



BID MANAGEMENT

User Management

- My Accounts
- My Documents

Auction Management

- My Auctions
- Live Auctions
- View Auction History

Bid Management

- Search Active Tenders
- My Tenders
- Clarification
- My Active Bids
- Bid Opening (Live)
- Techno Commercial Query History
- Confirmatory Documents
- Short fall Documents
- My Bids History
- Confirmatory Documents History

Active Tenders



Tender(s) has been set as your favorite successfully

[← Back](#)

Matches found : 0

Active Tenders

Sno	Tender ID	Tender Title	Tender Reference Number	Product Category	Value (INR)	Favorite
No Active Tenders Found.						

Tender set as favorite
successfully



DASHBOARD

User Management

- My Accounts
- My Documents

Auction Management

- My Auctions
- Live Auctions
- View Auction History

Bid Management

- Search Active Tenders
- My Tenders
- Clarification
- My Active Bids
- Bid Opening (Live)
- Techno Commercial Query History
- Confirmatory Documents
- Short fall Documents
- My Bids History
- Confirmatory Documents History
- Short Fall Documents History
- Archived Clarification

Welcome Wipro,

Roles : Tenderer



Announcements

Web based training on Government eProcurement System is being conducted on various topics on a regular basis. The Web based training will be conducted on all Central Government working days from 2.30 PM to 4.30 PM in English only.

Click on My Tenders



User Management

- My Accounts
- My Documents

Auction Management

- My Auctions
- Live Auctions
- View Auction History

Bid Management

- Search Active Tenders
- My Tenders
- Clarification
- My Active Bids
- Bid Opening (Live)
- Techno Commercial Query History
- Confirmatory Documents
- Short fall Documents
- My Bids History
- Confirmatory Documents History

BID MANAGEMENT

My Tenders

Search



Tender ID

Tender Title

Clear

Search

My Tenders

S.No	Tender ID	Tender Reference Number	Tender Title	View
1	2017_NIC_49820_1	XX-97/SO(DO)/Surgical Disposable items/2017-18/St	Tender for supply of surgical disposable and dressing items	
2	2017_NIC_49725_1	chk flow wilson	chk flow wilson Service	

Click on View Icon for bid submission

Bid Submission Start Date

18-Jul-2017 03:00 PM

Bid Submission End Date

18-Jul-2017 04:00 PM

Tender Documents**NIT Document**

S.No	Document Name	Description	Document Size (in KB)
1	Tendernotice_1.pdf 	Notice Inviting Tender for supply of surgical disposal and dressing items	850.80

 Download as zip file**Work Item Documents**

S.No	Document Type	Document Name	Description	Document Size (in KB)
1	BOQ	BOQ_46134.xls	Price Bid	294.00
2	Tender Documents	AIIMSTD.pdf	Tender document for supply of surgical disposable items and dressing items	2773.76

Tender Inviting Authority

Name	Store Officer
Address	Room No. 108,1st Floor, Animal House Building, Near Biotechnology Building, AIIMS, New Delhi-110 029

Click on Proceed For Bid Submission Button

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Terms & Condition

Print

eTender Portal User Agreement

In order to create a user account and use the eTender portal you must read and accept the eTender portal User Agreement.

TERMS AND CONDITIONS OF E-TENDER SERVICES AGREEMENT

YOU MAY NOT MODIFY, COPY, REPRODUCE, REPUBLISH, UPLOAD, POST, TRANSMIT, OR DISTRIBUTE, IN ANY MANNER, THE MATERIAL ON THE SITE, INCLUDING TEXT, GRAPHICS, CODE AND/OR SOFTWARE.

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Select the **Check Box** and
Click on **Next Button**

☒ I Agree

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Login ID	rbidder5@nic.in		
Company Name	Wipro	Registration Number	ASDAS322
Establishment Year	2016	Nature of Business	Software
Legal Status	Limited Company	Company Category	Others
City	Mumbai	State	Maharashtra
Postal Code	4567789	PAN Number	CESTG2458B

Contact Details

Title *

Mrs

Contact Name *

Kaniak Rastogi

Correspondence Email *

shivanigoel.1405@gmail.com

Designation

AGM

Phone *

9101124305770

Mobile *

9717721686

Registered Address *

Mumbai

Name of Partners / Directors

Enter the Contact details
and Click on **Next** Button

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My Tenders → Offline Fee Payment

Organisation Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and dressing items

Fee to be paid (Inclusive of Taxes) in ₹ : 1,000

Specify Instruments for Offline Payment :

Instrument Type	DD - Demand Draft	Amount *	1,000
Instrument Number *	54561265	Issuer Details *	SBI
Issued Date *	18-Jul-2017	Challan Number	
Expiry Date *	21-Sep-2017	Account Number	

Cancel

Save

Fee Details

S.No	Instrument No.	Name	Issued Date	Expiry Date	Acc.No	Amount	Delete
No details found							

Enter the Instruments details for offline payment and Click on **Save** Button

Next

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My Tenders → Offline Fee Payment

Organisation Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and
dressing items

Fee to be paid (Inclusive of Taxes) in ₹ : **1,000**

Specify Instruments for Offline Payment :

Instrument Type	DD - Demand Draft	Amount *	<input type="text"/>
Instrument Number *	<input type="text"/>	Issuer Details *	<input type="text"/>
Issued Date *	<input type="text"/>	Challan Number	<input type="text"/>
Expiry Date *	<input type="text"/>	Account Number	<input type="text"/>

Cancel

Save

After entering details, Click
on **Next** Button

Fee Details

S.No	Instrument No.	Name	Issued Date	Expiry Date	Acc.No	Amount	Delete
1	54561265	DD - Demand Draft	18-Jul-2017	21-Sep-2017		1,000	<input type="checkbox"/>

Delete

Next



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My Tenders → EMD Offline Payment

If, You are exempted from EMD payment, then select the option to 'Yes' and provide the details.

Are you exempted from EMD payment: ☐ Yes ☒ No

Next

Select the **Radio Button**
for EMD exemption and
then click on **Next**



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My Tenders → EMD Offline Payment

If, You are exempted from EMD payment, then select 'Yes' and provide the details.

Are you exempted from EMD payment: ☒ Yes ☐ No

If yes, Provide the exemption type: ☒ Percentage ☐ Fixed

Percentage/Amount* 100

Actual EMD amount in ₹ : 50,000

Only pdf,jpg files are permitted to upload.

Upload EMD exemption document:*



Next

If EMD percentage amount is 100
then EMD amount to be paid after
exemption is Rs. 0.00



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My Tenders → EMD Offline Payment

EMD Payment

If, You are exempted from EMD payment, then you can click on the button below.
Are you exempted from EMD payment?
If yes, click on the button below.

Only pdf,jpg files are allowed.

Upload

EMD amount to be paid after exemption: ₹ 0.00



Next

Showing EMD amount is
Rs. 0.00



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My Tenders → EMD Offline Payment

If, You are exempted from EMD payment, then select the option to 'Yes' and provide the details.

Are you exempted from EMD payment: ☒ Yes ☐ No

If yes, Provide the exemption type: ☒ Percentage ☐ Fixed

Percentage/Amount* 100

Actual EMD amount in ₹ : 50,000

Only pdf,jpg files are permitted to upload.

Upload EMD exemption document:*



Next

1) Enter EMD payment details and select the icon to upload EMD exemption document.



User Management

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Auction Management

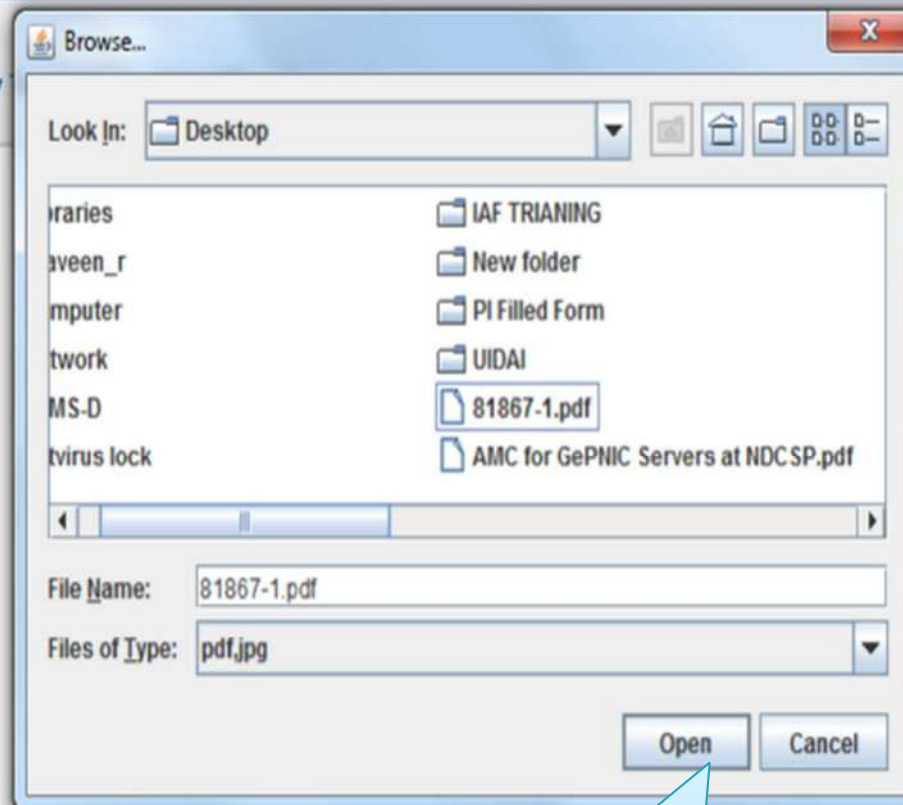
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BID SUBMISSION

My



the details.

Next

Select the EMD exemption document and then click on **Open Button**



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Are you exempted from EMD payment: ☒ Yes ☐ No

If yes, Provide the exemption type: ☒ Percentage ☐ Fixed

Percentage/Amount* 100

Actual EMD amount in ₹ : 50,000

Only pdf,jpg files are permitted to upload.

Upload EMD exemption document:*

C:\Users\praveen_r\Desktop\181867-1.pdf



Next

click on this Icon to
digitally sign the document



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My Tenders → EMD Offline Payment

File Signing

Digital signing in progress... Please wait

If, You are ex
Are you ex
If yes,

Actual EMD amount in ₹ : 50,000

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Upload EMD exemption doc

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Digitally signing

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**eProcurement
System**

10-Jul-2017 10:24:05
Government eProcurement System

BID SUBMISSION

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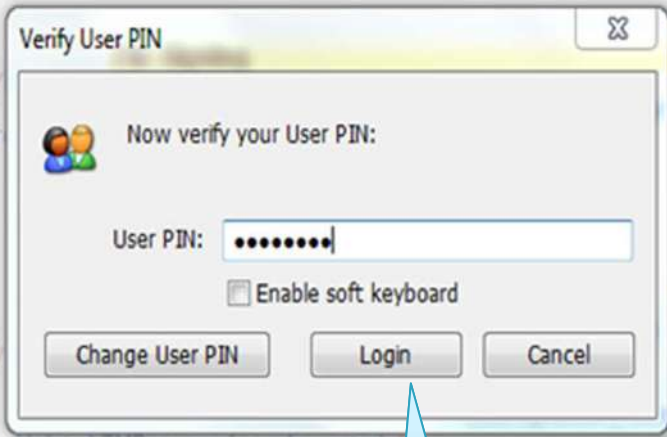
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My Tenders → EMD Offline Payment

Verify User PIN





Now verify your User PIN:

User PIN:

☐ Enable soft keyboard

Upload EMD exemption document:

Enter the DSC pin and
click **Login** button



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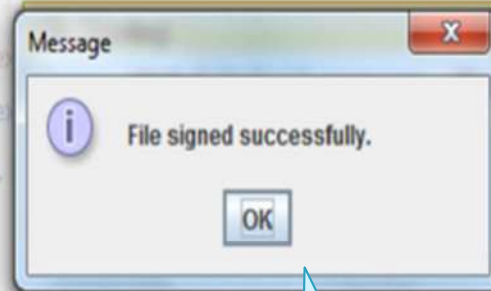
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My Tenders → EMD Offline Payment



If, You are ex
Are you ex
If yes,

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Click Ok

Next



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My Tenders → EMD Offline Payment

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Percentage/Amount* 100

Actual EMD amount in ₹ : 50,000

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Click on Next button



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My Tenders → 2017_NIC_49820_1 → Transaction Message

Click on **Action** Icon for entering interested items

Organization Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and dressing items

Bid Process List

S.No	Bid Process	Action
1	ITE Details	
2	Profile	

Bid Payment Details

S.No	Fee Type	Actual Fee	Exempted Fee	Fee To Be Paid	Paid Fee	Edit
1	Tender Fee	1000.00 (INR)	0.00	0.00	1000.00 (INR)	
2	Emd Fee	50000.00 (INR)	50000.00 (INR)	0.00	0.00	

Encrypt&Upload

- Search Active Tenders
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Bidder Item Wise Evaluation						ed Yes/No
S.No	Item Code	Description				
1		Disposable Syringes with Needle with leur lock (Sterilized) (ISO) *Reuse prevention breakable plunger syringe with possibility of multiple aspirations,				
2	item1	Size: 1 ml (As and when required)	Nos	1.00	Yes	▼
3	item2	Size: 2 ml	Nos	50000.00	Yes	▼
4	item3	Size: 5 ml	Nos	50000.00	Yes	▼
5	item4	Size: 10 ml	Nos	50000.00	Yes	▼
6	item5	Size: 20 ml (As and when required)	Nos	1.00	Yes	▼
7	item6	Size: 50CC	Nos	30000.00	No	▼
8		Disposable Syringes without Needle without leur lock (Sterilized) *Reuse prevention breakable plunger syringe with possibility of multiple aspirations				
9	item7	Size: 2 ml	Nos	50000.00	Yes	▼
10	item8	Size: 5 ml	Nos	50000.00	Yes	▼
11	item9	Size: 10 ml	Nos	50000.00	Yes	▼
12	item10	Size: 20 ml (As and when required)	Nos	1.00	Yes	▼
13	item11	Size: 50 ml	Nos	20000.00	Yes	▼
14	item12	Disposal Syringe with Needle with Leur Lock (Sterlized) (ISI/ISO/CE) Size: 1CC	Nos	20000.00	Yes	▼
15	item13	Auto destructive disposal Syringes with leur lock. The syringe on completing the injection should lock to prevent any reuse. Non reuseable involuntary activated auto disable syringes Size: 1ml	Nos	1.00	Yes	▼

1. Select **Yes/No** against each item to show interest

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Save

2. Click on Save

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No of sheets :	1	Total item(s) available in sheet(s) :	13
Eligible item(s) as quoted :	12	Not eligible item(s) as quoted :	1 Click to View

View Bidder Item Wise Evaluation List						
S.No	Sheet Name	Item Code	Description	Units	Quantity	Bidder Value
1	BoQ1	item1	Size: 1 ml (As and when required)	Nos	1.00	Yes
2		item2	Size: 2 ml	Nos	50000.00	Yes
3		item3	Size: 5 ml	Nos	50000.00	Yes
4		item4	Size: 10 ml	Nos	50000.00	Yes
5		item5	Size: 20 ml (As and when required)	Nos	1.00	Yes
6		item6	Size: 50CC	Nos	30000.00	No
7		item7	Size: 2 ml	Nos	50000.00	Yes
8		item8	Size: 5 ml	Nos	50000.00	Yes
9		item9	Size: 10 ml	Nos	50000.00	Yes
10		item10	Size: 20 ml (As and when required)	Nos	1.00	Yes
11		item11	Size: 50 ml	Nos	20000.00	Yes
12		item12	Disposal Syringe with Needle with Leur Lock (Sterlized) (ISI/ISO/CE) Size: 1CC	Nos	20000.00	Yes
13		item13	Auto destructive disposal Syringes with leur lock. The syringe on completing the injection should lock to prevent any reuse. Non reuseable involuntary activated auto disable syringes Size: 1ml	Nos	1.00	Yes

Click on Next Button.

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My Tenders → 2017_NIC_49820_1 → Transaction Message



Organization Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and dressing items

Bid Process List

S.No	Bid Process	Action
1	ITE Details	
2	Profile	

Bid Payment Details

S.No	Fee Type	Actual Fee	Exempted Fee	Fee To Be Paid	Paid Fee	Edit
1	Tender Fee	1000.00 (INR)	0.00	0.00	1000.00 (INR)	
2	Emd Fee	50000.00 (INR)	50000.00 (INR)	0.00	0.00	

Encrypt&Upload

Click on **Encrypt&Upload** Button.



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[Bid Submission](#) → [Packet Details](#)

Organisation Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and dressing items

First Click here to upload
all related technical
documents.

Documents

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Fee/PreQual/Technical



Click here to Upload

Finance



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Please use My Documents option to upload high volume of Technical Documents and Other Important Documents.

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Tender Title : **Tender for supply of surgical disposable and dressing items**

Tender ID : **2017_NIC_49820_1**

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File Type	Descri...	Upload...	File Name	File Size (In KB)	File Directory	File Last Modified	Browse
.pdf	Scann...	✗	File Not Uploaded				
.pdf	Scann...	✗	File Not Uploaded				
.pdf	Scann...	✗	File Not Uploaded				
.pdf	Scann...	✗	File Not Uploaded				

Total File Size: 0 KB

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 Sign & Upload

Browse all the corresponding technical documents and Upload

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Tender Title : **Tender for supply of surgical disposable and dressing items**

Tender ID : **2017_NIC_49820_1**

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.pdf	Scann...	✓	81867-1.pdf	239	C:\Users\praveen_...	21-Jun-2017 02:21...	
.pdf	Scann...	✓	Doc1.pdf	723	C:\Users\praveen_...	06-Jul-2017 03:29 ...	
.pdf	Scann...	✓	oversize_pdf_test_...	99305	C:\Users\praveen_...	07-Jul-2017 11:53 ...	
.pdf	Scann...	✓	NITRD.pdf	452	C:\Users\praveen_...	17-Jul-2017 04:40 ...	

Total File Size: 100719 KB

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0%

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Green marks shows documents uploaded successfully.

After uploading documents, click on **Sign & Upload**

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Tender Title : Tender for supply of surgical disposable and dressing items

Tender ID : 2017_NIC_49820_1

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Clear All Selection

Clear Selected

File Type	Description	Directory	File Last Modified	Browse
.pdf	Scan	praveen_...	21-Jun-2017 02:21...	
.pdf	Scan	praveen_...	06-Jul-2017 03:29 ...	
.pdf	Scan	praveen_...	07-Jul-2017 11:53 ...	
.pdf	Scan	praveen_...	17-Jul-2017 04:40 ...	

Total File Size: 100719

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Verify User PIN

Now verify your User PIN:

User PIN:

☐ Enable soft keyboard

Change User PIN

Login

Cancel

Enter the DSC pin and click Login button

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Tender Title : **Tender for supply of surgical disposable and dressing items**

Tender ID : **2017_NIC_49820_1**

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.pdf	Scann...	✓	81867-1.pdf	239	C:\Users\praveen_...	21-Jun-2017 02:21...	
.pdf	Scann...	✓	Doc1.pdf	723	C:\Users\praveen_...	06-Jul-2017 03:29 ...	
.pdf	Scann...				s\praveen_...	07-Jul-2017 11:53 ...	
.pdf	Scann...				s\praveen_...	17-Jul-2017 04:40 ...	

Message

Packet bid documents submitted successfully.

Total File Size: 100719 KB

File Signing Completed. (100%)

File(s) Uploaded successfully. (100%)

Sign & Upload

click on **OK** button

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Bid Submission → Packet Details

Organisation Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_

Tender Title : Tender for

Now **Click here to upload**
all related financial
documents.

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- Tender Status


Tender Title : **Tender for supply of surgical disposable and dressing items**

Tender ID : **2017_NIC_49820_1**

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File Type	Descri...	Upload...	File Name	File Size (In KB)	File Directory	File Last Modified	Browse
.xls	Price Bid	✖	File Not Uploaded				

Total File Size: 0 KB

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Sign & Upload

Browse all the corresponding financial documents and Upload

Name of the Bidder/ Bidding Firm / Company :	Wipro
--	-------

PRICE SCHEDULE

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Unit RATE In Figures To be entered by the Bidder in Rs. P	GST Rates in % on Unit Rates	TOTAL AMOUNT Without Taxes in Rs. P	TOTAL AMOUNT With Taxes in Rs. P	TOTAL AMOUNT In Words
1	2	4	5	13	14	53	54	55
1	Disposable Syringes with Needle with leur lock (Sterilized) (ISO) *Reuse prevention breakable plunger syringe with possibility of multiple aspirations,							
1.01	Size: 1 ml (As and when required)	1	Nos	31.00	5.00	31.00	32.55	INR Thirty Two and Paise Fifty Five Only
1.02	Size: 2 ml	50000	Nos	32.00	5.00	1600000.00	1680000.00	INR Sixteen Lakh Eighty Thousand Only
1.03	Size: 5 ml	50000	Nos	35.00	5.00	1750000.00	1837500.00	INR Eighteen Lakh Thirty Seven Thousand Five
1.04	Size: 10 ml	50000	Nos	41.00	5.00	2050000.00	2152500.00	INR Twenty One Lakh Fifty Two Thousand Five
1.05	Size: 20 ml (As and when required)	1	Nos	60.00	5.00	60.00	63.00	INR Sixty Three Only
1.06	Size: 50CC	30000	Nos			0.00	0.00	INR Zero Only
2	Disposable Syringes without Needle without leur lock (Sterilized) *Reuse prevention breakable plunger syringe with possibility of multiple aspirations							
2.01	Size: 2 ml	50000	Nos	21.00	5.00	1050000.00	1102500.00	INR Eleven Lakh Two Thousand Five Hundred Only
2.02	Size: 5 ml	50000	Nos	25.00	5.00	1250000.00	1312500.00	INR Thirteen Lakh Twelve Thousand Five Hundred
2.03	Size: 10 ml	50000	Nos	28.00	5.00	1400000.00	1470000.00	INR Fourteen Lakh Seventy Thousand Only
2.04	Size: 20 ml (As and when required)	1	Nos	32.00	5.00	32.00	33.60	INR Thirty Three and Paise Sixty Only
2.05	Size: 50 ml	20000	Nos	35.00	5.00	700000.00	735000.00	INR Seven Lakh Thirty Five Thousand Only
3	Disposal Syringe with Needle with Leur Lock (Sterilized) (ISI/ISO/CE) Size: 1CC	20000	Nos	50.00	5.00	1000000.00	1050000.00	INR Ten Lakh Fifty Thousand Only
4	Auto destructive disposal Syringes with leur lock. The syringe on completing the injection should lock to prevent any reuse. Non reuseable involuntary activated auto disable syringes Size: 1ml	1	Nos	65.00	5.00	65.00	68.25	INR Sixty Eight and Paise Twenty Five Only
Total in Figures						3350031.00	3517532.55	INR Thirty Five Lakh Seventeen Thousand Five Hundred & Thirty Two and Paise Fifty Five Only
Quoted Rate in Words			INR Thirty Five Lakh Seventeen Thousand Five Hundred & Thirty Two and Paise Fifty Five Only					

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File Type	Descri...	Upload...	File Name	File Size (In KB)	File Directory	File Last Modified	Browse
.xls	Price Bid	✓	BOQ_46134.xls	296	C:\Users\praveen_...	18-Jul-2017 03:35 ...	

Total File Size: 296 KB

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.xls	Price Bid	✓	BOQ_46134.xls	296	C:\Users\praveen_...	18-Jul-2017 03:35 ...	

Message

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File(s) Uploaded successfully. (100%)

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click on **OK** button

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Clarification

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My Withdrawn Bids

BID SUBMISSION

Bid Submission

Packet Details

Organisation Chain : NIC Org||NIC_Dept

Tender Reference Number : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and dressing items

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Green mark shows related technical and financial documents successfully.

Click on Next

Uploaded Documents

S.No	Packet Type	File Name	Description	File Size (KB)	File Hash
1	Fee/PreQual /Technical	81867-1.pdf	Scanned copy of Tender Fee and EMD	239.00	fPL5m5ErOTCH/y74Cc9IMaTEZZI=
		download.pdf	Scanned copy of Tender form as per section- VII and Documentary evidence form	14416.00	NS2tVnbDwmr2FetPMtabJWYrjc=
		NITRD.pdf	Scanned copy of Manufacturer Authorisation form , Documents with GIT clause 17 and performance certi	452.00	G+pt5LsvmaAYcvywmY9rf1ob7k=
		NIT.pdf	Scanned copy of checklist as per section VII	838.00	3mBNAYOKG3exNWUVUNbLWOjWU7U=
2	Finance	BOQ_46134.xls	Price Bid	296.00	0DYJ2PgnJ66alNW6zqrRXOv32Co=

Stagewise Bid Status

Tender Stages	Result
ItemWise Technical Evaluation	
ItemWise Technical Evaluation	✓

Click on **Freeze Bid** for bid submission

Freeze Bid



BID MANAGEMENT

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Bid Acknowledgement

Bid Acknowledgement

[Print Bid Details](#)

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Organisation Chain : NIC Org||NIC_Dept

Tender Ref No. : XX-97/SO(DO)/Surgical Disposable items/2017-18/St

Tender ID : 2017_NIC_49820_1

Tender Title : Tender for supply of surgical disposable and dressing items

Bid Start Date & Time : 18-Jul-2017 03:00 PM

Bid End Date & Time : 18-Jul-2017 04:00 PM

Bid ID : 39190

Bidder Name : Wipro

Bid Submitted Date & Time : 18-Jul-2017 03:38 PM

Bidder IP Address: 10.1.14.149

Bid submitted successfully and bidder **print the bid details** for future reference

Thank you



AN ISO 9001 & 14001 COMPANY

TENDER DOCUMENT

NIT No: EPI/WRO/CON/968/342

FOR

Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

VOLUME – II

ACC & GCC



TENDER INVITING AGENCY

**Engineering Projects (India) Limited
Contracts Division, Western Regional Office,
6A, Bakhtawar, Nariman Point
Mumbai – 400021**

1.	GENERAL
	The following Additional Conditions of Contract shall be read in conjunction with General Conditions of Contract of EPI. If there are any provisions in these Additional Conditions of Contract, which are at variance with the provisions of General Conditions of Contract, the provisions in these Additional Conditions of Contract shall take precedence.
2.	INTRODUCTION
	<p>Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”</p> <p>Following clauses of Additional Conditions of Contract (ACC) shall be applicable for this contract. These Additional Conditions of Contract shall be read in conjunction with General Conditions of Contract, Instructions to Tenderers (ITT)), Notice Inviting Tender (NIT), Price Bid, Tender conditions and Technical specifications & Other Tender Documents.</p>
3.	APPROACHES TO WORKSITE
	<p>The land is made available to the bidder(s)/contractor(s) free from all encumbrances as GSECL provided to EPI. The contractor shall make his own arrangement for approach to work site including borrow/ disposal area and for movement of men, materials, machineries, other equipment etc. required for carrying out the work under this contract.</p> <p>The access roads/ path to the work site may not be available at all places and at all time. The contractor shall plan his work as per the availability of access roads / path at site. All drainage of works area and all weather truck able haulage roads as required by the contractor shall be constructed and maintained during the construction period by the contractor at his own cost, including portions of the road already existing. if required after obtaining approval in writing of the GE to the layout of such approaches, to convey men, materials, plants and machinery required for the satisfactory completion of work and on completion of work the site shall be cleared of all temporary approaches. The tendered rates shall, interalia, be deemed to include for the aforesaid contingencies.</p> <p>SITE VISIT AND COLLECTING LOCAL INFORMATION:</p> <p>Before tendering, the tenderer is advised to visit the site, its surroundings to assess and satisfy themselves about the local conditions such as the working and other constraints at site, approach to the site, availability of water & power supply, application of taxes, cess duties and levies as applicable, nature of ground, soil and sub-soil condition, underground water table level, accommodations they may require etc., river regime, river water levels, other details of river, streams & any other relevant information required by them to execute complete scope of work. The tenderer may obtain all necessary information as to risks, weather conditions, contingencies & other circumstances (insurgencies etc.), which may influence or affect their tender prices. Tenderer shall be deemed to have considered site conditions to get satisfied himself in all respect before participating the tender.</p> <p>In addition to the above, the contractor / firms are requested to prepare a proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones based upon their site visit and collected information and has to be submitted.</p>
4.	ORDER OF PRECEDENCE

	<p>Clause 42.1 of GCC stands amended as under:</p> <p>In case of difference, contradiction, discrepancy, dispute with regard to Conditions of Contract, Specifications, Drawings, Bill of Quantities and Rates quoted by the Contractor and other documents forming part of the contract, the following shall prevail in order of precedence.</p> <ol style="list-style-type: none"> 1. Contract Agreement which includes NIT, Special Instructions to Tenderer, and Memorandum. 2. Letter of Acceptance 3. Bill of Quantity / Schedule of Quantities 4. Additional Conditions of Contract (ACC) 5. General Conditions of Contract (EPI GCC). 6. Tender Drawings 7. Condition of Contract (GSECL), 8. Technical Specification (GSECL) 9. National Building Code (Latest Edition) 10. BIS specifications
5	MOBILIZATION ADVANCE
	Clause 8.0 of GCC is stand cancelled.
6.	ABNORMALLY LOW BIDS (ALBS) :
	<p>GCC Clause No. 9.2 regarding Abnormally Low Bid is modified as below:</p> <p>In case of abnormally low bid EPI may seek written clarifications from the bidder including detailed price/rate analysis, time schedule etc.</p> <p>After evaluation of the aforesaid clarification documents, EPI in order to ensure performance of the contract, may:</p> <ol style="list-style-type: none"> a. Obtain undertaking from the bidder instead of additional performance security, to safeguard EPI interest. b. Reject the bid/ proposal upon not being satisfied with the documents submitted or upon failure to submit aforesaid undertaking by the bidders. <p>The decision of EPI on identification of Abnormally Low Bids (ALBs) shall be final and binding on the bidder. In case the bidder doesn't agree to the identification of ALB or to submit aforesaid undertaking before award of the contract, EPI reserves the right to suspend the bidder in terms of bid security declaration given by the bidder. The above shall be read in conjunction with clause No. 9.2 of GCC.</p>
7	RETENTION MONEY
	Clause 10.0 of GCC is stand deleted
8	STARTING DATE OF THE WORK :
	The date of start of contract shall be reckoned within 10 days from the date of issue of letter of Acceptance.
9	CONTRACT PERIOD
	The contract period for completion of entire work under scope shall be 10 (Ten) months from the " STARTING DATE OF THE WORK " as specified. The contractor should complete total works including handing over within above specified period.
10	TIME SCHEDULE & PROGRESS
	<p>In addition to Clause No. 43 of GCC</p> <ol style="list-style-type: none"> (i) The Contractor shall monitor progress of all the activities, and supply a progress report to the Project Manager every month. The progress report shall be in a form acceptable to the Project Manager and shall also indicate: (a) percentage completion

	<p>achieved compared with the planned percentage completion for each activity; and (b) where any activity is behind the program, giving comments and likely consequences and stating the corrective action being taken.</p> <p>(ii) The Contractor to furnish the detailed BAR / PERT CHART network immediately covering supply of material for all activities for completion of work including milestone achievements as mentioned below:</p> <table><tr><th>S. No.</th><th>Pre-requisite</th><th>Milestone Schedule achievement (from the date of LOI)</th></tr><tr><td>1</td><td>Placement of order of all equipment and on Approval of Design and GFC drawings from client/ GSECL.</td><td>03 Months (1st Milestone)</td></tr><tr><td>2</td><td>Completion of Supply 100%</td><td>7 Months (2nd Milestone)</td></tr><tr><td>3</td><td>Completion of Erection 100%</td><td>9 Months (3rd Milestone)</td></tr><tr><td>4.</td><td>Completion of Commissioning.</td><td>10 Months (04th Milestone)</td></tr></table> <p>Note: 0.5% per week or part thereof plus GST and cess applicable (limited upto 05%) on amount due will be withhold for the delay on non-achievement of milestone as per the payment terms in Clause No. 16 of ACC and the same will be released on completion of subsequent milestone in time.</p> <p>(iii) The Contractor submits fortnightly progress report for the supply reached at site with respected of BAR / PERT CHART with justification for delay in progress, if any and with corrective action to achieve the progress as per BAR / PERT CHART.</p> <p>(iv) The Contractor to depute your authorized representative to attend the progress review meeting to be held at site or at GSECL Corporate office.</p>	S. No.	Pre-requisite	Milestone Schedule achievement (from the date of LOI)	1	Placement of order of all equipment and on Approval of Design and GFC drawings from client/ GSECL.	03 Months (1st Milestone)	2	Completion of Supply 100%	7 Months (2nd Milestone)	3	Completion of Erection 100%	9 Months (3rd Milestone)	4.	Completion of Commissioning.	10 Months (04th Milestone)
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2	Completion of Supply 100%	7 Months (2nd Milestone)														
3	Completion of Erection 100%	9 Months (3rd Milestone)														
4.	Completion of Commissioning.	10 Months (04th Milestone)														
11	<p>SECURED ADVANCE AGAINST NON-PERISHABLE MATERIALS:</p> <p>Clause No. 35 of GCC stands deleted</p>															
12	<p>Price quoted is to be firm inclusive of all taxes and duties, labour cess, freight, insurance etc. but excluding GST as per GCC Cl no. 13.</p> <p>The Contractor shall issue tax invoices, file appropriate returns, and deposit the applicable GST to the account of appropriate government within the time limit prescribed under the GST Law. In the event of any default, Contractor shall be liable to pay any penalty/demand raised on EPIL due to default by Contractor, and the same shall be recovered from the Contractor.</p> <p>The Contractor shall be responsible for the issuance of E-way bill and other compliances relating to e-way bill as per GST law. The Employer will deduct GST at source at the applicable rates in case transactions under the contract are liable to GST deduction at source as per the prevailing provisions of GST Law.</p> <p>As per Rule 36(4) of CGST Rules and the corresponding restriction of eligible ITC, it is important that the respective Vendor/Supplier/Contractor reports the details of outward supplies in its FORM GSTR-1, on timely basis, to facilitate auto-population of details in FORM GSTR-2A at EPIL's end. In case, such details do not auto-populate in FORM GSTR-2A of EPIL, due to fault/mistake/ delay at Vendor/Supplier/Contractor's end, EPIL will not disburse the GST component to the respective Supplier. In other words, only when the Vendor/Supplier/Contractor discloses the details of outward supplies in its FORM GSTR-1 and the corresponding ITC gets auto-populated in FORM GSTR-2A, EPIL will be in a position to avail ITC and consequently disburse the tax component to the Suppliers. Any GST component, even if already disbursed by EPIL, would be recoverable</p>															

	by EPIL as a deduction from future bills or by any other means as per the contractual terms.																														
13	TAXES AND DUTIES																														
	The following shall be also read with clause no 13 of GCC: (i) The bidder/Contractor must be registered with GST for Gujarat and should have valid GSTIN number. (ii) The bidder/contractor must submit as a compliance of GST Act, the invoices in GST compliant format failing which the GST amount shall be recovered/ adjusted by EPI without any prior notice from the next invoices or available dues with EPI. (iii) The bidders/contractors are requested to update/upload the GST/Taxes data periodically so as to enable EPI to avail ITC credit failing which EPI shall be recover/ adjust the same without any prior notice from the next invoices or available dues with EPI. (iv) Rates quoted in this tender shall be all inclusive with all other taxes and duties, cess etc. excluding GST. It may change at prevailing rate from time to time as reimbursed by client. (v) Bidder while quoting the rates in the tender must also consider the ITC credit applicable for the works, if any.																														
14	ESCALATION / PRICE VARIATION																														
	Clause 16.0 of GCC stands good. No escalation/ price variation clause shall be applicable on this contract																														
15	INSURANCES																														
	In addition to the GCC clause 17, 18 & 19, EPI will take care of all the policy such as EAR, CAR and Marine policy etc. except Workmen's Compensation Policy (WCP) and the amount shall be recovered from the bidder's bill on Pro-Rata Basis. Any other risk which bidder anticipates and does not cover in this policy, the bidder shall take as per the requirement.																														
16	PAYMENT TERMS																														
	Clause No. 37 of GCC amends as below: A) Against Supply of Material <table><tr><th>S. No.</th><th>Description</th><th>Weightage</th></tr><tr><td>i</td><td>On Approval of Drawings as per BBU</td><td>10.0%</td></tr><tr><td>ii</td><td>Supply of Equipment (On MRC) as per BBU</td><td>70.0%</td></tr><tr><td>iii</td><td>After successful E & C</td><td>10.0%</td></tr><tr><td>iv</td><td>On Successful PG Test</td><td>5.0%</td></tr><tr><td>v</td><td>After completion of all punch points against submission of equivalent amount of BG (till defect liability period)</td><td>5.0%</td></tr></table> B) Against Erection, Testing and Commissioning <table><tr><th>S. No.</th><th>Description</th><th>Weightage</th></tr><tr><td>i</td><td>On successful Erection of Equipment</td><td>80%</td></tr><tr><td>ii</td><td>On successful PG Test</td><td>10%</td></tr><tr><td>iii</td><td>Punch Point</td><td>10%</td></tr></table>	S. No.	Description	Weightage	i	On Approval of Drawings as per BBU	10.0%	ii	Supply of Equipment (On MRC) as per BBU	70.0%	iii	After successful E & C	10.0%	iv	On Successful PG Test	5.0%	v	After completion of all punch points against submission of equivalent amount of BG (till defect liability period)	5.0%	S. No.	Description	Weightage	i	On successful Erection of Equipment	80%	ii	On successful PG Test	10%	iii	Punch Point	10%
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i	On successful Erection of Equipment	80%																													
ii	On successful PG Test	10%																													
iii	Punch Point	10%																													

	The detailed billing breakup (BBU) will be finalized during execution with successful bidder.
17	LAND FOR LABOUR HUTS/ SITE OFFICE AND STORAGE ACCOMMODATION
	<p>In addition to GCC Clause no 28.1, It is bidder responsibility to arrange on its own cost of following</p> <ol style="list-style-type: none"> 1. Labour Hutment 2. Storage unit 3. Site Establishment
18	HEALTH & SANITARY ARRANGEMENTS
	<p>The following shall be also read in conjunction with GCC clause no. 30</p> <p>EPI will issue (form-V) and contractor has to take labour license in its own name.</p> <p>The contractor shall, unless otherwise provided in the GCC clause reference, make its own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.</p> <p>The contractor shall, if required by the engineer, deliver to the engineer a return in detail, in such form and at such intervals as the engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the contractor on the site and such other information as the engineer may require.</p> <p>The contractor shall also be responsible for labour welfare and for arranging labour and other licenses/permits/clearance etc. For the project at their own. In case epi has to take labour license or and other licenses, all expenditure towards the same shall also be borne by the contractor. The contractor shall comply with all the requirements as per labour laws/acts. All the records in this regard shall be maintained by contractor as per statutory requirements and rules and shall be produced by the contractor on demand if required.</p> <p>During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and by e laws of the state or central government or local authority and any other labour law (including rules), regulations, byelaws that may be passed or notification that may be issued under any labour law in future either by the state or the central government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The contractor shall keep the employer indemnified in case any action is taken against the employer by the competent authority on account of contravention of any of the provisions of any act or rules made there under, regulations or notifications including amendments. If the employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/acts/rules/regulations including amendments, if any, on the part of the contractor, the engineer/employer shall have the right to deduct any money due to the contractor including his amount of performance security. The employer/engineer shall also have right to recover from the contractor any sum required or estimated to be required for making good the loss or damage suffered by the employer. The employees of the contractor and the sub-contractor in no case shall be treated as the employees of the employer at any point of time.</p> <p>In building and other construction work. Salient features of some major labour laws applicable to establishments Engaged in building and other construction work.</p>

	<p>A) Workmen compensation act 1923:- the act provides for compensation in case of injury by accident arising out of and during the course of employment.</p> <p>B) payment of gratuity act 1972:- gratuity is payable to an employee under the act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death the rate of 15 days wages for every completed year of service. The act is applicable to all establishments employing 10 or more employees.</p> <p>C) Employees p.f. and miscellaneous provision act 1952: the act provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the act are:</p> <p>(I) Pension or family pension on retirement or death, as the case may be. (II) Deposit linked insurance on the death in harness of the worker. (III) Payment of PF. accumulation on retirement/death etc. (IV) Contractors are assigned to submit copy of "ecr" electronic challan fees of the pf deposited by 20th of next month.</p> <p>D) Maternity benefit act 1951:- the act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.</p> <p>E) Contract labour (regulation & abolition) act 1970:- the act provides for certain welfare measures to be provided by the contractor to contract labour and in case the contractor fails to provide, the same are required to be provided, by the principal employer by law. The principal employer is required to take certificate of registration and the contractor is required to take license from the designated officer. The act is applicable to the establishments or contractor of principal employer if they employ 20 or more contract labour.</p> <p>F) Minimum wages act 1948:- the employer is supposed to pay not less than the minimum wages fixed by appropriate government as per provisions of the act if the employment is a scheduled employment. Construction of buildings, roads, and runways are scheduled employments.</p> <p>G) Payment of wages act 1936:- it lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.</p> <p>H) Equal remuneration act 1979:- the act provides for payment of equal wages for work of equal nature to male and female workers and for not making discrimination against female employees in the matters of transfers, training and promotions etc.</p> <p>I) Payment of bonus act 1965:- the act is applicable to all establishments employing 20 or more employees. The act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing rs.3500/-per month or less. The bonus to be paid to employees getting rs.2500/- per month or above up to rs.3500/- per month shall be worked out by taking wages as rs.2500/-per month only. The act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the state governments have reduced the employment size from 20 to 10 for the purpose of applicability of this act.</p> <p>J) Industrial disputes act 1947:- the act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal</p>
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	<p>and what are the requirements for laying off or retrenching the employees or closing down the establishment.</p> <p>K) Industrial employment (standing orders) act 1946:- it is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the states and central government to 50). The act provides for laying down rules governing the conditions of employment by the employer on matters provided in the act and get the same certified by the designated authority.</p> <p>L) Trade unions act 1926:- the act lays down the procedure for registration of trade unions of workmen and employers. The trade unions registered under the act have been given certain immunities from civil and criminal liabilities.</p> <p>M) Child labour (prohibition & regulation) act 1986:- the act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in building and construction industry.</p> <p>N) Inter-state migrant workmen's (regulation of employment & conditions of service) act 1979:- the act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.</p> <p>O) The building and other construction workers (regulation of employment and conditions of service) act 1996 and the cess act of 1996:- all the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the government. The employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodations for workers near the work place etc. The employer to whom the act applies has to obtain a registration certificate from the registering officer appointed by the government.</p> <p>P) Factories act 1948:- the act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.</p>
19	WATER & ELECTRICITY
	<p>Clause 44 of GCC amended as under:</p> <p>(i) The contractor shall submit EPI/GSECL within 3 weeks from the date of letter of acceptance about his electrical power requirements, to allow the planning of the same by GSECL. The L.T. / H.T. electric power will be made available at single point. Further extension will have to be carried out by the contractor as per requirement at their cost. The necessary charges will be recovered as per the tariff rate of Dakshin Gujarat Vij Company Limited (DGVCL) / Paschim Gujarat Vij Company Limited (PGVCL) from time to time. Power supply for labour and staff colony shall be provided at one point and Contractor shall be charged at rates as referred above.</p>

	<p>(ii) Free Supply of Service Water will be made available for construction and drinking purposes as a single point at works site to be decided by EPI/GSECL.</p> <p>(iii) Free Supply of Service air shall be provided at one nearest available point.</p> <p>(iv) The contractor shall advise EPI/GSECL within 3 weeks from the date of letter of acceptance about his exact requirement of space for his office, storage area, preassembly and fabrication areas, etc. Above requirements shall be reviewed by GSECL's Engineer and the space as decided by GSECL will be allotted to the Contractors for construction of his temporary structures, facilities like offices, storage sheds, pre-assembly and fabrication areas etc. for contractor's as well as his sub-contractors use. Land for staff and labour colony shall not be provided by EPI/GSECL and Contractor has to make his own arrangement for the same at his own cost.</p> <p>(v) All the tools and tackles including Cranes / loading - unloading arrangements/ any other special tools and tackles shall have to be arranged by bidder at their own cost. However, as a backup services, facilities of EOT crane along with operator may be provided on chargeable basis by EPI/GSECL at his discretion depending upon the availability of the same, if required during execution of work. However, as GSECL is purely generating company, it does not have any facility for huge / large scale erection works. The contractor shall have no claims, whatsoever in case of non-availability of the construction equipment being provided by GSECL as back up service and the work shall be carried out by the Contractor as per Schedule.</p> <p>(vi) Area lighting shall be provided by GSECL as per its own scheme. However, any additional lighting required for the safe execution of the work shall be arranged by the Contractor. Any damage caused due to inadequate lighting shall be made good by the Contractor at his own Cost.</p>
20	MATERIALS TO BE PROVIDED BY THE CONTRACTOR
	<p>In Addition to clause 45 of GCC:</p> <p>(i) If any material for the execution of this contract is procured with the assistance of EPI either by issue from its stores or purchase made under orders of permits or licenses obtained by EPI, the contractor shall hold and use the said materials economically and solely for the purpose of this contract and shall not dispose them without the written permission of Engineer-In-Charge. The contractor, if required by EPI, shall return all such surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination on whatsoever reason, on being paid or credited such price as EPI shall determine having due regard to the conditions of materials.</p> <p>(ii) All the materials are deemed to be in scope of contractor and shall be arranged by him, however if any such material is procured with assist of EPI, a handling charges of 10% plus GST on actual purchase cost shall be levied and recovered from RA bills of contractors.</p>
21	ALTERATION IN SPECIFICATION, DESIGN & DRAWING
	Clause No. 69 stands deleted
22.	COMPENSATION FOR DELAY AND REMEDIES

	<p>Clause 72.1 and 72.4 amended as below</p> <p>A) LIQUIDATED DAMAGES FOR DELAYS IN COMPLETION OF SUPPLIES / SERVICES-WORKS –</p> <p>i) For delay in Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS. due to reason attributed to the Bidder, the liquidated Damage shall be considered 0.5 % per week or part thereof plus GST and cess as applicable on total contract price for the delay beyond schedule date of pre commissioning of the facilities.</p> <p>ii) If due to delay in supply, erection and commissioning of any material / facility, the commissioning of DCS Package is not affected due to reason attributed to the bidder, then the liquidated Damage for delay shall be imposed 0.5 % per week or part thereof plus GST and cess as applicable on the cost of delayed portion.</p> <p>iii) Maximum liquidated damage payable on account of delay in supply, erection and commissioning of the DCS Package considered in I & II above is 10% plus GST and cess as applicable of the total contract price.</p> <p>Note:</p> <p>(i) Each of the liquidated damages specified above shall be independent and these liquidated damages shall be levied concurrently as applicable.</p> <p>(ii) Total Liquidated Damages (LD) shall not exceed ten percent (10%) plus GST and cess as applicable of the Contract Price.</p> <p>(iii) Contract Price shall be considered here to be the total of Basic Price (for the contract of work and supply excluding O&M contract) with GST and cess as applicable.</p>
23	WORKS TO BE OPEN TO INSPECTION:
	<p>All works executed or under the course of execution in pursuance of this contract shall at all times be open to inspection and supervision of EPI. The work during its progress or after its completion may also be inspected, by chief technical examiner of government of India (CTE) and/ or an inspecting authority of state government of state in which work is executed and/or by third party checks by owner/ clients. The compliance of observations/ improvements as suggested by the inspecting officers of EPI/CTE/ state authorities/ owners shall be obligatory on the part of the contractor at the cost of contractor.</p> <p>Any recovery, penalty imposed by CTE due to non-performance, non-compliance of agreed condition or otherwise whatsoever the same shall be recovered from RA bill/final bill of contractor.</p>
24	DEFECT LIABILITY PERIOD
	<p>Clause no. 74 OF GCC amended as:</p> <p>a. The Contractor warrants that the Facilities or any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.</p> <p>b. The Defect Liability Period shall be Twelve (12) months from the date of successful Completion of the Facilities (or any part thereof) or Eighteen (18) months</p>

	<p>from the date of completion of supply whichever occurs first. If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair, replacement or making good of any defects or of any damage to the Facilities arising out of or resulting from any of the following causes:</p> <ul style="list-style-type: none"> (i) Improper operation or maintenance of the Facilities by the Employer. (ii) Operation of the Facilities outside specifications provided in the Contract. (iii) Normal wear and tear. <p>c. The Contractor's obligations under this Clause shall not apply to:</p> <ul style="list-style-type: none"> i. Any materials that are supplied by the Employer (Employer-Supplied Plant, Equipment and Materials), that are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein. ii. Any designs, specifications or other data designed, supplied or specified by or on behalf of the Employer or any matters for which the Contractor has disclaimed responsibility herein. iii. Any other materials supplied or any other work executed by or on behalf of the Employer, except for the work executed by the Employer under Sub- Clause (g) hereunder. <p>d. The Employer shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.</p> <p>e. The Employer shall afford the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations under the Clause of Defect Liability. The Contractor may, with the consent of the Employer, remove from the Site any Plant and Equipment or any part of the Facilities that are defective, if the nature of the defect and/or any damage to the Facilities caused by the defect is such that repairs cannot be expeditiously carried out at the Site.</p> <p>f. If the repair, replacement or making good is of such a nature that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests. If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests. The tests, in character, shall in any case be not inferior to what has already been agreed upon by the Employer and the Contractor for the original equipment/part of the Facilities.</p> <p>g. If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days, the</p>
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	<p>Employer may following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection be deducted by the Employer from any monies due to the Contractor or claimed under the Performance Securities.</p> <p>h. If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons. Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/ replacement shall have the Defect Liability Period for a period of twelve (12) month from the time such replacement/repair of the Facilities or any part thereof has been completed. However, all such extended defect liabilities shall be expiring on completion of 24 months from the date of successful completion of PG test.</p> <p>i. At the end of the Defect Liability Period, the contractor liability ceases except for latent defects. The contractor's liability for latent defects warranty for the plant and equipment including spares shall be limited to a period of five (5) years from the end of Defect Liability Period of the respective plant and equipment including spares. For the purpose of this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the Defect Liability Period as defined in the Clause of Defect Liability, but later.</p> <p>j. Except as provided in the Clause of Defect Liability (Loss of or Damage to Property / Accident or Injury to Workers / Indemnification), the Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Facilities or any part thereof, the Plant and Equipment, design or engineering or work executed that appear after Completion of the Facilities or any part thereof, except where such defects are the result of the gross negligence, fraud, criminal or willful action of the Contractor.</p> <p>k. In addition, the Contractor shall also provide an extended warranty for any such component of the Facilities and for the period of time as may be specified in the tender bid documents. Such obligation shall be in addition to the defect liability specified at (b) above.</p>
25	PRIORITY OF WORK:
	The contractor has to deploy resources and plan the work accordingly and nothing extra shall be payable to the contractor on this account. The contractor has to ensure safety of the occupants as to avoid any hazard to occupants.
26	FORCE MAJEURE
	<p>Clause no 75 of GCC amended as below</p> <p>(i) The force majeure events shall mean presence of any one or combination of more than one or all the circumstances enumerated below:-</p> <p>(ii) Act of God, epidemic, extremely adverse and inhuman conditions, earthquake, landslides, volcanic, flood, cyclone, lightening, radioactive or chemical contamination and any other unforeseen natural disaster beyond the control of human beings.</p>

	<p>(iii) An act of war or war like situation (declared or undeclared) invasion, armed conflict or any other activity of foreign enemy, blockage, embargo, riots insurrection, terrorist attack, military act ion and politically motivated bandhs.</p> <p>(iv) Strikes or boycotts (other than involving the contractor or his employees attributable to the omissions and acts of the contractor or his employees) adversely affecting the operation (s) of the work.</p> <p>(v) Any order or judgment of the court of competent jurisdiction or statutory authority made against either party to the contract or the contractor/ successful Contractor in any of the proceedings for reasons other than:</p> <ul style="list-style-type: none"> a) Failure of the successful Contractor to comply with any law applicable and governing the conditions of the contract. b) Breach of any law applicable and governing the conditions of the contract c) Enforcement of any agreement or vital condition of the contract. d) Any other events or circumstance of a nature analogous to any of the foregoing
27	ARBITRATION
	<p>General Conditions of Contract (GCC) Sub Clause no. 76.3 of Arbitration is amended as given below.</p> <p>76.3 JURISDICTION:</p> <p>The courts in New Delhi alone will have jurisdiction to deal with matters arising from the contract</p>
28.	RESPONSIBILITY TO COMPLETE THE WORK
	<p>The CONTRACTOR shall deploy sufficient plant & equipment of the required and in good working condition for completion of the works in stipulated time with required quality, the equipment should either be owned by the CONTRACTOR or hired/leased. The deployment of equipment by CONTRACTOR shall be as decided by EPI and the same shall not be less than the minimum deployment stipulated by the Client, if any for execution of "Works" and as per schedule agreed with EPI. The CONTRACTOR shall make arrangement for regular maintenance including preventive and breakdown maintenance and maintain stock of essential spares at site/near to site so as to ensure minimum breakdown time of equipment. The equipment once brought to site shall not be allowed to be removed without the consent of EPI. In case the CONTRACTOR fails to deploy sufficient equipment to the satisfaction of EPI or in case of prolonged breakdown of equipment, EPI at its sole discretion shall arrange the required equipment and debit all the related costs including 10% overheads of EPI and shall recover the same from the due payments of CONTRACTOR, including from its bank guarantees Retention money /other dues available with EPI.</p>
29	Materials Procured With the Assistance of EPI:
	<p>If any material for the execution of this contract is procured with the assistance of EPI either by issue from its stores or purchase made under orders of permits or licenses obtained by EPI, the contractor shall hold and use the said materials economically and solely for the purpose of this contract and shall not dispose them without the written permission of Engineer-In-Charge. The contractor, if required by EPI, shallis return all such surplus or unserviceable materials that may be left with him after the completion of</p>

	<p>the contract or at its termination on whatsoever reason, on being paid or credited such price as EPI shall determine having due regard to the conditions of materials.</p> <p>All the materials are deemed to be in scope of contractor and shall be arranged by him, however if any such material is procured with assist of EPI, a handling charges of 10% plus GST on actual purchase cost shall be levied and recovered from RA bills of contractors.</p>
30	DEPLOYMENT OF SUFFICIENT PLANT AND EQUIPMENT
	The contractor has to deploy resources and plan the work accordingly and nothing extra shall be payable to the contractor on this account. The contractor has to ensure safety of the occupants as to avoid any hazard to occupants.
31	WITHDRAWAL OF OFFER
	If any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the downloaded tender which are not acceptable to the EPIL, then the EPIL shall, without prejudice to any other right or remedy, be at liberty to forfeit entire amount of Earnest Money as aforesaid.
32	RELEASE OF FINAL BILL
	<p>The final bill will be submitted by the contractor within 60 days from the date of acceptance of completion of work accompanied by the following documents :</p> <ul style="list-style-type: none"> i) Completion certificate issued by the Engineer-in-Charge specifying the handing over of the work including list of inventories (fittings & fixtures) ii) Computerized stage wise payment schedule. iii) No claim certificate by the contractor. iv) No claim certificate from the sub-agencies / vendors engaged by the contractor. v) All quality documents including royalty challan and measurement books. vi) All statutory approvals from various state / central govt. local bodies, if required for completion & handing over of the work as included in scope of Contractor. vii) Manufacture's guarantee of various machines / equipment's installed as part of works. viii) All operation and maintenance manuals. ix) As built' drawings.
33	LOSS OR DAMAGE TO PROPERTY, ACCIDENT OR INJURY TO WORKERS, INDEMNIFICATION
	The Contractor shall indemnify and hold harmless the EPIL and its officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property (other than the Chimney whether accepted or not), arising in connection with the construction of the Chimney and by reason of the negligence of the Contractor or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Employer, its contractors, employees, officers or agents.
34	PROTECTION OF WORK
	The contractor shall have total responsibility for protecting his works till it is finally taken over by the Client. No claim will be entertained by the owner or the engineer for any damage or loss to the contractor's works and the contractor shall be responsible for the complete restoration of the damaged works to its original condition to comply with the specifications and drawings. Should any such damage to the contractor's works occur because of other party not under his supervision or control, the contractor shall make his claim directly with the party concerned. If dis-agreement or conflict or dispute develops between the contractor and the other party or parties concerned regarding the

	responsibility for damage to the contractor's works the same shall be resolved as per the provisions of the clause 7.0 above-entitled co-operation with other contractors. The contractor shall not cause any delay in the repair of such damaged works because of any delay in the resolution of such disputes. The contractor shall proceed to repair the work immediately and the cause thereof will be assigned pending resolution of such dispute.
35	MANDATORY SAFETY REQUIREMENTS
	<ul style="list-style-type: none"> i. The Contractor shall comply with all the requirements of "The Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act," 1996 and its Central Rule 1998 / State Rules and any other statutory requirements as applicable. ii. The GENERAL SAFETY RULES and TERMS AND CONDITIONS REGARDING INDUSTRIAL LAWS AND OTHER RELATED MATTER are to be strictly observed by the contractor. iii. The Contractor shall at his own expenses arrange for the safety provisions as given below in respect of all Labour directly or indirectly employed for performance of the works and shall provide all facilities in connection therewith. All necessary personal safety equipment shall be available for use of persons on the site and Contractor shall take adequate steps to ensure proper use of equipment by those concerned. iv. Workers shall be provided with Helmet, Safety Shoe, High Visibility Jacket, Glove, Safety Belt / Full body safety Harness etc. v. Those engaged in handling any material which is injurious to eyes shall be provided with protective Goggles. vi. The machinery, plant & equipment to be deployed by contractor shall be in good working condition. vii. Bidder shall strictly ensure that the labours will not cause any damage to the cultivating land or cause any hindrance to existing operations in the existing facilities. viii. Bidder must reconcile Safety issues with EPI safety Officer on daily basis. ix. The Contractor shall have the approved Safety; Health and Environment (SHE) Policy in respect of Safety and health of Building Workers and it shall be circulated widely and displayed at conspicuous place in Hindi and local language understood by the majority of the workers. A copy of the safety policy should be submitted to Engineer in charge. x. Bidder shall take all necessary precautions to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to the activities of the contractor on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be immediately made good by the contractor at his own cost to the satisfaction of the Client. The contractor shall also take all necessary safety measures with specific reference to excavation in rock, at his own cost, to avoid any harm or injury to his workers and staff from the equipment and facilities of the power plant. xi. The Contractor shall follow GSECL Safety Rules as issued from time to time with respect to safety in construction & erection.

	<p>xii. The Contractor shall provide suitable latest Personal Protective Equipments of prescribed standard to all their employees and workmen according to the need. The Engineer I/c shall have the right to examine these safety equipments to determine their suitability, reliability, acceptability and adaptability. The Contractor should also ensure these before their use at worksite.</p> <p>xiii. The Contractor shall follow and comply with all the Safety Rules, standards, code of practices of GSECL and relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any protest or contest or reservation. In case of any unconformity between statutory requirement and the Safety Rules of the Owner referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent. As and when required he can refer / obtain copy of GSECL safety documents as stated above.</p> <p>xiv. All equipment used in construction and erection by the Contractor shall meet BIS / International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's operation manual. The Contractor should also follow Guidelines / Rules of the Owner in this regard.</p> <p>xv. In pursuant to this Contract, any period within which a bidder, fails to complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform / carry out activities as a result of Force Majeure.</p>																				
36	REMOVAL AND RESTORATION OF ALL FOULING																				
	The scope of Contractor shall also include supply of all the required materials, Services / works involved and Civil works for removal and restoration of all fouling, obstructions etc for construction. Bidder is required to visit the site and assess all the fouling, obstructions etc which can be foreseen for completion of Chimney. All such works are to be completed within the scheduled time period. Any unforeseen fouling, obstructions etc. whatsoever encountered during the execution of the contract is to be removed and restored without any time and cost implication to EPIL. Bidder has to quote the bid accordingly.																				
37	TECHNICAL STAFF FOR WORK																				
	In addition to GCC clause no. 27 following technical staff to be deputed at site by contractor																				
	<table><tr><th>S. No.</th><th>Qualification</th><th>Nos</th><th>Minimum experience (Years)</th><th>Rate of recovery in case non-compliance in Rs.</th></tr><tr><td>1</td><td>Project Manager with degree in Instrumentation Engineering and Experience in Execution of DCS based control system Erection works.</td><td>01</td><td>12</td><td>1,00,000.00</td></tr><tr><td>2</td><td>Instrumentation Engineer with degree in Instrumentation Engineering and Experience.</td><td>01</td><td>05</td><td>60,000.00</td></tr><tr><td>3</td><td>Billing Engineer with degree/ diploma in Instrumentation engineering.</td><td>01</td><td>05</td><td>40,000.00</td></tr></table>	S. No.	Qualification	Nos	Minimum experience (Years)	Rate of recovery in case non-compliance in Rs.	1	Project Manager with degree in Instrumentation Engineering and Experience in Execution of DCS based control system Erection works.	01	12	1,00,000.00	2	Instrumentation Engineer with degree in Instrumentation Engineering and Experience.	01	05	60,000.00	3	Billing Engineer with degree/ diploma in Instrumentation engineering.	01	05	40,000.00
S. No.	Qualification	Nos	Minimum experience (Years)	Rate of recovery in case non-compliance in Rs.																	
1	Project Manager with degree in Instrumentation Engineering and Experience in Execution of DCS based control system Erection works.	01	12	1,00,000.00																	
2	Instrumentation Engineer with degree in Instrumentation Engineering and Experience.	01	05	60,000.00																	
3	Billing Engineer with degree/ diploma in Instrumentation engineering.	01	05	40,000.00																	

	4	Qualified Safety Engineer for maintaining Safety measures / workshop	01	05	40,000.00
	5	Store Keeper with any graduate degree	01	04	25,000.00
	6;	HR/ Payroll administration staff for documentation of Labour Muster roll, Overtime, minimum Wages and record certification from local Labour office etc.	01	04	30,000.00
	Note: In case of non-deployment, EPIL will deploy Engineer and amount will be debited to the agency.				
38	FURNISHED OFFICE ACCOMODATION AND MOBILITY AND COMMUNICATION TO BE PROVIDED BY CONTRACTOR TO EPI: Clause No 28.3 of GCC amended as below: 1. Office Furniture up to Rs. 5 Lakhs to be provided by contractor as and where as per instructions of Engineer In charge.				
39	GCC clause no. 84 is modified as under				
	<p>With the issue of Letter of Acceptance (LOA), the event of signing of agreement shall be done only after receipt and verification of Security Deposit Cum Performance Bank Guarantee (SDPG) or within such extended time, as may be granted by EPI.</p> <p>The cost of stamp papers, stamp duty, registration, if applicable on the contract, shall be borne by the contractor. In case, the Contractor doesn't sign the agreement as above, or doesn't start the work within scheduled times his Earnest Money is liable to be forfeited and Letter of Acceptance consequently will stand withdrawn.</p>				
40	GCC clause no. 85 is modified as under:				
	<p>i. The agreement as per the prescribed Performa as enclosed to the additional conditions of contract shall be signed at the office of EPI within days as per GCC clause no. 84. The Contractor shall provide for signing of the contract appropriate power of attorney in favour of the authorized representative duly attested by Notary public and the requisite document/materials. Till a formal contract is prepared and executed, the Letter of Acceptance read in conjunction with the bidding document will constitute a binding contract.</p> <p>ii. The agreement will be signed in two originals and three more copies, EPI shall retain the "Original", the Contractor shall be provided with the other signed original and the remaining three copies will be retained by EPI. In case of a dispute of any kind whatsoever, the "Original" retained by EPI alone shall be treated as the "Original Agreement".</p> <p>iii. The Contractor shall provide free of cost to EPI all the engineering data, drawings and descriptive material submitted along with the bid in atleast five(5) copies to form an integral part of the agreement within days as per GCC clause no. 84.</p> <p>iv. Subsequent to signing of the agreement, the Contractor at his own cost shall provide to EPI with atleast five (5) true hard bound copies of agreement along with all the enclosures viz. Letter of Acceptance, Tender Documents etc. within days as per above GCC clause no. 84.</p>				
41	The price quoted should be inclusive of customs duty also.				
42	The bidder should comply with the FEMA provisions also where ever applicable				

43	The bidder should obtain all necessary clearances and other related statutory requirements etc as applicable for import of materials if any without any additional cost to EPIL.
44	Any inspection required by EPIL and Client for pre dispatch clearance of the materials either with in the India or outside India, the relevant expenses may be borne by bidder only.
45	The Successful Bidder shall furnish data and provide Work Completion Certificates/ Work Orders on provenness for critical equipment, auxiliaries, system and bought-out items which have been manufactured/ got manufactured by OEMs and supplied by the bidder/ manufacturer or manufactured/ got manufactured by proposed sub-vendors before placement of order and these are in successful operation in at least one plant for a period not less than one year prior to 30 days of initial date of Techno-commercial Bid Opening.



**Engineering Projects (India) Limited
(A Govt. of India Enterprise)**



**GENERAL CONDITIONS OF
CONTRACT FOR CONSTRUCTION
WORKS (GCC) – 2024**



ENGINEERING PROJECTS (INDIA) LIMITED

(A Govt. of India Enterprise)

GENERAL_CONDITIONS_OF_CONTRACT-2024 FOR CONSTRUCTION WORKS



ENGINEERING_PROJECTS_(INDIA)_LIMITED
(A_Govt._of_India_Enterprise)

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GENERAL CONDITIONS OF CONTRACT

1.0 GENERAL

The Contract means the documents forming the Tender and acceptance thereof and the formal agreement executed between the Competent Authority on behalf of EPI and the Contractor, together with the documents referred to therein including these conditions, the Specifications, Designs, Drawings and Instructions issued from time to time by the Engineer-In-Charge and all relevant documents taken together, shall be deemed to form one Contract and shall be complementary to one another.

1.1 In the Contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them.

1.2 Engineering Projects (India) Limited, hereinafter called 'EPI' proposes to get the works executed as mentioned in the Contract on behalf of Owner/ Client.

1.3 The work will be executed as per Drawings "GOOD FOR CONSTRUCTION" to be released by EPI unless otherwise specified elsewhere in the Tender Documents.

1.4 OTHER DEFINITIONS

- a) **ENGINEER-IN-CHARGE** means the Regional Office In-Charge of EPI himself or an engineer of EPI nominated by the Regional Office In-Charge for supervision and/or project management of the project from time to time.
- b) **WORKS OR WORK** The expression works or work shall unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the Contract Contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.
- c) **CONTRACTOR** The Contractor shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.
- d) **DRAWINGS** mean the Drawings referred to in the Bill of Quantities, specifications and any modifications of such Drawings or such other Drawings as may from time to time be approved or furnished by EPI.
- e) **SITE** means the lands and other places on, under, in or through which the works are to be executed or carried out and any other lands or places provided by EPI or used for the purpose of the agreement.
- f) **APPROVAL** means approved in writing including subsequent written confirmation of previous verbal approval.

- g) **WRITING** means any manuscript typed, written or printed statement under or over signature and/or seal as the case may be.
- h) **MONTH** means English Calendar month. 'Day' means a Calendar day of 24 Hrs each.
- i) **CONTRACT VALUE** means the sum for which the Tender is accepted as per the Agreement/ Letter of Acceptance/ Letter of Intent.
- j) **LANGUAGE:** All documents and correspondence in respect of this Contract shall be in English Language. In case of any discrepancy between the English version and the Hindi version of these documents, the provisions contained in the English version shall be applicable.
- k) **BILL OF QUANTITIES** or **SCHEDULE OF QUANTITIES** means the priced and completed Bill of Quantities or Schedule of Quantities forming part of the Tender.
- l) **OWNER/ CLIENT / EMPLOYER** means the Government, Organization, Authority, Company, Ministry, Department, Society, Cooperative etc. who has awarded the work/ project to EPI and/ or appointed EPI as Implementing / Executing Agency/ Project Manager and/ or for whom EPI is acting as an agent and on whose behalf EPI is entering into the Contract and getting the work executed.
- m) **IMPLEMENTING/ EXECUTING AGENCY** means EPI
- n) **TENDER** means the Contractor's priced offer to EPI for the execution and completion of the work and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Acceptance/ Letter of Intent. The word **TENDER** is synonymous with Bid and the word **TENDER DOCUMENTS** with "Bidding Documents" or "offer documents".
- o) The headings in the clauses/ conditions of Tender Documents are for convenience only and shall not be used for interpretation of the clause/ condition.
- p) Words imparting the singular meaning only also include the plurals and vice versa where the context requires. Words imparting persons or parties shall include firms and corporations and organizations having legal capacities.
- q) **APPROVED INSURANCE COMPANY** means any Insurance Company registered with 'Insurance Regulatory & Development Authority' (IRDA) of India and meeting insurance needs of the projects of EPI.

2.0 SITE VISIT AND COLLECTING LOCAL INFORMATION

Before tendering, the tenderer is advised to visit the Site, its surroundings to assess and satisfy themselves about the local conditions such as the working and other constraints at Site, approach roads to the Site, availability of water & power supply, applicability of taxes, duties and levies etc., nature of

ground, soil and sub-soil condition, underground water table level, accommodations they may require etc., river regime, river water levels, other details of river, streams & any other relevant information required by them to execute the complete scope of work. The tenderer may obtain all necessary information as to risks, weather conditions, contingencies & other circumstances (insurgencies etc.) which may influence or affect their tender prices. Tenderer shall be deemed to have considered Site conditions whether he has inspected it or not and to have satisfied himself in all respects before quoting his rates and no claim or extra charges whatsoever in this regard shall be entertained / payable by EPI at a later date.

2.1 ACCESS BY ROAD

Contractor, if necessary, shall build temporary access roads to the actual Site of construction for the works at his own cost to make the Site accessible. The Contractor shall maintain the same in motorable condition at all times as directed by Engineer-In-Charge at his own cost. The Contractor shall be required to permit the use of any roads so constructed by him for vehicles of EPI or any other agencies/ Contractors who may be engaged on the project Site, free of cost.

Non-availability of access roads or approach to Site, for the use of the Contractor shall in no case condone any delay in the execution of work nor be the cause for any claim for compensation.

2.2 HANDING OVER & CLEARING OF SITE

- 2.2.1 The Contractor should note that area for construction may be made available in phases as per availability and in conjunction with pace of actual progress of work at Site. The work may be required to be carried out in constrained situations. The work is to be carried out in such a way that the traffic, people movement, if any, is kept operative and nothing extra shall be payable to the Contractor due to this phasing / sequencing of the work. The Contractor is required to arrange the resources to complete the entire project within total stipulated time. Traffic diversion, if required, is to be done and maintained as per specification by the Contractor at his own cost and the Contractor shall not be entitled for any extra payment, whatsoever, in this regard.
- 2.2.2 Efforts will be made by EPI to handover the Site to the Contractor free of encumbrances. However, in case of any delay in handing over of the Site to the Contractor, EPI shall only consider suitable extension of time for the execution of the work. It should be clearly understood that EPI shall not consider any revision in Contract price or any other compensation whatsoever viz. towards idleness of Contractor's labour, equipment etc.
- 2.2.3 The Contractor shall be responsible for removal of all over-ground and underground structures (permanent, semi-permanent and temporary) and constructions from the Site. The cost to be incurred in this regard shall be

deemed to be included in the quoted rates of Bill of Quantities items and Contractor shall not be entitled for any extra payment whatsoever, in this regard. Old structures on the proposed Site, if required, shall be demolished by the Contractor properly. The useful material obtained from demolition of structures & services shall be the property of the Owner/EPI and these materials shall be stacked in workmanship like manner at the place specified by the Engineer- in-charge.

- 2.2.4 If required, the Contractor has to do site clearance, enabling work, barricading, diversion of Roads, shifting/ realignment of existing utility services, drains, nallahs etc. at his own cost as per direction of Engineer-In-Charge and the Contractor shall not be entitled for any extra payment whatsoever in this regard.
- 2.2.5 Necessary arrangements including its maintenance are to be made by the Contractor for temporary diversion of flow of existing drain and road, as the case may be. The existing drain, road would be demolished, wherever required, with the progress of work under the scope of proposed project. The existing Road and Drain, which are not in the alignment of the said project but are affected and/ or need to be demolished during execution for smooth progress of the project, shall be restored to its original status and condition (including black topping) by the Contractor at his own. The cost to be incurred by Contractor in these regards shall be deemed to be included in the quoted rates of the Bill of Quantities items and Contractor shall not be entitled for any extra payment whatsoever, in these regards.
- 2.2.6 The Contractor shall be responsible to co-ordinate with service provider/ concerned authorities for cutting of trees, shifting of utilities and removal of encroachments etc. and making the Site unhindered for completion of work. This shall include initial and frequent follow up meetings/ actions/ discussions with each involved service provider/ concerned authorities. The Contractor shall not be entitled for any additional compensation for delay in cutting of trees, shifting of utilities and removal of encroachments by the service provider/ concerned authorities.
- 2.2.7 The information about the public utilities (whether over ground or underground) like electrical/ telephone/ water supply lines, OFC Cables, sewer lines, open drains etc. is the responsibility of Contractor who has to ascertain the utilities that are to be affected by the works through the site investigation and collection of information from the concerned utility Owners.
- 2.2.8 The Contractor shall be responsible to obtain necessary approval from the respective authorities for shifting/ re-alignment of existing public utilities. EPI shall only provide necessary letters required for liaisoning by the Contractor in obtaining the approval from the concerned authorities.
- 2.2.9 Any services affected by the works must be temporarily supported by the Contractor who must also take all measures reasonably required by the various bodies to protect their services and property during the progress of works. It shall be deemed to be the part of the Contract and no extra payment shall be made to the Contractor for the same. Shifting/ re-alignment of public utilities should be done without disturbing the existing one. New service lines

should be laid and connected before dismantling the existing one.

- 2.2.10 Shifting/ re-alignment of existing public utilities shall be done by the Contractor as per technical requirement of respective bodies or as per direction of Engineer-In-Charge. Shifting/ re-alignment of public utilities includes all materials, labours, tools and plants and any other expenses whatsoever for the same. The cost to be incurred in this regard shall be deemed to be included in his quoted rates of BOQ items and the Contractor shall not be entitled for any extra payment, whatsoever, in this regard. In case any of these services are shifted by the State Govt./ local authorities themselves for which deposit as per their estimates is to be made to them, the Contractor shall deposit the same and the Contractor shall be paid only at the rates quoted by him in BOQ for quantity specified in the BOQ, if such items are included in the BOQ irrespective of amount paid by him to the State Govt./ local authorities for execution of these works. In case such provision is not made in the BOQ or the quantity exceeds those specified in the BOQ, the same is deemed to be included in the rates quoted by him for other items in BOQ and nothing extra shall be payable to Contractor on this account.

3.0 SCOPE OF WORK

- 3.1 The scope of work covered in this Tender shall be as per the Bill of Quantities, Specifications, Drawings, Instructions, Orders issued to the Contractor from time to time during the pendency of work. The Drawings for this work, which may be referred for tendering, provide general idea only about the work to be performed under the scope of this Contract. These may not be the final drawings and may not indicate the full range of the work under the scope of this Contract. The work will be executed according to the Drawings to be released as "GOOD FOR CONSTRUCTION" from time to time by the Engineer-In-Charge of EPI and according to any additions/ modifications/ alterations/deletions made from time to time, as required by any other drawings that would be issued to the Contractor progressively during execution of work. It shall be the responsibility of the Contractor to incorporate the changes that may be in the scope of work, envisaged at the time of tendering and as actually required to be executed.
- 3.2 The quantities of various items as entered in the "BILL OF QUANTITIES" are indicative only and may vary depending upon the actual requirement. The Contractor shall be bound to carry out and complete the stipulated work irrespective of the variation in individual items specified in the Bill of Quantities. The variation of quantities will be governed as per clause No. 69 of GCC.

4.0 VALIDITY OF TENDER

The validity of offer(s) submitted by Tenderer shall be ninety (90) days from the last date of submission of the Tender. The earnest money will be forfeited without any prejudice to any right or remedy, in case the Contractor withdraws his offer(s) during the validity period or in case he changes his offer to his benefits, which are not acceptable to EPI. The validity period may be extended on mutual consent.

5.0 ACCEPTANCE OF TENDER

EPI reserves to itself the Authority to reject any or all the Tenders received without assigning any reason. The acceptance of a Tender shall be effective w.e.f. the date on which the e-mail/ letter of intent or acceptance of the Tender is put in the communication by EPI. EPI also reserves the right to split the work among two or more parties at lowest negotiated rate without assigning any reason thereof. The Contractor is bound to accept the portion of work as offered by EPI after split up at the quoted/ negotiated rates.

6.0 SET OF TENDER DOCUMENTS:

The following documents will complete a set of Tender Documents.

A) VOLUME I :

- a) Notice Inviting Tenders & Instructions to tenderers
- b) General Conditions of Contract
- c) Additional Conditions of Contract

B) VOLUME II :

- a) Technical Specifications, Bill of Quantity
- b) Tender Drawings

C) VOLUME III :

- a) Schedule of Rates/ Bills of quantities (Price-Bid)

7.0 EARNEST MONEY DEPOSIT

Earnest Money Deposit (EMD) of amount as mentioned in "Memorandum" to "Form of Tender" required to be submitted along with the Tender shall be in the form of Demand Draft payable at place as mentioned in "Notice Inviting Tender" in favour of 'Engineering Projects (India) Limited' from any Nationalized bank / Scheduled Bank or in the form of Bank Guarantee from any Nationalized bank / Scheduled Bank as per the enclosed format or Insurance Surety Bond or Online Mode in acceptable format. The EMD shall be valid for minimum period of 150 days (One hundred fifty Days) from last day of submission of Tender.

- 7.1** Any tender received without requisite Earnest Money Deposit (EMD) along with 'Letter of Undertaking' shall be rejected and such tenderer(s) shall be considered non-responsive bids.
- 7.2** The EMD of all unsuccessful tenderers shall be returned after the opening of price bids by EPI. EMD of successful tenderer shall be refunded after submission of Security Deposit cum Performance Guarantee by him.
- 7.3** Once the tenderer has given an unconditional acceptance to the tender conditions in its entirety, he is not permitted to put any remark(s)/conditions(s)

(except unconditional rebate on price, if any) in/ along-with the Tender.

7.4 In case the condition 7.3 mentioned above is found violated at any time after opening of Tender, the Tender shall be summarily rejected and EPI shall, without prejudice to any other right or remedy, be at liberty to forfeit the full said Earnest Money absolutely.

7.5 No interest will be payable by EPI on the said amount covered under EMD/Other security documents.

7.6 At any time after the due date of the Tender, if any tenderer alters /modifies/withdraws his tender within the validity period (or the extended validity period) of his tender or fails to furnish the "Security Deposit cum Performance Guarantee" or the "Additional Performance Guarantee" or fails to execute the "Contract Agreement" within the prescribed time period after the placement of LOI on him, EPI without prejudice to any other rights or remedies shall be at liberty to forfeit the Earnest Money deposited by the tenderer. In the event of retender, such tenderer shall not be allowed to submit tender.

8.0 MOBILIZATION ADVANCE

8.1 Mobilisation Advance payments up to the maximum amount specified in the Memorandum to the Form of Tender shall be made to the Contractor upon submission of an irrevocable and unconditional bank guarantee from a nationalised or scheduled bank for an amount equal to 110% of the mobilisation advance. The guarantee must be in accordance with the proforma given in the attachment, subject to the conditions set out below. The mobilisation advance shall be granted at the interest rate specified in the memorandum accompanying the tender form. This advance shall be disbursed in three installment , as follows:-

i. The initial installment of 50% (fifty percent) of the total mobilisation advance shall be paid after the fulfilment of the following conditions:

1. The submission of the security deposit cum performance guarantee.
2. The signing of the agreement.

ii. The second installment of 25% (twenty-five percent) of the total mobilisation advance shall be paid after the establishment of a site office and the provision of the Contract, and the completion of enabling works required for the commencement of construction. These include the construction of a store and labour hutments, among other things.

iii. The remaining balance may be paid upon certification by the engineer of the Contractor's achievement of a financial progress of 10 (ten) percent of the Contract price.

8.2 Recovery of such sums advanced shall be made by the deduction from the Contractors bills commencing after first Ten percent (10%) of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time eighty percent (80%) of the gross value of the Contract is executed and paid, together with interest due on the entire outstanding amount

upto the date of recovery of the installment.

- 8.3** Part 'Bank Guarantees' (BGs) against mobilization advance shall be furnished in as many numbers as the number of recovery installment as given in "Memorandum" to the "Form of Tender" and should be equivalent to the amount of each recovery instalment. At any point of time, if the Contractor's payable amount on account of work done is not available with EPI or the amount payable is less than the recovery installment, recovery of such advance shall be effected by encashing the BG of equivalent recovery amount. The decision of EPI in this regard shall be final and binding on the Contractor. The validity period for the part BGs shall be till three months after the end of the month in which instalment is due to be recovered with further three months claim period.
- 8.4** In case recovery of Mobilization Advance is delayed, interest shall be charged @12% (Twelve percent) per annum on delayed recoveries due to late submission of bills by the Contractor or due to delayed encashment of Bank Guarantee, as stated above or due to any other reasons whatsoever.
- 8.5** Contractor is required to furnish the Utilization Certificate for each instalment of mobilization advance to the satisfaction of Engineer-In-Charge. Subsequent installment of mobilization advance shall be released only after getting satisfactory utilization certificate from the Contractor for the earlier released installment.
- 8.6** Notwithstanding what is contained in aforesaid clauses, no mobilization advance whatsoever shall be payable, if payment of mobilization advance is not mentioned in the "Memorandum" to the "Form of Tender".

9.0 SECURITY DEPOSIT CUM PERFORMANCE BANK GUARANTEE

Within 21 (Twenty-One) days from the date of issue of Letter of Acceptance/ Letter of Intent or within such extended time as may be granted by EPI in writing, the Contractor shall submit to EPI a Performance Security in the form Bank Guarantee (format enclosed), from any Nationalized bank / Scheduled Bank / Commercial Bank or in the form of Insurance Surety Bonds (format enclosed) or Account Payee Demand Draft or online Payment in an acceptable form.

The value of the Performance Security shall be as specified in the Memorandum to the Form of Tender for the due and proper execution of the Contract. This Performance Security if submitted in the form of bank guarantee or Insurance Surety Bond (ISB) shall remain valid up to 90 (ninety) days after the end of defects liability period.

However, a penal rate of interest @ 12% per annum shall be charged for the delay in submission of SDPG after 21 days beyond the time as may be granted by EPI in writing.

In case the Contractor fails to submit the Security Deposit cum Performance Guarantee of the requisite amount within the stipulated period or extended period, Letter of Acceptance/ Letter of Intent will stand withdrawn and EMD of

Contractor shall be forfeited.

9.1 ADDITIONAL PERFORMANCE GUARANTEE FOR EXISTING CONTRACTORS

In case bidder is a working Contractor of EPI at the time of issuance of Letter of Acceptance/ Letter of Intent for the work, the bidder has to furnish an additional Performance Guarantee of 1% (One Percent) of the Contract Value of the work, in case working capacity of the bidder is less than the aggregate of balance work-load of all the works of the bidder with EPI as on date of placement of LOI for this work. The balance workload shall also include the value of work awarded but not yet started and finally approved value of this work. This additional Performance Guarantee shall be in addition to the Security Deposit cum Performance Guarantee of the works to be furnished by the bidder as specified in the clause no. 9 of General Conditions of Contract. Further, no relaxation in Security Deposit cum Performance Guarantee as in clause no. 9 of General Conditions of Contract shall be made in case working capacity works-out to be more than the balance value of works as mentioned above. The working capacity of the Contractor shall be calculated as under:

WORKING CAPACITY = 2.5 X (Average Turnover of the party as per latest three audited Balance Sheets).

NOTE: The decision of amount of additional Performance Guarantee as above shall be taken by EPI and shall be final & binding to the Contractor.

In case the Contractor fails to submit the additional performance guarantee of therequisite amount within 21 days from the date of issue of letter of Acceptance or within such extended time as may be granted by EPI in writing, the letter of Acceptance/ Letter of Intent will stand withdrawn and EMD of the Contractor shall be forfeited.

9.2 ABNORMALLY HIGH AND LOW RATED ITEMS

For item rate tenders if, the rates quoted by the lowest bidder for certain items of the Bill of Quantities of the Tender are found to be abnormally high or low in comparison to the Market Rate analysis of the item done by EPI and/or in comparison to EPI's method of working out market rate justification for the items, the same shall be governed as under: -

For Abnormally High Rated items (AHR), the progressive payment shall be 80% (Eighty percent) of the payment due to the Contractor against execution of the AHR items. The balance withheld 20% (twenty percent) payment shall be released after 80% of total value of the original Contract is completed in financial terms in order to ensure that the Abnormally Low Rated (ALR) items identified at the time of Award of work have been executed as per requirement of project and as per terms of Contract. Further, deviation limit for AHR items shall be nil on plus side and 100% on minus side. The provision of deviation limit of clause 69.1(v) shall not apply to AHR items. In case of deviation of quantities given in

schedule of quantities for AHR items on plus side, the same shall be governed by clause 69.2. The decision of Engineer-In-Charge of EPI in this regard shall be final and binding on the Contractor.

The decision of EPI on identification/marketing of AHR and ALR items is final and binding on the Contractor. In case the Contractor does not agree to the identified AHR and ALR items, at the time of award of works, the EMD/Security Deposit cum Performance Guarantee of the Contractor shall be forfeited and decision of EPI in this regard shall be final & binding on the Contractor.

In case of Abnormally Low Bid, EPI may in such cases seek written clarifications from the bidder, including detailed price analyses of its bid price in relation to scope, schedule, allocation of risks and responsibilities, and any other requirements of the bids document. If after evaluating the price analyses, EPI determines that the bidder has substantially failed to demonstrate its capability to deliver the Contract at the offered price, the Procuring Entity may reject the bid/ proposal and forfeit the EMD.

The provision of para 9.2 shall not be applicable on tenders invited on Percentage Rate/lump Sum basis/ EPC basis.

10.0 RETENTION MONEY

The Retention Money shall be deducted from each running bill of the Contractor at 5% (five percent only) of the gross value of the Running Account bill. The Earnest Money Deposited by the tenderer in the form of Demand Draft will be treated as part of the Retention Money. The Retention Money shall be refunded to the Contractor after expiry of defects liability period (referred to in Clause No. 74) or on payment of the amount of the final bill whichever is later.

If the amount of Retention Money deduction in cash is more than Rs.10.00 lakhs (Rupees Ten lakhs only), the excess amount can be refunded to Contractor against submission of Bank Guarantee of equivalent amount from a Nationalized bank / Scheduled Bank in the prescribed proforma of Performance Guarantee of EPI.

11.0 MOBILIZATION OF MEN, MATERIALS AND MACHINERY:

- 11.1** All expenses towards mobilization at Site and de-mobilization including bringing in equipment, work force, materials, dismantling the equipment, clearing the Site etc. shall be deemed to be included in prices quoted and no separate payment on account of such expenses shall be entertained.
- 11.2** It shall be entirely the Contractor's responsibility to provide, operate and maintain all necessary construction equipment, scaffoldings and safety gadget, lifting tackles, tools and appliances to perform the work in a workman like and efficient manner and complete all jobs as per the specifications and within the schedule time of completion of work. Further, Contractor shall also be responsible for obtaining temporary electric and water connection for all purposes. The Contractor shall also make standby arrangement for water &

electricity to ensure un-interrupted supply.

- 11.3** It shall be the responsibility of the Contractor to obtain the approval for any revision and/ or modification desired by him from EPI before implementation. Also such revisions and/or modifications if accepted / approved by EPI shall be carried at no extra cost to EPI.
- 11.4** The procurement and supply in sequence and at the appropriate time of all materials and consumable shall be entirely the Contractor's responsibility and his rates for execution of work shall be inclusive of supply of all these items.
- 11.5** It is mandatory for the Contractor to provide safety equipment and gadgets to its all workers, supervisory and Technical staff engaged in the execution of the work while working. The minimum requirement (but not limited to) shall be gumboots, safety helmets, Rubber hand gloves, facemasks, safety nets, belts, goggles etc. as per work requirements. Sufficient nos. of these equipment and gadgets shall also be provided to EPI by the Contractor at his own cost for use of EPI Officials and/ or workforce while working/ supervision at Site. No staff/ worker shall be allowed to enter the Site without these equipment/ gadgets. The cost of the above equipment/ gadgets are deemed to be included in the rates quoted by the Contractor for the items & works as per Bill of Quantities and Contractor shall not be entitled for any extra cost in these regard. The above norm is to be strictly complied with at Site. In case the Contractor is found to be deficient in providing Safety Equipment/ Gadgets in the opinion of Engineer-In-Charge, the Engineer- In-Charge at his option can procure the same at the risk & cost of Contractor and provide the same for the use of worksite and shall make the recoveries from the bills of the Contractor for the same. The decision of the Engineer-In-Charge shall be final and binding on Contractor in this regard.
- 11.6** All Designs, Drawings, Bill of Quantities, etc. (except Bar Bending Schedule, Shop & Fabrication Drawings) for all works shall be supplied to the Contractor for all buildings services and development works by EPI in phased manner as the works progress. However it shall be the duty and responsibility of the Contractor to bring to the notice of EPI in writing as to any variation, discrepancy or any other changes required and to obtain revised drawings and designs and / or approval of EPI in writing for the same.
- 11.7** One copy of Contract documents including Drawings furnished to the Contractor shall be kept at the Site and the same shall at all reasonable times be available for inspection.
- 11.8** All materials, construction plants and equipment etc. once brought by the Contractor within the project area, will not be allowed to be removed from the premises without the written permission of EPI. Similarly all enabling works built by the Contractor for the main construction undertaken by him, shall not be dismantled and removed without the written Authority of EPI.
- 11.9** Contractor shall have to prepare the Bar Bending Schedule, Shop and Fabrication Drawings free of cost, if required for any of the items of work. Five copies of these Drawings each including for revision will be submitted to EPI for approval. Before executing the item, Bar Bending Schedule, Shop & Fabrication

Drawings should be got approved from EPI.

12.0 INCOME TAX & GST:

12.1 Contracts to be inclusive of all Taxes/Duties including GST:

The rates quoted by the Contractor shall be deemed to be inclusive of all taxes, duties, cess and statutory levies payable under any law (as applicable on the date of submission of bid) by the Contractor in connection with execution of the Contract.

12.2 Variation in Taxes/Duties & Imposition of New Taxes/Duties:

In case of any reduction in rate of GST or other taxes in future or the project getting exemption status starting from seven days prior to the last date of bid submission or afterwards, the subContractor shall pass on the benefit to EPI immediately, failing which EPI shall have the right to recover the differential amount from the amounts due to the sub-Contractor. Further, in case of any increase in rate of GST or other taxes in future or the project losing exemption status w.e.f. seven days prior to last date of bid submission or afterwards, the said increase of taxes shall be paid / reimbursed to the subContractor, subject to the condition that the client also reimburses the said increased taxes to EPI.

Further, the imposition of any new taxes, duties, levies etc during the currency of the Contract shall be borne by Contractor and shall not be paid or reimbursed to the Contractor by EPI unless the same is received from the client.

12.3 Payment of Taxes/Duties & Adherence to procedural requirements under various enactments:

Notwithstanding anything contained above, the Contractor shall ensure payment of appropriate taxes, excise duty, custom duty, royalty, cess, levy and other taxes or duties etc. which may be levied by local/state/central government from time to time on all goods and services which may be used for the execution of work made under the Contract. The Contractor shall issue e-invoice/tax invoice having all the particulars prescribed under the applicable provisions of the GST law including description of goods/services, rate and amount of tax paid or payable on the supplies made under the Contract, so that EPI is able to avail Input Tax Credit ('ITC') wherever permissible. The Contractor shall comply with all applicable provisions of GST law including the circulars, notifications & instructions issued from time to time by the Government. The Contractor shall discharge his obligations for payment of taxes, filing of returns on or before the due dates etc. under the appropriate provisions of law in respect of all the taxes, duties, levies, cess, etc. EPI has the right to seek necessary evidence that the Contractor is registered under the law and is duly discharging its obligations under the various tax laws, enabling EPI to avail ITC. In the event of non-payment/default in payment of any taxes, duties, levies etc by Contractor, EPI reserves the right to withhold the dues/payments of Contractor.

12.4 Uploading of Invoice details on GST portal:

As per Section 16 of CGST Act read with Rule 36(4) of CGST Rules (as

amended from time to time) and the corresponding restrictions on the eligibility of ITC, it is important that the respective Vendor/Supplier/Contractor (hereinafter termed as 'Supplier') reports the details of outward supplies in its FORM GSTR-1, on timely basis, to facilitate auto-population of details in FORM GSTR-2A/2B at EPI's end. In case, such details are not auto-populated in FORM GSTR-2A/2B of EPI, due to fault/mistake/delay at Supplier's end, EPI will not disburse the GST component to the respective Supplier. In other words, only when the Supplier discloses the details of outward supplies in its FORM GSTR-1 and the corresponding ITC gets auto-populated in FORM GSTR-2A/2B, EPI will be in a position to avail ITC and consequently disburse the tax component to the Suppliers. Any GST component, even if already disbursed by EPI, would be recoverable by EPI as a deduction from future bills or by any other means as per the Contractual terms in case of any adverse action by GST Authorities on EPI.

12.5 Obtaining Registrations under various applicable Enactments:

The Contractor should obtain registration under the applicable enactment levying tax/ levy/cess on supply of goods or services.

12.6 Liability of Interest / Penalty under various Enactments:

In case EPI has to bear any liability (like interest / penalty etc) due to denial/reversal/delay of input tax credit in respect of the invoice submitted by the Contractors/vendors, for the reason attributable to the Contractors/vendors, the same shall be recovered from the RA Bills/bills of the Contractors/vendors.

12.7 Tax Deduction at Source:

- a. EPI will deduct GST at source at the applicable rates in case transactions under the Contract are liable to GST deduction at source as per the prevailing provisions of GST Law.
- b. Income tax deductions shall be made from all payments made to the Contractor including advances against work done, in accordance with the Income Tax act prevailing from time to time.

12.8 E-way Bill:

The Contractor shall be responsible for the issuance of E-way bill and other compliances relating to e-way bill as per GST law.

12.9 Other Charges:

Stamp duty and registration charges, if any, payable on the executed Contract document, shall be borne by the Contractor.

13.0 LABOUR CESS:

The rates of the Contractor shall be inclusive of labour cess. EPI shall make a recovery @ 1% on account of labour cess from each RA bill of the Contractor and labour cess so recovered/deducted shall be deposited (if required) with the Labour Board of the concerned state.

Every Contractor, sub-Contractor, affiliates, their legal assigns or heirs as the

case may, shall be responsible for adherence to The Buildings and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and The Building and Other Construction Workers' Welfare Cess Act, 1996.

The Contractor shall also be responsible for maintaining register of beneficiaries i.e. the workers in such form & the same shall be kept open at all reasonable times for inspection of relevant Authority and officials of client / EPI.

In the event of Contractor failing to comply with the above clause(s) in part or in full, EPI, without prejudice to any other rights or remedy available under law or any other clause(s) of Contract, shall be at absolute liberty to forfeit any sum or sums that are payable or could become payable on account of execution of Contract work and decision of Engineer-in-charge shall be final & binding in this regard on the Contractor.

14.0 ROYALTY ON MATERIALS:

The Contractor shall deposit royalty / seignories charges and obtain necessary permit for supply of bajri, stone, kankar, sand, etc. from the local authorities and quoted rates shall be inclusive of royalty.

15.0 RATES TO BE FIRM

- 15.1** The rates quoted by the tenderer shall be firm and fixed for the entire period of completion and till handing over of the work. No revision to rates or any escalation shall be allowed on account of any increase in prices of materials, labour, POL and Overheads etc or any other statutory increase during the entire Contract period or extended Contract period.
- 15.2** The Contractor shall be deemed to have inspected the Site, its surrounding and acquainted itself with the nature of the ground, accessibility of the Site and full extent and nature of all operations necessary for the full and proper execution of the Contract, space for storage of materials, construction plant, temporary works, restrictions of working time, restrictions on the plying of heavy vehicles in area, supply and use of labour, materials, plant, equipment and laws, rules and regulations, if any, imposed by the local authorities.
- 15.3** The rates and prices to be tendered in the Bill of Quantities are for completed and finished items of works complete in all respects. It will be deemed to include all construction plant, labour, supervision, materials, transport, all temporary works, erection, maintenance, Contractor's profit and establishment/overheads, together with preparation of designs & drawings pertaining to casting yard, shop drawing, fabrication drawing (if required), staging form work, stacking yard, etc. all general risk, taxes, royalty, duties, cess, octroi and other levies, insurance, liabilities and obligations set out or implied in the Tender Documents and Contract.
- 15.4** Unless otherwise specified in the Bill of Quantities (BOQ), the Contractor has to make his own arrangement for dewatering/ bailing out of water, effluent including

strutting, shoring etc at every stage of work wherever required (including Tunnel work) including working under foul condition as per direction of Engineer-In-Charge at his own cost and the Contractor shall not be entitled for any extra payment, whatsoever, in this regard.

15.5 If required to make work site suitable for execution, Contractor shall have to clear jungle including of rank vegetation, grass, trees etc., clear & clean existing drains/ canals (including strutting, shoring and packing cavities) and dispose them out of the Site up-to any lead and lift as per direction of Engineer-In-Charge. The Contractor should inspect the Site of work from this point of view. Unless otherwise specified in the Bill of Quantities, the cost to be incurred in this regard shall be deemed to be included in his quoted rates of BOQ items and the Contractor shall not be entitled for any extra payment in this regard.

15.6 If any temporary/ permanent structure is encountered or safety of such structure in the vicinity is endangered due to execution of the project, the Contractor has to protect the structures by any means as per direction of Engineer - in - Charge. If any damage caused to any temporary or permanent structure(s) in the vicinity is caused due to execution of the project, the Contractor has to make good the same by any means as per direction of Engineer - in - Charge. The Contractor should inspect the Site of work from this point of view. The cost to be incurred in this regard shall be deemed to be included in his quoted rates of BOQ items and the Contractor shall not be entitled for any extra payment in this regard.

16.0 ESCALATION / PRICE VARIATION

No claim on account of any Price Variation / Escalation on whatsoever ground shall be entertained at any stage of works. All rates as per Bill of Quantities (BOQ)/Price-Bid quoted by Contractor shall be firm and fixed for entire Contract period as well as extended period for completion of the works. No escalation/price variation clause shall be applicable on this Contract.

17.0 INSURANCE OF WORKS ETC.

Contractor is required to take Contractor's All Risk Policy or Erection All Risk Policy (as the case may be) including Marine Insurance from an Approved Insurance Company in the joint name with EPI and bear all costs towards the same for the full period of execution of works including the defect liability period for the full amount of Contract against all loss or damage from whatever cause arising for which he is responsible under the terms of the Contract and in such manner that EPI and the Contractor are covered during the period of construction of works and/or also covered during the period of defect liability for the loss or damage as under:

- a. The work and the temporary works to the full value of such works.
- b. The materials, construction plant, centring, shuttering and scaffolding materials and other things brought to the Site for their full value. Whenever required by EPI, the Contractor shall produce the policy or the

policies of insurance and the receipts for payment of the current premiums.

The Contractor is required to submit the original policy document and the receipt for payment of the current premium to EPI.

18.0 INSURANCE UNDER WORKMEN'S COMPENSATION ACT

Contractor is required to take insurance cover as per requirement of the Workmen's Compensation Act, 1923 amended from time to time from an Approved Insurance Company and pay premium charges thereof. Wherever required by EPI the Contractor shall produce the policy or the policies of Insurance and the receipt of payment of the current premiums.

19.0 THIRD PARTY INSURANCE

Contractor is required to take third party insurance cover for an amount of 5% (five percent) of Contract Value from an Approved Insurance Company for insurance against any damage, injury or loss which may occur to any person or property including that of EPI, arising out of the execution of the works or temporary works. Wherever required by EPI the Contractor shall produce the policy or the policies of Insurance and the receipt of payment of the current premiums.

In case of failure of the Contractor to obtain insurance for works, insurance under Workman Compensation Act and Third Party insurance as described above within one month from the date of commencement of work, running account payments of the Contractor shall be withheld till such time the aforesaid insurance covers are obtained by the Contractor.

20.0 INDEMNITY AGAINST PATENT RIGHTS

The Contractor shall fully indemnify EPI from and against all claims and proceedings for or on account of any infringement of any patent rights, design, trademark or name or other protected rights in respect of any construction plant, machine, work or material used for in connection with the works or temporary works.

21.0 LABOUR LAWS TO BE COMPLIED WITH BY THE CONTRACTOR

The Contractor shall obtain a valid license under the Contract labour (Regulation & Abolition) Act 1970 and the Contract Labour Act (R&A) Central Rules 1971 and amended from time to time, and continue to have a valid licence until the completion of the work including defect liability period. The Contractor shall also abide by the provision of the child labour (Prohibition and Regulation) Act. 1986 and as amended from time to time. Any failure to fulfil this requirement shall attract the penal provisions of this Contract arising out of the resultant non-

execution of the work.

The Contractor shall comply with the provisions of the payment of Wages Act, 1936, Minimum Wages Act, 1948, Employer's Liability Act, 1938, Workmen's Compensation Act, 1923, Maternity Benefit Act, 1961 and Mines Act -1932, Industrial Disputes Act, 1947 or any modifications thereof or any other law relating thereto and rules made there under from, time to time.

21.1 No labour below the age of 18 years shall be employed on the work.

22.0 LABOUR SAFETY PROVISION

The Contractor shall be fully responsible to observe the labour safety provisions.

23.0 OBSERVANCE OF LABOUR LAWS

23.1 The Contractor shall be fully responsible for observance of all labour laws applicable including local laws and other laws applicable in this matter and shall Indemnify and keep indemnified EPI against effect of non-observance of any such laws. The Contractor shall be liable to make payment to all its employees, workers and sub-Contractors and make compliance with labour laws. If EPI or the Client/ Owner/ Employer is held liable as "Principal Employer" to pay any amount or contributions etc. under legislation of Govt. or Court decision in respect of the employees of the Contractor, then the Contractor would reimburse the amount of such payments, contribution etc. to EPI and/ or same shall be deducted from the payments, Retention Money etc. of the Contractor.

23.2 The Contractor shall submit proof of having valid EPF registration certificate. In absence of the said certificate payment to the extent of 4.70% (four point seven percent) of the value of all the Running Account bills may be withheld by EPI and shall be released only after the production of the EPF registration certificate from the concerned authorities. If it is incumbent upon EPI to deposit withheld amount with EPF authorities, the withheld amount shall be deposited by EPI with EPF authorities. In such a case EPI shall not refund this withheld amount to the Contractor even after the production of EPF registration certificate.

23.3 The Contractor shall be liable to pay cess levied under the Building and other Construction Workers Welfare Cess Act, 1996, at such rates as may be notified by the Government from time to time. EPI shall deduct at source from every Running Account Bill of the Contractor, the said cess, at such rates for the time being prevailing, which shall not exceed 2% (two percent) but not be less than 1% (one percent) of the cost of construction incurred by EPI.

24.0 LAWS GOVERNING THE CONTRACT

This Contract shall be governed by the Indian Laws for the time being in force and amended from time to time.

25.0 LAWS, BYE LAWS RELATING TO THE WORK

The Contractor shall strictly abide by the provisions, for the time being in force, of law relating to works or any regulations and bye laws made by any local Authority or any water & lighting agencies or any undertakings within the limits of the jurisdiction of which the work is proposed to be executed. The Contractor shall be bound to give to the authorities concerned such notices and take all approvals as may be provided in the law, regulations or bye laws as aforesaid, and to pay all fees and taxes payable to such authorities in respect thereof.

26.0 EMPLOYMENT OF PERSONNEL

26.1 The Contractor shall employ only Indian Nationals as his representatives, servants and workmen after verifying their antecedents and loyalty. He shall ensure that no personnel of doubtful antecedents & integrity and any other nationality in any way are associated with the works.

26.2 EPI shall have full power to get removed immediately any representative, agent, servant and workmen or employees of the Contractor on account of misconduct, negligence or incompetence or whose continued employment may in the opinion of the Engineer-In-Charge be undesirable without assigning any reason for the removal. The Contractor shall not be allowed any compensation on this account whatsoever.

27.0 TECHNICAL STAFF FOR WORK

27.1 The Contractor shall employ at his cost the adequate number of technical staff during the execution of this work depending upon the requirement of work. For this purpose the numbers to be deployed, their qualification, experience as decided by EPI shall be final and binding on Contractor. The Contractor shall not be entitled for any extra payment in this regard. The technical staff should be available at Site, whenever required by EPI to take instructions.

27.2 Within 15 days from the date of Letter of Acceptance/ Letter of Intent, the Contractor shall submit a site organizational chart and Resume including details of experience of the Project-in-Charge and other staff proposed by him and shall depute them on the Project after getting approval from Engineer-In-Charge. If desired by the Contractor at later date, the Project-in-Charge and other staff whose resume is approved by EPI can be replaced with prior written approval of EPI and replacement shall be with equivalent or superior candidate only. Decision of Engineer-In-Charge shall be final and binding on the Contractor.

Even after approving the site organizational chart, the Engineer-In-Charge due to nature and exigency of work can direct the Contractor to depute such additional staff as in view of Engineer-In-Charge is necessary and having qualification and experience as approved by the Engineer-In-Charge. The removal of such additional staff from the Site shall only be with the prior written approval of

Engineer-In-Charge. The Contractor shall not be paid anything extra whatsoever on account of deployment of additional staff and decision of the Engineer-In-Charge shall be final and binding on the Contractor.

- 27.3** In case the Contractor fails to employ the staff as aforesaid, he shall be liable to pay a reasonable amount for each month of default in the case of each person. The decision of number of Technical Staff to be adequate for the project and the period for which the required technical staff was not employed by the Contractor and as to the reasonableness of the amount to be deducted on this account shall be final and binding on the Contractor.

Requirement of Technical Representative(s) and recovery Rate as per Additional Conditions of Contract.

28.0 LAND FOR LABOUR HUTS/ SITE OFFICE AND STORAGE ACCOMMODATION

- 28.1** The Contractor shall arrange the land for temporary office, storage accommodation and labour huts at his own cost and get the clearance of local authorities for setting up of labour camp and cost of same is deemed to be included in the rates quoted by the Contractor for the works. The Contractor shall ensure that the area of labour huts is kept clean and sanitary conditions are maintained as laid down by the local authorities controlling the area. The labour huts shall be so placed that it does not hinder the progress of work or access to the worksite. The vacant possession of the land used, for the purpose shall be given back by Contractor after completion of the work. The Retention Money of the Contractor shall be released only after Contractor demolishes all structures including foundations and gives back clear vacant possession of this land.

- 28.2** In the event the Contractor has to shift his labour camp at any time during execution of the work on the Instructions of local authorities or as per the requirement of the work progress or as may be required by EPI, he shall comply with such instructions at his cost and no claim whatsoever shall be entertained on this account.

28.3 FURNISHED OFFICE ACCOMMODATION & MOBILITY AND COMMUNICATION TO BE PROVIDED BY CONTRACTOR TO EPI

On acceptance of Tender, the Contractor at his own cost will provide following for EPI staff.

1. Construct a suitable furnished office at Site equipped with basic facilities such as telephone(s), fax, internet, photocopier, computer(s) & printer(s) along with operator(s), regular electricity, drinking water supply & Conference room for requisite meetings.
2. Vehicles for staff etc. as per the requirement of the project.
3. The Contractor shall provide consumable as required and maintain the aforesaid facilities intact/operational during the currency of the Contract including the defects liability period.

4. The Contractor shall also make sufficient arrangement for photography/ videography preferably by maintaining a camera/video camera at Site so that photographs video can be taken of any specific activity at any point of time.
 5. The Contractor shall have facility for planning on MS project software for the purpose of preparing progress report, etc.
- 28.4** The Contractor shall make all arrangements for ground breaking ceremony/ inaugural function etc for the project as required and the cost towards it is deemed to be included in his rates/offer. Any expenditure already incurred/to be incurred by EPI, shall be recovered from the Contractor.
- 28.5 PROTECTION OF TREES**
- Trees designated by the Engineer-In-Charge shall be protected from damage during the course of the works and earth level within one meter of each such tree shall not be changed. Where necessary, such trees shall be protected by providing temporary fencing.
- 29.0 WATCH & WARD AND LIGHTING**
- The Contractor shall at his own cost take all precautions to ensure safety of life and property by providing necessary barriers, lights, watchmen etc. during the progress of work as directed by Engineer-In-Charge.
- 30.0 HEALTH & SANITARY ARRANGEMENTS**
- In case of all labour directly or indirectly employed in work for the performance on the Contractor's part of this Contract, the Contractor shall comply with all rules and regulations framed by Govt. from time to time for the protection of health and sanitary arrangements for workers.
- 31.0 WORKMEN'S COMPENSATION ACT**
- The Contractor shall at all times indemnify EPI and Owner against all claims for compensation under the provision of Workmen's Compensation Act, 1923 or any other law in force, for any workmen employed by the Contractor or his sub-Contractor in carrying out the Contract and against all costs and expenses incurred by EPI therewith.
- 32.0 MINIMUM WAGES ACT**
- The Contractor shall comply with all the provisions of the Minimum Wages Act, 1948, Contract Labour Act (R&A) 1970, and rules framed there under and other labour laws/local laws affecting Contract labour that may be brought into force from time to time.

33.0 LABOUR RECORDS

The Contractor shall submit by the 4th & 19th of every month to the Engineer-In-Charge of EPI a true statement, showing in respect of the second half of the preceding month and the first half of the current month, respectively, of the following data :-

- a) The number of the labour employed by him (category-wise).
- b) Their working hours.
- c) The wages paid to them.
- d) The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused.
- e) The number of female workers who have been allowed Maternity Benefits under the Maternity Benefit Act, 1962 and the amount paid to them.
- f) Any other information required by Engineer-In-Charge.

34.0 RELEASE OF RETENTION MONEY AFTER LABOUR CLEARANCE

Retention Money of the work shall not be refunded till the Contractor produces a clearance certificate from the concerned Labour Officer. As soon as the work is virtually complete, the Contractor shall apply for the clearance certificate to the concerned Labour Officer under intimation to the Engineer-In-Charge. The Engineer-In-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the Contractor in respect of the work. If no complaint is pending, on record till three months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Retention Money will be released if otherwise due.

35.0 SECURED ADVANCE AGAINST NON-PERISHABLE MATERIALS

Interest free secured advance up- to a maximum of 75% (seventy five percent) of the Market Value of the materials or the cost of materials as derived from the tendered item rate of the Contractor, whichever is less, required for incorporation in the permanent works and brought to site and duly certified by EPI site Engineer shall be paid to the Contractor for all non-perishable items as per CPWD/ MORTH (as the case may be) norms. The advance will be paid only on submission of indemnity bond in the prescribed pro-forma.

The Contractor shall construct suitable go down at the Site of work for safe storage of the materials against any possible damages due to sun, rain, dampness, fire, theft etc. at his own cost. He shall also employ necessary watch & ward establishment for the purpose at his cost and risks such secured

advance shall be payable on other items of key construction materials, fragile and combustible with the approval of the Engineer-In-Charge provided the Contractor provides a comprehensive insurance cover for the full cost of such materials. The decision of the Engineer-In-Charge shall be final and binding on the Contractor in this matter. No secured advance shall however, be paid on high-risk materials such as ordinary glass, sand, petrol, diesel etc.

Amount of advance against each material shall be recovered within 3 months from the date of payment. In case recovery could not be made within the above period due to any reason, interest as applicable to mobilization advance and mentioned in the Memorandum shall be charged on the outstanding advance amount which shall be recovered/deducted on monthly basis.

36.0 MEASUREMENTS OF WORKS

- 36.1** Unless otherwise mentioned in the Bill of Quantities the measurements of works shall be done as per CPWD/MORTH specifications (as specified in Technical Specification of the Tender) and if the same is not given in the CPWD/MORTH Specifications, the same shall be measured as per latest relevant BIS codes in force. The quantity of steel reinforcement and the structural steel sections incorporated in the work shall be measured & paid on the basis of standard coefficients of sections as per BIS Codes of practice.
- 36.2** The Engineer-In-Charge shall, except as otherwise stated, ascertain and determine by measurement the value of work done in accordance with the Contract.
- 36.3** All items having financial value shall be entered in Measurement Book, level book, etc. prescribed by EPI so that a complete record is obtained of all work performed under the Contract. Items of non-financial value (which are not payable) may also be entered in Measurement Book at the sole discretion of the Engineer-In-Charge.
- 36.4** Measurements shall be taken jointly by the Engineer-In-Charge or his authorized representative and by the Contractor or his authorized representative.
- 36.5** Before taking measurements of any work the Engineer-In-Charge or the authorized person deputed by him for the purpose shall give a reasonable notice to the Contractor. If the Contractor fails to attend or send an authorized representative for measurement after such a notice or fails to countersign or to record the objection within a week from the date of measurement, then in any such event measurement taken by the Engineer-In-Charge or by the person deputed by him shall be taken to be correct measurements of the work.
- 36.6** The Contractor shall, without extra charge provide assistance with every appliance, labour and other things necessary for measurement.

Measurements shall be signed and dated by both parties each day on the Site on completion of measurement.

36.7 COMPUTERIZED MEASUREMENT BOOKS

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the Contract. All measurements of all items having financial value shall be entered by the Contractor and compiled in the shape of the Computerized Measurement Book as per the format of EPI so that a complete record is obtained of all the items of works performed under the Contract. All such measurements and levels recorded by the Contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the Contractor from the Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative.

After the necessary corrections made by the Engineer-in-Charge, the measurement sheets shall be returned to the Contractor for incorporating the corrections and for resubmission to the Engineer-in-Charge for the dated signatures by the Engineer-in-Charge and the Contractor or their representatives in token of their acceptance.

Whenever bill is due for payment, the Contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/test checked from the Engineer-in-Charge and/or his authorized representative. The Contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit it to EPI along with all the required documents e.g. measurement sheet, quality test reports, ESIC/EPF challans, Tax invoice, theoretical v/s actual consumption of material etc. No payment of RA bill shall be released until all obligations and documents as above as per direction of Engineer In-charge.

The Contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for checking of measurements / levels by the Engineer-in-Charge or his representative.

The Contractor shall give not less than seven days' notice to the Engineer-in-Charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the EPI to check the measurements recorded by Contractor and all provisions stipulated herein above or anywhere in the tender document shall be applicable to such checking of measurements or levels. It is also a term of this Contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the Contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

37.0 PAYMENTS

37.1 The bill shall be submitted by Contractor each month on or before the date fixed by the ENGINEER-IN-CHARGE for all works executed in previous months. The Contractor shall prepare computerized bills using the program as approved by Engineer-In-Charge as per prescribed format/ pro-forma.

37.2 The Contractor shall periodically submit Running Account (RA) bill in the prescribed Performa for the work done provided. Monthly RA Bill Should not be accepted value Less than $0.8 \times (\text{Awarded value})/(\text{Completion Period})$.

All RA-bills payments will be released subjects to receipt of payment from client. All running bills shall be accompanied with the photographs in sufficient nos. and angles illustrating the progress of work and which claims raised in RA bill are evident. The photographs shall be duly signed by the Contractor. The RA bill shall also accompany the progress chart showing status of work against agreed schedule delays and way to mitigate such delays. The payment against each RA bill shall only be released on receipt of corresponding bill payment from client to EPI.

The bill not submitted in the prescribed format may not be considered for payment. TDS shall be deducted on prescribed norms of the Govt. enforce time to time from the bills. In this regard, Client /EPI Guidelines amended up to date for submission of RA Bills shall be followed.

37.3 All running payments shall be regarded as 'on account' payments against



the final payment only and not as payments for work actually done and completed and / or accepted by EPI and shall not preclude the recovery for bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the Contract, or any part thereof, in this respect, or the accruing of any claim, nor shall it conclude, determine or affect in any way the powers of EPI under these conditions or any of them as to the final settlement and adjustments of the accounts or otherwise, or in any other way vary/ affect the Contract. The final bill shall be submitted by the Contractor within three months of completion of work, otherwise EPI's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on Contractor. Each Running Bill should be accompanied by two sets of requisite photographs as per direction of Engineer-In-Charge taken from various points depicting status of work as on Report/ Bill date along with Monthly Progress Report for the concerned month in the pro-forma to be given/ approved by Engineer-In-Charge. Intermittent progress photographs as and when required shall also be provided by the Contractor at his own cost as per direction of Engineer-In-Charge. No payment of running account bill shall be released unless it is accompanied by progress photographs and Monthly Progress Report as above. No further claims shall be made by the Contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payment of those items of the bill in respect of which there is no dispute, and for those items which are in dispute on account of quantity and/or rates shall be paid at approved quantity and/or rates by the Engineer-in Charge, within three months period reckoned from the date of receipt of the bill by the Engineer in-Charge or his authorized Assistant Engineer, complete with account of materials issued by the Department and dismantled materials also No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the Contractor to the Engineer-in-Charge.

- 37.4** It is clearly agreed and understood by the Contractor that notwithstanding anything to the contrary that may be stated in the agreement between EPI and the Contractor, the Contractor shall become entitled to payment only after EPI has received the corresponding payment(s) from the Client/ Owner for the work done by the Contractor. Any delay in the release of payment by the Client/ Owner to EPI leading to delay in the release of the corresponding payment by EPI to the Contractor shall not entitle the Contractor to any compensation/ interest from EPI.

Subject to clause 37.3 above, the payment due to the Contractor shall be made within fifteen days of getting the measurements verified from the Engineer-In-Charge or his subordinate/ representative and certification of bill by the Engineer-In-Charge.

- 37.5** All payments shall be released by RTGS/ online mode directly at the Bank account notified by the Contractor.
- 37.6** Direct payment to sub-vendor / sub-Contractor against Work done Bills – Request of Contractor shall have to be accompanied by an Indemnity

bond.

EPI shall not make payment directly to any sub-vendor or sub-Contractor, but may consider on specific request and authorization by the vendor/Contractor in writing in exceptional circumstances, as mentioned below, where the Contractor may be unable to make prompt payment to the sub-Contractor or sub-vendor, which affects the supplies of material & progress of work.

- a) Initiation of Insolvency proceedings against Contractor, (On request of Resolution Professional (RP) appointed by the Insolvency and Bankruptcy Board (IBB),
- b) Freezing of Contractor's Bank Account,
- c) Automatic debit from Contractor's Bank Account by the bank or any other creditor, or by any statutory Authority etc.
- d) Other than in circumstances, as mentioned above at SL. 01 to 03 , EPI may at its discretion or on advice of client decide to make direct payment to sub- vendors/ sub-Contractors/ labour/ labour supply agencies in circumstances when the Contractor is suspected to diversion of funds/ payments from EPI to other activities/projects instead of meeting the project liabilities

Where EPI agrees to release payment directly to the sub-vendor/ sub-Contractor, the Contractor shall submit the following documents/details for every payment.

- i) Request letter by authorized signatory of Contractor stating the reasons for direct payments.
- ii) Indemnity bond in the prescribed format, enclosed as Performa.
- iii) The acceptance of Indemnity bond shall be decided with concurrence of RO Incharge
- iv) Details of sub-vendor/sub-Contractor name, Bill details (Copy of the bill raised on main Contractor) bank details and net amount to be paid after recovery of all deductions.
- v) The main Contractor has to submit Running Account bill from time to time for the work done as per the terms of the Contract to arrive at net payable amount by EPI.

Indemnity Bond shall be applicable case to case basis in order to protect interest of EPI in line with timely completion of project.

Any such direct payment to the sub-vendor or sub-Contractor shall be limited to amount payable to the main Contractor at any point of time by EPI. Further, any such payments shall not relieve the Contractor from any of his liabilities, compliances of statutory requirements, tax compliances, or any other obligations under the Contract.

The decision of EPI shall be final and binding whether to accept or deny direct payment to sub-vendors/sub-Contractors

38.0 WORK ON SUNDAYS, HOLIDAYS AND DURING NIGHT

For carrying out work on Sunday and Holidays or during night, the Contractor will approach the Engineer-In-Charge or his representative at least two days in advance and obtain his permission. The Engineer-In-Charge at his discretion can refuse such permission. The Contractor shall have no claim on this account whatsoever. If work demand, the Contractor shall make arrangements to carry out the work on Sundays, Holidays and in two, three shifts with the approval of Engineer-in- Charge at no extra cost to EPI.

39.0 NO IDLE CHARGES TOWARDS LABOUR OR PLANT & MACHINERY ETC.

No idle charges or compensation shall be paid for idling of the Contractor's labour, staff or Plant & Machinery etc. on any ground or due to any reason whatsoever. EPI will not entertain any claim in this respect.

40.0 WORK TO BE EXECUTED IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS, ORDERS, ETC.

The Contractor shall execute the whole and every part of the work in the most substantial and workman like manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The Contractor shall also conform exactly, fully and faithfully to the Design, Drawings and Instructions in writing in respect of the work assigned by the Engineer-In-Charge and the Contractor shall be furnished free of charge one copy of the Contract Documents together with Specifications, Designs, Drawings.

The Contractor shall comply with the provisions of the Contract and execute the works with care and diligence and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these is specified or is reasonably inferred from the Contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.

The Contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the EPI/Client The Contractor shall, at his own expense and without delay supply to the Engineer-in-Charge samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the Contract. The Contractor shall, if requested by the Engineer-in Charge furnish proof, to the satisfaction of the Engineer-in-Charge that the materials so comply. The Engineer-in-Charge shall within thirty (30) days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval, fresh samples complying with the specifications laid down in the Contract. When materials are required to be tested in accordance with specifications, approval of the Engineer-in-Charge shall be issued after the test results are received. The Contractor shall at his cost submit the samples of

materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials. The Contractor shall, at his cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer-in-Charge and bear all charges including testing charges. The Engineer -in- Charge or his authorized representative shall always have access to the works and to all workshops and places where work component is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the Contractor shall afford every facility and every assistance in obtaining the right to such access. The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the Contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have Materials to be provided by the Contractor full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor. The Contractor shall at his own expense, provide a material testing lab at the site for conducting routine field tests. The lab shall be equipped at least with the testing equipment as specified

41.0 DIRECTION FOR WORKS

- 41.1** All works to be executed under the Contract shall be executed under the direction and subject to approval in all respect of the Engineer-In-Charge of EPI who shall be entitled to direct at what point or points and in what manner works are to be commenced and executed.
- 41.2** The Engineer-In-Charge and his representative shall communicate or confirm their instructions to the Contractor in respect of the execution of work during their Site inspection in a 'Works Site Order Book' maintained at the site office of Engineer-In-Charge. The Contractor or his authorized representative shall confirm receipt of such instructions by signing against the relevant orders in the book. The Contractor shall be bound to sign the site order book as and when required by Engineer-In-Charge and carry out compliance of instructions promptly to the satisfaction of Engineer-In-Charge.

42.0 ORDER OF PRECEDENCE OF DOCUMENTS

- 42.1** In case of difference, contradiction, discrepancy, dispute with regard to Conditions of Contract, Specifications, Drawings, Bill of Quantities and Rates

quoted by the Contractor and other documents forming part of the Contract, the following shall prevail in order of precedence.

- i) Contract Agreement
- ii) E-Mail, Letter of Acceptance/ Letter of Intent, detailed letter of Work Order along with statement of agreed variations and its enclosures.
- iii) Description in Bill of Quantity / Schedule of Quantities
- iv) Additional Conditions of Contract.
- v) General Conditions of Contract.
- vi) Technical specifications (General / Special Technical Specification) as given in the Tender Documents. Relevant B.I.S. Codes
- vii) Drawings
- viii) CPWD/ MORTH specifications (as specified in Technical Specification of the Tender) update with correction slips issued up to last date of receipt of Tenders.

42.2 If there are varying or conflicting provisions made in any one document forming part of the Contract, the Engineer-In-Charge shall be the deciding Authority with regard to the intention of the document which shall be final and binding on the Contractor.

42.3 Any error in description, quantity or rate in the Schedule of Quantities/items or Bill of Quantities or any omission there from shall not vitiate the Contract or release the Contractor from the execution of the whole or any part of the works comprised therein according to the Drawings and Specifications or from any of his obligations under the Contract.

43.0 TIME SCHEDULE & PROGRESS

43.1 Time allowed for carrying out all the works as entered in the Tender shall be as mentioned in the "Memorandum" to the "Form of Tender" which shall be reckoned from the Letter for Acceptance/ Letter of Intent is issued to the Contractor. Time shall be the essence of the Contract and Contractor shall ensure the completion of the entire work within the stipulated time of completion.

43.2 The Contractor must provide a CPM network/PERT chart/bar chart showing how the work will be completed within the agreed timeframe. This must be prepared in line with the Execution Milestones set out in the Additional Conditions of Contract and submitted to the Engineer In-charge for approval. Once approved, this Network/PERT Chart will form part of the agreement.

43.3 Contractor shall mobilize and employ sufficient resources for completion of all the works as indicated in the agreed BAR CHART/Network. No additional payment will be made to the Contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule even though the time schedule is approved by the Engineer-In-Charge.

- 43.4** During the currency of the work the Contractor is expected to adhere to the time schedule on miles stone and total completion and this adherence will be a part of Contractor's performance under the Contract. During the execution of the work Contractor is expected to participate in the review and updating of the Network/ BAR CHART undertaken by EPI. These reviews may be undertaken at the discretion of EPI either as a periodical appraisal measure or when the quantum of work order on the Contractor is substantially changed through deviation orders or amendments. The review shall be held at Site or any of the offices of EPI/ Owner or Consultant of EPI/ Owner at the sole discretion of EPI.
- 43.5** If at any time, it appears to the Engineer-In-Charge that the actual progress of work does not conform to the approved programme referred above, the Contractor shall produce a revised programme showing the modifications to the approved programme by additional inputs to ensure completion of the work within the stipulated time. The Contractor will adhere to the revised schedule thereafter. The approval to the revised schedule resulting in a completion date beyond the stipulated date of completion shall not automatically amount to a grant of extension of time to the Contractor.
- 43.6** Contractor shall submit fortnightly/ Monthly (as directed by Engineer-In-Charge) progress reports (5 copies) on a computer based program (program and software to be approved by Engineer-In-Charge) highlighting status of various activities and physical completion of work.
- 43.7** The Contractor shall send completion report along with as built drawings and maintenance schedule to the office of Engineer-In-Charge, of EPI in writing within a period of 30 days of completion of work.

44.0 WATER AND ELECTRICITY

The Contractor shall make his own arrangement for Water & Electrical power for construction and other purposes at his own cost and pay requisite electricity and water charges. The Contractor shall also make standby arrangement for water & electricity to ensure un-interrupted supply.

45.0 MATERIALS TO BE PROVIDED BY THE CONTRACTOR

The Contractor shall, at his own expense, provide all materials, required including Cement & Steel for the works.

The Contractor shall at his own expense and without delay, supply to the Engineer-in- Charge samples of materials to be used on the work and shall get the same approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the Contract. The Contractor shall, if requested by the Engineer-in- Charge furnish proof, to the satisfaction of the Engineer-In-Charge that the materials so comply.

The Contractor shall at his risk and cost submit the samples of materials to be tested or analysed and bear all charges and cost of testing unless specifically

provided for otherwise elsewhere in the Contract or specifications. The Engineer-In-Charge or his authorized representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the Contractor shall afford every facility and every assistance and cost in obtaining the right and visit to such access.

The Engineer-In-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-In-Charge shall be at liberty to employ at the expense of the Contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-In-Charge shall also have full power to require other proper materials to be substituted thereof and in case of default, the Engineer-In-Charge may cause the same to be supplied and all costs which may require such removal and substitution shall be borne by the Contractor.

45.1 CEMENT AND CEMENT GODOWN

Cement shall be procured by Contractor of 43 Grade conforming to BIS : 8112 Specification latest edition or higher Grade as directed by the Engineer-In-Charge. The cement shall be procured directly from the reputed manufacturers/stockist, which will have to be got approved from EPI in advance. Relevant vouchers and test certificates will be produced as and when required. The cement shall be stored by the Contractor in such suitable covered and lockable stores, well protected from climate and atmospheric effect. The cement godown shall be constructed by the Contractor as per CPWD specifications at his own cost. The cement will remain under double lock, one from EPI and other from Contractor. The cement in bags shall be stored in godowns in easy countable position. Cement bags shall be used on first in first out basis. Cement stored for beyond 90 days will be required to be tested at Contractors cost, before use in works.

45.2 STEEL & STEEL STOCKYARD

Steel conforming to BIS specifications (latest edition) shall be procured by the Contractor directly from reputed manufacturers/producers as approved by EPI. The manufacturer has to give a certificate that the material supplied is not a re-rolled product. Relevant vouchers & test certificates will be produced by the Contractor. Re-rolled sections will not be allowed.

Reinforcement steel, structural steel shall be stored and stacked in such manner so as to facilitate easy identification, removal etc. The Contractor shall take proper care to prevent direct contact between the steel and the ground/ water for which he shall provide necessary arrangement at his own cost including ensuring proper drainage of area to prevent water logging as per directions of the Engineer-In-Charge. If required, the reinforcement steel shall also be

protected, by applying a coat of neat cement slurry over the bars for which no extrapayment shall be made.

Test certificates for each consignment of steel shall be furnished and tests to be got carried out by the Contractor at his own cost from the authorized laboratory as per the directions of Engineer-In-Charge, before incorporating the materials in the work.

46.0 SCHEDULE OF QUANTITIES / BILL OF QUANTITIES

46.1 The quantities shown against the various items of work are only approximate quantities, which may vary as per the actual requirement at Site.

46.2 All items of work in the Bill of Quantities/ schedule of quantities shall be carried out as per the CPWD/ MORTH (as the case may be) specifications, drawings and instructions of the ENGINEER-IN-CHARGE of EPI and the rates shall include for supply of required materials including proper storage, consumables, skilled & unskilled labour, supervision, tools, tackles, plant & machinery complete as called for in the detailed specifications and conditions of the Contract. No item, which is not covered in the Bill of Quantities, shall be executed by the Contractor without the approval of EPI. In case any Extra/Substituted item is carried out without specific-approval, the same will not be paid.

47.0 ANTI-TERMITE TREATMENT & WATER PROOF TREATMENT

47.1 The water proof treatment shall be of type and specifications as given in the schedule of quantities and/or specifications/ design-basis-report mentioned in tender documents and the treatment shall be carried out as details in BIS : 6313 (Part-II) latest revision may be followed in case specification is not given in tender.

47.2 The water-proofing treatment of basement, roofs, water retaining areas and termite infestation shall be and remain fully effective for a period of not less than 10 (Ten) years to be reckoned from the date of expiring of the Defect Liability period, prescribed in the Contract. At any time during the said guarantee period if EPI finds any defects in the said treatment or any evidence of re- infestation, dampness, leakage in any part of buildings or structure and notifies the Contractor of the same, the Contractor shall be liable to rectify the defect or give re-treatment and shall commence the work or such rectification or re-treatment within fifteen days from the date of issue of such letter to him. If the Contractor fails to commence such work within the stipulated period, the EPI may encash the Bank Guarantee submitted by the Contractor in this regard and get the same done by another agency and the decision of the Engineer-in-Charge of EPI shall be final and binding upon him.

47.3 Re-treatment if required shall be attended to and carried out by the Contractor within fifteen days of the notice from Engineer-in-Charge of EPI.

47.4 The EPI reserves the right to get the quality of treatment checked in accordance

with recognized test methods and in case it is found that the chemicals with the required concentration and rate of application have not been applied, or the water proofing treatment is not done as per specifications, the Contractor will be required to do the re-treatment in accordance with the required concentration & specifications at no extra cost failing which no payment for such work will be made. The extent of work thus rejected shall be determined by EPI.

- 47.5 Water proofing and Anti-termite treatment shall be got done through approved / specialized agencies only with prior approval of Engineer-in-Charge.
- 47.6 The Contractor shall make such arrangement as may be necessary to safe guard the workers and residents of the building against any poisonous effect of the chemicals used during the execution of the work.
- 47.7 During the execution of work, if any damage shall occur to the treatment already done, either due to rain or any other circumstances, the same shall be rectified and made good to the entire satisfaction of Engineer-In-Charge by the Contractor at his cost and risk.
- 47.8 The Contractor shall make his own arrangement for all equipments required for the execution of the job. The Contractor whose tender is accepted shall submit a Bank Guarantee for a sum equivalent to *Fifty per cent (50%)* of the approximate cost of waterproofing work and anti-termite treatment as deciding by Engineer In -Charge, valid for five years from the expiry of Defect Liability Period. In addition, a Guarantee Bond on plain paper valid for 10 years from the expiry of defect liability period would also be submitted by the Contractor. Security Deposit will be released only after submission of above-mentioned Bank Guarantee and Guarantee Bond.

48.0 INDIAN STANDARDS

Wherever any reference is made to any IS in any particular specifications, Drawings or Bill of Quantities, it means the Indian Standards editions with the amendments current at the last date of receipt of Tender Documents.

49.0 CENTERING & SHUTTERING

Marine plywood only or steel plates of minimum thickness as approved by Engineer-In-Charge shall be used for formwork. The shuttering plates shall be cleaned and oiled after every repetition and shall be used only after obtaining approval of EPI's Engineers at Site. The number of repetitions allowed for plywood and steel shuttering shall be at the discretion of Engineer-In-Charge of EPI depending upon the condition of shuttering surface after each use and the decision of ENGINEER-IN-CHARGE in this regard shall be final and binding on the Contractor. Cost of all framework stagging /shuttering etc. for completion of activity shall be included in rates /Prices / works of the Contracts. No claim whatsoever on this account shall be admissible.

50.0 CONTROLLED MATERIALS

50.1 The following Controlled materials shall be brought to Site after the approval of EPI.

- a) Water proofing compound.
- b) Cement
- c) Steel
- d) Primer/ Paints/ Varnish etc.
- e) Bitumen
- f) Chemical for anti-termite treatment
- g) Any other materials as per discretion of EPI and required for project completion.

50.2 The quantity of Controlled materials shall be measured and recorded in the Measurement books and signed by the Contractor and the Engineer-In-Charge as a check to ensure that the required quantities as required for execution of works as per specifications have been brought to Site for incorporation in the work.

50.3 Controlled materials brought at Site shall be stored as directed by EPI and those already recorded in Measurement book, shall be suitably marked for identification.

50.4 The Contractor shall ensure that the Controlled materials are brought to Site in original sealed containers or packing bearing manufacturer's markings and brands (except where the quantity required is a fraction of the smallest packing). Materials not complying with this requirement shall be rejected. The empty containers of such Controlled materials shall not be destroyed/ disposed-off without the written permission of EPI.

50.5 The Contractor shall produce receipted vouchers showing quantities of the materials to satisfy Engineer-In-Charge that the materials comply with the specifications. These vouchers shall be endorsed, dated and initialled by Engineer-In-Charge giving the Contract number and name of work and a certified copy of each such voucher signed both by EPI and the Contractor shall be kept on record.

50.6 When the cost of each category of materials is less than Rs.5000/- production of vouchers may not be insisted upon if EPI is otherwise satisfied with the quality and quantity of materials.

51.0 RECORDS OF CONSUMPTION OF CEMENT & STEEL

51.1 For the purpose of keeping a record of cement and steel received at Site and consumption in works, the Contractor shall maintain a properly bound register in the form approved by EPI, showing columns like quantity received and used in

work and balance in hand etc. This register shall be signed daily by the Contractor's representative and EPI's representative.

51.2 The register of cement & steel shall be kept at Site in the safe custody of EPI's Engineer during progress of the work. This provision will not, however, absolve the Contractor from the quality of the final product.

51.3 In case cement or steel quantity consumed is lesser as compared to the theoretical requirement of the same as per CPWD/MORTH (as the case may be) specifications/ norms, the work will be devalued and/ or a penal rate (i.e. double the rate at which cement/ steel purchased last) recovery for lesser consumption of cement/ steel shall be made in the item rates of the work done subject to the condition that the tests results fall within the acceptable criteria as per CPWD/MORTH (as the case may be) specifications otherwise the work shall have to be dismantled and redone by the Contractor at no extra cost.

In case of cement, if actual consumption is less than 98% of the theoretical consumption, a recovery shall be effected from the Contractor's dues at the penal rate for the actual quantity that is lower than 98% of theoretical consumption.

52.0 MATERIALS AND SAMPLES

52.1 The materials/ products used on the works shall be one of the approved make/ brands out of list of manufacturers/ brands/ makes given in the Tender Documents. The Contractor shall submit samples/ specimens out of approved makes of materials/ products to the Engineer-In-Charge for prior approval. In exceptional circumstances Engineer-In-Charge may allow alternate equivalent makes/ brands of products/ materials at his sole discretion. The final choice of brand/ make shall remain with the Engineer-In-Charge, whose decision in this matter shall be final and binding and nothing extra on this account shall be payable to the Contractor.

In case single brand/ make is mentioned, other equivalent makes/ brands may be considered by the Engineer-In-Charge with prior approval. In case of variance in CPWD/ IS/BIS Specifications from approved products/ makes specification, the specification of approved product/ make shall prevail for which nothing shall be paid extra to the Contractor.

In case no make or brand of any materials, articles, fittings and accessories etc. is specified, the same shall comply with the relevant Indian Standard Specifications and shall bear the ISI/BIS mark. The Engineer of EPI and the Owner shall have the discretion to check quality of materials and equipments to be incorporated in the work, at source of supply or site of work and even after incorporation in the work. They shall also have the discretion to check the workmanship of various items of work to be executed in this work. The Contractor shall provide the necessary facilities and assistance for this purpose.

52.2 The above provisions shall not absolve the Contractor from the quality of final product and in getting the material and workmanship quality checked and

approved from the Engineer-In-Charge of EPI.

- 52.3** The Contractor shall well in advance, produce samples of all materials, articles, fittings, accessories etc. that he proposes to use and get them approved in writing by EPI. The materials articles etc. as approved shall be labelled as such and shall be signed by EPI and the Contractor's representative.
- 52.4** The approved samples shall be kept in the custody of the Engineer- in-Charge of EPI till completion of the work. Thereafter the samples except those destroyed during testing shall be returned to the Contractor. No payment will be made to the Contractor for the samples or samples destroyed in testing.
- 52.5** The brands of all materials, articles fittings etc. approved together with the names of the manufacturers and firms from which supplies have been arranged shall be recorded in the Site Order Book.
- 52.6** The Contractor shall set up and maintain at his cost, a field testing laboratory for all day-to-day tests at his own cost to the satisfaction of the Engineer-In-Charge. This field testing laboratory shall be provided with equipment and facilities to carry out all mandatory field tests as per CPWD/MORTH (as the case may be) specifications. The laboratory building shall be constructed and installed with the appropriate facilities; Temperature and humidity controls shall be available wherever necessary during testing of samples.

All equipment shall be provided by the Contractor so as to be compatible with the testing requirements specified. The Contractor shall maintain all the equipment in good working condition for the duration of the Contract. The Contractor shall provide approved qualified personnel to run the laboratory for the duration of the Contract. The number of staff and equipment available must at all times be sufficient to keep pace with the sampling and testing programme as required by the Engineer-In-Charge.

The Contractor shall fully service the site laboratory and shall supply everything necessary for its proper functioning, including all transport needed to move equipment and samples to and from sampling points on the Site, etc.

The Contractor shall re-calibrate all measuring devices whenever so required by the Engineer-In-Charge and shall submit the results of such measurements without delay.

All field tests shall be carried out in the presence of EPI's representative. All costs towards samples, materials, collection, transport, manpower, testing, including concrete mix-design etc. shall be borne by the Contractor and are deemed to be included in the rates quoted by him in the Bill of Quantities.

53.0 TESTS AND INSPECTION

- 53.1** The Contractor shall carry out the various mandatory tests as per specifications and the technical documents that will be furnished to him during the performance of the work. All the tests on materials, as recommended by CPWD, MORTH (as the case may be) and relevant Indian Standard Codes or other standard specifications (including all amendments current at the last date of submission of

Tender Documents) shall be got carried out by the Contractor at the field testing laboratory or any other recognized institution/ laboratory, at the direction of EPI. All testing charges, expenses etc. shall be borne by the Contractor. All the tests, either on the field or outside laboratories concerning the execution of the work and supply of materials shall be got carried out by the Contractor or EPI at the cost of the Contractor.

53.2 WORKS TO BE OPEN TO INSPECTION

All works executed or under the course of execution in pursuance of this Contract shall at all times be open to inspection and supervision of EPI. The work during its progress or after its completion may also be inspected, by Chief Technical Examiner of Government of India (CTE) and/ or an inspecting Authority of State Government of State in which work is executed and/or by third party checks by Owner/ Clients. The compliance of observations/ improvements as suggested by the inspecting officers of EPI/CTE/ State authorities/ Owners shall be obligatory on the part of the Contractor at the cost of Contractor.

54.0 BORROW AREAS

The Contractor shall make his own arrangements for borrow pits and earth disposal areas including their approaches and space for movement of men, machinery, other equipment as required for carrying out the works. The Contractor shall be responsible for taking all safety measures, getting approval, making payment of royalties, charges etc. and nothing extra shall be paid to the Contractor on this account and unit rates quoted by the Contractor for various items of Bill of Quantities shall be deemed to include the same.

55.0 BITUMEN WORK

The Contractor shall be responsible for arranging Bitumen/Tar of required grade from source to be approved by the Engineer-In-Charge. No Bitumen work shall be carried out on wet surface or in rainy conditions.

56.0 CARE OF WORKS

From the commencement to the completion of works and handing over, the Contractor shall take full responsibility for care of all the works and in case of any damage/loss to the works or to any part thereof or to any temporary works due to lack of precautions or due to negligence on part of Contractor, the same shall be made good by the Contractor at his own cost.

57.0 WORK IN MONSOON AND DEWATERING

The execution of the work may entail working in the monsoon also. The Contractor must maintain labour force as may be required for the job and plan

and execute the construction and erection according to the prescribed schedule. No special/ extra rate will be considered for such work in monsoon. The Contractor's rate shall be considered inclusive of cost of dewatering required, if any and no extra rate shall be payable on this account.

58.0 NO COMPENSATION FOR FORECLOSURE / CANCELLATION / REDUCTION OF WORKS

If at any time after the commencement of the work EPI shall for any reason whatsoever is required to abandon the work or does not require the whole work thereof as specified in the Tender to be carried out, the Engineer-In-Charge shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment of compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been carried out or on foreclosure, neither shall he have any claim for compensation by reason of any alterations having been made in the original Specifications, Drawings, Designs and Instructions which shall involve any curtailment of the work as originally contemplated.

Provided that the Contractor shall be paid the charges on the cartage only of materials actually and bona fide brought to the Site of the work by the Contractor and rendered surplus as a result of the abandonment or curtailment of the work or any portion thereof and then taken back by the Contractor, provided however, that the Engineer-In-Charge shall have in all such cases the option of taking over all or any such materials at their purchase price or at local current rates whichever may be less. In the case of such stores having been issued by EPI and returned by the Contractor to EPI, credit will be given to him by the Engineer-In-Charge at rates not exceeding those at which they were originally issued to him after taking into consideration any deduction for claims on account of any deterioration or damage while in the custody of the Contractor and in this respect the decision of the Engineer-In-Charge shall be final.

59.0 RESTRICTION ON SUBLETTING

59.1 The Contractor shall not sublet or assign the whole or part of the works except where otherwise provided, by the Contract and even then only with the prior written approval of EPI and such approval if given shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults or neglects of any sub-Contractor, his agents, servants or workmen as full as if they were the acts, defaults or neglects of the Contractor, his agent, servants or workmen provided always that the provision of labour on piece work basis shall not be deemed to be a subletting under this clause.

59.2 The Contractor may entrust specialized items of works to the agencies specialized in the specific trade. The Contractor shall give the names and details of such firm whom he is going to employ for approval of EPI. These details shall

include the expertise, financial status, technical manpower, equipment, resources and list of works executed and on hand of the specialized agency. specialized agency shall be engaged only after obtaining written approval of the Engineer-In-Charge.

60.0 PROHIBITION OF UNAUTHORISED CONSTRUCTION & OCCUPATION

No unauthorized buildings, structures should be put up by the Contractor anywhere on the project Site, neither any building built by him shall be unauthorizedly occupied by him or his staff.

61.0 CO-ORDINATION WITH OTHER AGENCIES

Work shall be carried out in such a manner that the work of other Agencies operating at the Site is not hampered due to any action of the Contractor. Proper Co-ordination with other Agencies will be Contractor's responsibility. In case of any dispute the decision of EPI shall be final and binding on the Contractor. No claim whatsoever shall be admissible on this account.

62.0 SETTING OUT OF THE WORKS

62.1 The Contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works. If at any time during the progress of works, shall any error appear or arise in the position, levels, dimensions or alignment of any part of the works, the Contractor shall at his own expenses rectify such error to the satisfaction of Engineer-in-charge. The checking of any setting out or of any line or level by the engineers of EPI shall not in any way relieve the Contractor of his responsibility for the correctness.

62.2 Contractor shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural, Plumbing and other services Drawings.

63.0 NOTICE BEFORE COVERING UP THE WORK

The Contractor shall give not less than seven days notice before covering up or otherwise placing beyond the reach of measurement any work, to the Engineer-In-Charge in order that the same may be inspected and measured. If any work is covered up or placed beyond the reach of Inspection/ measurement without such notice to the Engineer-In-Charge or his consent being obtained, the same shall be uncovered at the Contractors expenses and he shall have to make it good at his own expenses.

64.0 SITE CLEARANCE

- 64.1** The Contractor shall ensure that the working Site is kept clean and free of obstructions for easy access to job Site and also from safety point of view. Before handing over the work to EPI the Contractor shall remove all temporary structures like the site offices, cement godown, stores, labour hutments etc., scaffolding rubbish, left over materials tools and plants, equipments etc., clean and grade the Site to the entire satisfaction of the Engineer-In-Charge. If this is not done the same will be got done by EPI at his risk and cost.
- 64.2** The Contractor shall clean all floors, remove cement/ lime/ paint drops and deposits, clean joinery, glass panes etc., touching all painter's works and carry out all other necessary items of works to make the premises clean and tidy before handing over the building, and the rates quoted by the Contractor shall be deemed to have included the same.

65.0 VALUABLE ARTICLES FOUND AT SITE

All gold, silver and other minerals of any description and all precious stones, coins, treasure, relics, antiques and all other similar things which shall be found in, under or upon the Site, shall be the property of the Owner/ Government and the Contractor shall duly preserve the same to the satisfaction of Engineer-In-Charge and shall from time to time deliver the same to such person or persons indicated by EPI.

66.0 MATERIALS OBTAINED FROM DISMANTLEMENT TO BE OWNER'S PROPERTY

All materials like stone, boulders and other materials obtained in the work of dismantling, excavation etc. will be considered Owner/ government property and may be issued to the Contractor by the Owner/ EPI, if required for use in this work at rates approved by EPI or the Contractor may be asked to dispose off these items at his cost.

67.0 SET-OFF OF CONTRACTOR'S LIABILITIES

EPI shall have the right to deduct or set off the expenses incurred or likely to be incurred by it in rectifying the defects and/or any claim under this agreement against the Contractor from any or against any amount payable to the Contractor under this agreement including Retention Money and proceeds of Security Deposit cum Performance Guarantee and from any other Contract being executed by the Contractor for EPI.

68.0 MATERIALS PROCURED WITH THE ASSISTANCE OF EPI

If any material for the execution of this Contract is procured with the assistance of EPI either by issue from its stores or purchase made under orders or permits or licenses obtained by EPI, the Contractor shall hold and use the said materials economically and solely for the purpose of this Contract and shall not dispose them without the written permission of Engineer-In-Charge. The Contractor, if required by EPI, shall return all such surplus or unserviceable materials that may be left with him after the completion of the Contract or at its termination on

whatsoever reason, on being paid or credited such price as EPI shall determine having due regard to the conditions of materials.

69.0 ALTERATION IN SPECIFICATION, DESIGN & DRAWING

69.1 The Engineer-In-Charge shall have power to make any alterations in, omissions from, additions to or substitutions for, the original Specifications, Drawings, Designs and Instructions that may appear to him to be necessary during the progress of the work, and the Contractor shall carry out the work in accordance with any instructions which may be given to him in writing signed by the Engineer-In-Charge and such alterations, omissions, additions, or substitutions shall not invalidate the Contract and any altered, additional or substituted work which the Contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on the same conditions in all respects on which he agreed to do the main work.

The time for the completion of the work shall be extended in the proportion that the altered, additional or substituted work price bears to the original Contract work price, and the certificate of the Engineer-In-Charge shall be conclusive as to such proportion. Over and above this, a further period to the extent of 25 percent of such extension shall be allowed to the Contractor.

The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions in their respective order :

- i) If the rates for the additional, altered or substituted work are specified in the Contract for the work, the Contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the Contract for the work.
- ii) If the rates for the additional, altered or substituted work are not specifically provided in the Contract for the work, the rates will be derived from the rates for a nearest similar item of work as are specified in the Contract for the work. In case of composite tenders where two or more schedule of quantities/ Bill of Quantities form part of the Contract, the rates shall be derived from the nearest similar item in the schedule of quantities/Bill of Quantities of the particular part of work in which the deviation is involved failing that from the lowest of the nearest similar item in other schedule of quantity. The opinion of the Engineer-In-Charge as to whether or not the rate can be reasonably so derived from the item in this Contract will be final and binding on the Contractor.
- iii) If the altered, additional or substituted work includes any work for which no rate is specified in the Contract for the work and which cannot be derived in the manner specified in sub para (i) and (ii) above from the similar class of work in the Contract then such work shall be carried out at the rates entered in the Schedule of Rates (as mentioned in "Memorandum" to the "Form of Tender" for Civil / Sanitary Works) minus / plus the percentage which the tendered amount of scheduled items bears

with the estimated amount of schedule items based on the Schedule of Rates (as mentioned in "Memorandum" to the "Form of Tender" for Civil / Sanitary Works). The scheduled items mean the items appearing in the Schedule of Rates (as mentioned in "Memorandum" to the "Form of Tender" for Civil/ Sanitary Works), which shall be applicable in this clause. This clause will apply mutatis mutandis to electrical work except that Electrical Schedule of Rates as mentioned in "Memorandum" to the "Form of Tender" will be considered in place of Civil / Sanitary works Schedule of rates as mentioned in "Memorandum" to the "Form of Tender".

- iv) If the rates for the altered, additional or substituted work cannot be determined in the manner specified in sub-clauses (i) to (iii) above, then the Contractor shall, within 7 days of the date of receipt of order to carry out the work, inform the Engineer-In-Charge the rates which he intends to charge for such class of work, supported by analysis of the rate or rates claimed, and the Engineer-In-Charge shall determine the rate or rates on the basis of prevailing market rates of the material, Labour, T&P etc. plus 10% (Ten percent) to cover the Contractors supervision, overheads and profit and pay the Contractor accordingly. The opinion of the Engineer-In-Charge as to the current market rates of materials and quantum of labour involved per unit of measurements will be final and binding on the Contractor.

However, the Engineer-In-Charge, by notice in writing, will be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner, as he may consider advisable. But under no circumstances, the Contractor shall suspend the work on the plea of non-settlement of rates of items falling under the clause.

- v) Except in case of items relating to foundations, provisions contained in sub clauses (i) to (iv) above shall not apply to Contract, altered or substituted items as individually exceed the 'deviation limit' of plus/minus 25% (Twenty Five Percent) subject to the following:-

- (a) Deviation limit shall apply to individual items.
- (b) The value of additions of items, of any individual trade not already included in the Contract, shall not exceed 20% of the Tendered value of work, subject to overall deviation limit as given above.

Provided further that in case where the original item is substituted, the Substituted Item shall be deemed to have replaced the original item in the Contract itself to that extent and above provisions pertaining to the deviations shall apply with respect to such Substituted Item and not the original item.

NOTE: Individual trade means the trade section to which Bill of Quantities annexed to the agreement has been divided or in the absence of any such division the individual section of the MORTH/C.P.W.D. (as the case may be) Scheduled of rates

specified above, such as excavation and earthwork, Concrete, wood work and joinery, etc.

The rate of any such work except the items relating to foundations which is in excess of the deviation limit and deviation in quantities of AHR items on plus side as contained in Clause 9.2(i) shall be determined in accordance with the provisions contained in Clause 69.2.

- 69.2** In the case of Contract items, substituted items, Contract cum substituted items or additional items which exceed the limits laid down in sub para (v) of condition 69.1 above (except the items relating to foundation work, which the Contractor is required to do under Clause 69.1 above and deviation in quantities of AHR items on plus side as contained in clause 9.2 (i)), the Contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper analysis, for the work in excess of the above mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities or those derived in accordance with the provisions of sub para (i) to (iii) of conditions 69.1 by more than five percent, the Engineer-In- Charge shall within three months of receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the Contractor, determine the rates on the basis of the market rates and if the rates so determined exceed the rates specified in the schedule of quantities or those derived in accordance with the provisions of sub paras (i) to (iii) of condition 69.1 by more than five percent, the Contract shall be paid in accordance with the rates determined. In the event of the Contractor failing to claim revision of rates within the stipulated period, or if the rates determined by the Engineer-In-Charge within the period of three months of receipt of the claims supported by analysis are within five percent of the rates specified in the schedule of quantities or of those determined in accordance with the provisions of sub-para (i) to (iii) of condition 69.1, the Engineer-In-Charge shall make payment at the rates as specified in the schedule of quantities or those already determined under sub para (i) to (iii) of condition 69.1 for the quantities in excess of the limits laid down in sub para (v) of condition 69.1.
- 69.3** The provisions of the preceding paragraph shall apply to the decrease in the rates of items for the work in excess of the limits laid down in sub para (v) of condition 69.1 provided that such decrease is more than five percent of rates specified in the schedule of quantities or those derived in accordance with the provisions of sub para (i) to (iii) of condition 69.1 and the Engineer-In-Charge may after giving notice to the Contractor within two months of receipt of order by the Contractor or occurrence of the excess and after taking into consideration any reply received from him within fifteen days of receipt of the notice revise the rates for the work in question within two months of expiry of the said period of fifteen days having regard to the market rates.
- 69.4** The Contractor shall send to the Engineer-In-Charge once every three months an up to date account giving complete details of all claims for additional

payments to which the Contractor may consider himself entitled and of all additional work ordered by the Engineer-In-Charge which he has executed during the preceding quarter failing which the Contractor shall be deemed to have waived his right.

69.5 For the purpose of operation of clause 69.1 (v) the following works shall be treated as works relating to foundation:-

- i) For buildings, compound walls plinth level or 1.2 meters (4 feet) above ground level whichever is lower excluding items of flooring and D.P.C. but including base concrete below the floors.
- ii) For abutments, piers, retaining walls of culverts and bridges, walls of water reservoirs the bed of floor level.
- iii) For retaining walls where floor level is not determinate 1.2 meters above the average ground level or bed level.
- iv) For Roads all items of excavation and filling including treatment of sub base and soiling work.
- v) For water supply lines, sewer lines, under-ground storm water drains and similar works. All items of work below ground level except items of pipe work, masonry work.
- vi) For open storm water drains, all items of work except lining of drains.

70.0 ACTION AND COMPENSATION PAYABLE IN CASE OF BAD WORK

If it shall appear to the Engineer-In-Charge or his authorized subordinate in charge of the work or to the Chief Technical Examiner or to any other inspecting agency of Government/ State Government/ Owner where the work is being executed, that any work has been executed with unsound, imperfect, or unskilful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that Contracted for or otherwise not in accordance with the Contract, the Contractor shall on demand in writing which shall be made within six months of the completion of the work from the ENGINEER-IN-CHARGE specifying the work, materials or articles complained of notwithstanding that the same may have been passed, Certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost, and in the event of his failing to do so within a period to be specified by the Engineer-In-Charge in his demand aforesaid, then the Contractor shall be liable to pay compensation at the rate of one percent of the estimated amount put to tender for every day not exceeding ten days, while his failure to do so shall continue and in the case of any such failure, the Engineer-In-Charge may rectify or remove and re-execute the work or remove and replace with others, the

material or articles complained of as the case may be at the risk and expense in all respects of the Contractor.

71.0 POSSESSION PRIOR TO COMPLETION

71.1 EPI shall have the right to take possession of or use any completed or partially completed work or part of the work. Such possession or use shall not be deemed to be any acceptance of any work not completed in accordance with the Contract agreement. If such prior possession or use by EPI delays the progress of work an equitable adjustment in the time of completion will be made and the Contract agreement shall be deemed to be modified accordingly. The decision of EPI in this case shall be final binding and conclusive.

71.2 When the whole of the works or the items or the groups of items of work for which separate periods of completion have been specified have been completed the Contractor will give a notice to that effect to the Engineer in writing. The Engineer shall within 15 days of the date of receipt of such notice inspect the works and either the Engineer-In-Charge issues to the Contractor a completion certificate stating the date on which in his opinion the works were completed in accordance with the Contract or gives instructions in writing to the Contractor specifying the balance items of work which are required to be done by the Contractor before completion certificate could be issued. The Engineer-In-Charge shall also notify the Contractor of any defect in the works affecting completion.

71.3 The Contractor shall during the course of execution prepare and keep updated a complete set of 'as built' drawings to show each and every change from the Contract Drawings, changes recorded shall be countersigned by the Engineer-In-Charge and the Contractor. Four copies of 'as built' drawings shall be supplied to EPI by the Contractor within 30 days of the completion. All costs incurred in this respect shall be borne by the Contractor only.

71.4 COMPLETION CERTIFICATE

71.4.1 Within ten days of the completion of the work, the Contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice, the Engineer-in-Charge shall inspect the work and if there is no defect in the work, Project Head shall furnish the Contractor with a final certificate of completion subject to receiving same from end user/ Client for actual executed works.

71.4.2 But no final certificate of completion shall be issued, nor shall the work be considered to be complete until

- (i) the Contractor shall have
 - (a) removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been

erected or constructed by the Contractor(s)

And

- (b) cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution; thereof,

And

- (ii) Not until the work shall have been measured by the Engineer-in-Charge.

71.4.3 If the Contractor shall fail to comply with the requirements of this Clause 71.4.2

(i) above then,

- (i) The Engineer-in-Charge may at the expense of the Contractor

- (a) remove such scaffolding, surplus materials and rubbish etc.,

and/or

- (b) dispose of the same as he thinks fit and clean off such dirt as aforesaid,

And,

- (ii) The Contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof less actual cost incurred on removal of materials / debris / malba etc.

The Contractor shall be responsible for handing over of project including signing of inventories by the client and shall obtain final work completion certificate in favour of EPI from client. Necessary support for the same, shall however, be provided by EPI. No payment of final bill shall be released.

72.0 COMPENSATION FOR DELAY AND REMEDIES

72.1 If the Contractor fails to maintain the required progress in terms of clause 72.4 or relevant clause of Additional Conditions of Contract, to complete the work and clear the Site on or before the completion date or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to EPI on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below or such smaller amount as the Engineer-in-charge (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day / week (as applicable) that the progress remains below that specified in Clause 72.4.1 or the relevant clause in Additional Conditions of Contract or that the work remains incomplete. This will also apply to items or group of items for which a separate period of completion has been specified.

i) For works with completion period not exceeding 3	@ 1% per day
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month (as originally stipulated)	
ii) For works with completion period exceeding 3 months (as originally stipulated)	@ 1% per week or part thereof

Provided always that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the Tendered Value of work or of the Tendered Value of the item or group of items of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other Contract with EPI even after completion of the work.

72.2 CANCELLATION / DETERMINATION OF CONTRACT IN FULL OR PART

Subject to other provisions contained in this clause, the Engineer-In-Charge may, without prejudice to his any other rights or remedy against the Contract in respect of any delay, inferior workmanship, any claims for damages and / or any other provisions of this Contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the Contract in full or in part in any of the following cases:

- i) If the Contractor having been given by the Engineer-In-Charge a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or unworkman like manner shall omit to comply with the requirement of such notice for a period of seven days thereafter; or
- ii) If the Contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion of the ENGINEER-IN-CHARGE (which shall be final and binding) he will be unable to secure completion of the work by the date for completion and continues to do so after a notice in writing of seven days from the Engineer-In-Charge; or
- iii) If the Contractor fails to complete the work within the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completion and does not complete them within the period specified in a notice given in writing in that respect by the Engineer-In-Charge; or
- iv) If the Contractor persistently neglects to carry out his obligations under the Contract and / or commits default in complying with any of the terms and conditions of the Contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that respect by the Engineer-In-Charge; or
- v) If the Contractor shall offer or give or agree to give to any person in EPI service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for

having done or forbore to do any action in relation to the obtaining or execution of this or any other Contract for EPI; or

- vi) If the Contractor shall enter into a Contract with EPI in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-In-Charge; or
- vii) If the Contractor shall obtain a Contract with EPI as a result of wrong tendering or other non-bona-fide methods of competitive tendering; or
- viii) If the Contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors; or
- ix) If the Contractor being a company, shall pass a resolution or the Court shall make an order for the winding up of the company, or a receiver or manager on behalf of the debenture holders or otherwise shall be appointed or circumstances shall arise which entitle the Court or debenture holders to appoint a receiver or manager; or
- x) If the Contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days; or
- xi) If the Contractor assigns, transfers, sublets (engagement of labour on a piece-work basis or of the labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer sublet or otherwise parts with the entire works or any portion thereof without and prior written approval of the Engineer- In-Charge.

When the Contractor has made himself liable for action under any of the clauses aforesaid, the Engineer-In-Charge may without prejudice to any other right or remedy which shall have accrued or shall accrue hereafter to EPI, by a notice in writing to cancel the Contract as a whole or only such items of work in default from the Contract.

The Engineer-In-Charge shall on such cancellation by EPI have powers to:

- a) Take possession of Site and any materials, Construction Plant & machinery, implements, stores, etc. thereon; and/ or
- b) Carry out the incomplete work by any means at the risk and cost of the Contractor; and/ or
- c) To determine or rescind the Contract as aforesaid (of which termination

or rescission notice in writing to the Contractor under the hand of the Engineer-In-Charge shall be conclusive evidence). Upon such determination or rescission the full Retention Money recovered by EPI under the Contract and Security Deposit cum Performance Guarantee shall be liable to be forfeited and un-used materials, construction plant & machinery, implements, temporary buildings, etc. shall be taken over and shall be absolutely at the disposal of EPI. If any portion of the Retention Money has not been received or recovered by EPI from RA Bills, it would be called for and forfeited; and/ or

- d) To employ labour and to supply materials, equipment to carry out the work or any part of the work debiting the Contractor with the cost of the labour and the price of the materials, equipment rentals (of the amount of which cost and price certified by the Engineer-In-Charge shall be final and conclusive) against the Contractor and crediting him with the value of the work done in all respects in the same manner and at the same rates as if it had been carried out by the Contractor under the terms of his Contract. The certificate of the Engineer-In-Charge as to the value of the work done shall be final and conclusive against the Contractor provided always that action under the sub-clause shall only be taken after giving notice in writing to the Contractor. Provided also that if the expenses incurred by the EPI are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor; and/or
- e) After giving notice to the Contractor to measure up the work of the Contractor and to take such whole, or the balance or part thereof as shall be un- executed or delayed with reference to the General Conditions of Contract clause no. 72.4.1 and/ or relevant clause of Additional Conditions of Contract, out of his hands and to give it to another Contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original Contractor if the whole work had been executed by him (of the amount of which excess the certificate in writing of the Engineer-In-Charge shall be final and conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by EPI under his Contract or on any other account whatsoever or from his Retention Money, Security Deposit cum Performance Guarantee or the proceeds of sales of unused materials, construction plants & machinery, implements temporary buildings etc. thereof or a sufficient part thereof as the case may be. If the expenses incurred by EPI are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor; and/ or
- f) By a notice in writing to withdraw from the Contractor any items or items of work as the Engineer-In-Charge may determine in his absolute discretion and get the same executed at the risk and cost of the Contractor.

Any excess expenditure incurred or to be incurred by EPI in completing the

works or part of the works or the excess loss or damages suffered or may be suffered by EPI as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to EPI in law be recovered from any moneys due to the Contractor on any account, and if such moneys are not sufficient the Contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the Contractor shall fail to pay the required sum within the aforesaid period of 30 days, the Engineer-In-Charge shall have the right to sell any or all of the Contractor's unused materials, Construction Plant, machinery, implements, temporary buildings, etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the Contractor under the Contract and if thereafter there be any balance outstanding from the Contractor, it shall be recovered in accordance with the provisions of the Contract and law.

Any sums in excess of the amounts due to EPI and unsold materials, Construction Plant etc. shall be returned to the Contractor, provided always that if cost or anticipated cost of completion by EPI of the works or part of the works is less than the amount which the Contractor would have been paid had he completed the works or part of the works, such benefit shall not accrue to the Contractor.

In the event of anyone or more of the above courses being adopted by the Engineer-In-Charge the Contractor shall have no claim to compensation whatsoever for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the Contract. And in case action is taken under any of the provision aforesaid the Contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this Contract unless and until the Engineer-In-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified. Provided further that if any of the recoveries to be made, while taking action as per (d) and/or (e) above, are in excess of the Retention Money & Security Deposit cum Performance Guarantee forfeited, these shall be limited to the amount by which the excess cost incurred by the EPI exceeds the Retention Money & Security Deposit cum Performance Guarantee so forfeited.

Right of EPI after Rescission of Contract owing to Default of Contractor:

In the event of any or several of the courses, referred to Clause (72.2), i to xi of this Clause, being adopted in the Contract which has been rescinded as a whole, the Security Deposit already with EPIs under the Contract shall be encashed / forfeited and the Performance Guarantee already submitted for the Contract shall be encashed. The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a

Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm. Further the authorized representative of failed Contractor cannot be accepted as authorized representative in new Contract.

72.3 CONTRACTOR LIABLE TO PAY COMPENSATION EVEN IF ACTION NOT TAKEN

In any case in which any of the powers conferred upon the Engineer-In-Charge by relevant clause thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the Contractor and the liability of the Contractor for compensation shall remain unaffected. In the event of the Engineer-In-Charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the Contractor, take possession of (or at the sole discretion of the Engineer-In-Charge which shall be final and binding on the Contractor) use as on hire (the amount of the hire money being also in the final determination of the Engineer-In-Charge) all or any tools, plant, machinery, materials and stores, in or upon the works, or the site thereof belonging to the Contractor, or procured by the Contractor and intended to be used for the execution of the work / or any part thereof, paying or allowing for the same in account at the Contract rates, or in the case of these not being applicable, at current market rates to be certified by the Engineer-In-Charge, whose certificate thereof shall be final, and binding on the Contractor and/or direct the Contractor, clerk of the works, foreman or other authorized agent to remove such tools, machinery, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the Contractor failing to comply with any such requisition, the Engineer-In-Charge may remove them at the Contractor's expense or sell them by auction or private sale on account of the Contractor and his risk in all respects and the certificate of the Engineer-In-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the Contractor.

72.4 TIME ESSENCE OF CONTRACT & EXTENSION FOR DELAY

The time allowed for execution of the Works as specified in the terms of Contract or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works shall commence from the 10th day or such time period as mentioned in letter of Acceptance/ Letter of Intent after the date on which the Engineer-In-Charge issues written orders to commence the work. If the Contractor commits default in commencing the execution of the work as aforesaid, the Executing Agency shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money absolutely.

72.4.1 With issue of Letter of Acceptance/ Letter of Intent, the Contractor shall submit following

- i. Time and Progress Chart (CPM/ PERT/ Quantified Bar Chart) and get it approved by the Engineer-In-Charge.
- ii. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast (mile-stones) of the dates of commencement and completion of various items, trades, sections of the work and may be amended as necessary by agreement between the Engineer-In-Charge and the Contractor within the limitations of time stipulated in the Contract documents,
- iii. and further to ensure good progress during the execution of the work, the Contractor shall in all cases in which the time allowed for any work exceeds one month (save for special jobs for which a separate program has been agreed upon) complete 1/8th of the whole of work before 1/4th of the whole time allowed in the Contract has elapsed,
- iv. 3/8th of the work before one half of such time has elapsed and 3/4th of the work before 3/4th of such time has elapsed.
- v. The physical report including photographs shall be submitted by the Contractor on the prescribed format & the intervals (not exceeding a month) as decided by the Engineer in Charge.
- vi. The compensation for delay as per clause 72.1 shall be leviable at intermediate stages also, in case the required progress is not achieved to meet the above time deadlines of the completion period and/ or milestones of time and progress chart, provided always that the total amount of Compensation for delay to be paid under this condition shall not exceed 10% (Ten Percent) of the tendered value of work".

72.4.2 If the work(s) be delayed by:

- i) force-majeure or
- ii) abnormally bad weather, or
- iii) serious loss or damage by fire, or
- iv) civil commotion of workmen, strike or lockout, affecting any or the trades employed on the work, or
- v) delay on the part of other Contractors or tradesmen engaged by Engineer-In-Charge in executing work not forming part of the Contract, or
- vi) non-availability of stores, which are responsibility of EPI or,
- vii) non-availability or break down of tools and plant to be supplied or supplied by EPI or,

- viii) any other cause which, in the absolute discretion of EPI, is beyond the Contractor's control,

then, upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-In-Charge but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-In-Charge to proceed with the works.

72.4.3 Request for extension of time, to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay on the prescribed form. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired. In any such case EPI may give a fair and reasonable extension of time for completion of work. Such extension shall be communicated to the Contractor by the Engineer-In-Charge in writing, within 3 months of the date of receipt of such request. Non-application by the Contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Engineer-In-Charge and the extension of time so given by the Engineer-In-Charge shall be binding on the Contractor.

72.4.4 In the event of a delay caused by the Contractor, even if an extension of time (EOT) has been granted by the Client/EPI, all expenses incurred by the EPI shall be recovered from the Contractor. This includes the salary, travel and daily allowance (TA & DA) of all relevant personnel, as well as office expenses

73.0 WITHHOLDING AND LIEN IN RESPECT OF SUMS DUE FROM CONTRACTOR

73.1 Whenever any claim or claims for payment of a sum of money arises out of or under the Contract or against the Contractor, EPI shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any, deposited by the Contractor and for the purpose aforesaid, EPI shall be entitled to withhold the Retention Money, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, EPI shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the Contractor under the same Contract or any other Contracts pending finalization or adjudication of any such claim.

73.2 It is an agreed term of the Contract that the sum of money or moneys so withheld or retained under the lien referred to above by the Engineer-In-Charge or EPI will be kept withheld or retained as such by the Engineer-In-Charge or EPI till the claim arising out of or under the Contract is determined by the Arbitrator / Competent Court and that the Contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or

retention under the lien referred to above and duly notified as such to the Contractor. For the purpose of this clause, where the Contractor is a sole proprietor or a partnership firm or a limited company, etc. the Engineer-In-Charge or EPI shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to proprietor /partnership firm/limited company, as the case may be whether in his individual capacity or otherwise.

EPI shall have the right to cause an audit and technical examination of the works and the final bills of the Contractor including all supporting vouchers, abstract, etc. to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the Contractor under the Contract or any work claimed to have been done by him under the Contract and found not to have been executed, the Contractor shall be liable to refund the amount of overpayment and it shall be lawful for EPI to recover the same from him in the manner prescribed in sub-clause (l) of this clause or in any other manner legally permissible; and if it is found that the Contractor was paid less than what was due to him under the Contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by EPI to the Contractor, without any interest thereon whatsoever.

73.3 LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

Any sum of money due and payable to the Contractor (including the Retention Money & Security deposit returnable to him) under the Contract may be withheld or retained by way of lien by the Engineer-In-Charge or by EPI against any claim of the Engineer-In-Charge or EPI in respect of payment of a sum of money arising out of or under any other Contract made by the Contractor with the Engineer-In-Charge or EPI.

It is an agreed term of the Contract that the sum of money so withheld or retained under this clause by the Engineer-In-Charge or EPI will be kept withheld or retained as such by the Engineer-In-Charge or EPI or till his claim arising out of the same Contract or any other Contract is either mutually settled or determined by the Arbitrator or Competent court as the case may be, and that the Contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the Contractor.

74.0 DEFECTS LIABILITY PERIOD

~~---The Contractor shall be responsible for the rectification of defects in the works~~ for a period of twelve months from the date of taking over of the works by the Owner/ Client. Any defects discovered and brought to the notice of the Contractor forthwith shall be attended to and rectified by him at his own cost and expense. In case the Contractor fails to carry out these rectifications, the same may without prejudice to any other right or remedy available, be got rectified by

EPI at the cost and expense of the Contractor.

75.0 FORCE MAJEURE

Any delay or failure of the performance of either party hereto shall not constitute default hereunder to give rise to any claims for damages, if any to the Extent such delay or failure of performance is caused by occurrences such as Acts of God or the public enemy, expropriation, compliance with any order or request of Government authorities/ Courts, acts of war, rebellions, sabotage fire, floods, illegal strikes, or riots (other than Contractor's employees). Only extension of time shall be considered for Force Majeure conditions as accepted by EPI. No adjustment in Contract price shall be allowed for reasons of force majeure.

76.0 DISPUTE RESOLUTION:

Amicable Resolution

Save where expressly stated to the contrary in this document, any dispute, difference or controversy of whatever nature between the Parties, howsoever arising under, out of or in relation to this document, including those arising with regard to acts, decision or opinion of the EPI (the "Dispute") and so notified in writing by either Party, shall in the first instance be attempted to be resolved amicably by the representatives of the Parties in accordance with the procedure set forth as below:

Mutual Settlement of Disputes: - In the event of any Dispute between the Parties, either Party may call upon the Regional In-charge/ concerned officer, as the case may be, to mediate and assist the Parties in arriving at an amicable settlement thereof.

Upon such reference, the representatives of the Parties shall within 15 (fifteen) days of service of a written notice from one Party to the other Party (ies), hold a meeting with an effort to resolve the Dispute in good faith and the dispute may be mutually settled between the parties.

If the Dispute is not amicably settled within 15 (fifteen) days of reference of said dispute, either Party may refer the dispute to mediation in accordance with the provisions of below:

Mediation

In case of any dispute /differences, such dispute shall be referred for mediation by either parties to CMD of EPI for resolution of dispute and CMD may nominate any person/committee for mediation of the dispute. If such dispute is not resolved within a period of 30 days from the date of reference to CMD of EPI, then in such a case matter /dispute shall be referred to the Court for resolution.

Dispute between Govt. bodies

"In the event of any dispute or difference relating to the interpretation and

application of the provisions of commercial Contract(s) between Central Public Sector Enterprises (CPSEs) / Port Trusts inter se and also between CPSEs and Government Department Organizations (excluding disputes relating to Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for its resolution through AMRCD as mentioned in DPE OM No. 05/0003/2019-FTS-10937 dated 14th December, 2022 and the decision of AMRCD on the said dispute will be binding on both the parties."

Jurisdiction

The courts in New Delhi alone will have jurisdiction to deal with matters/disputes arising there from, to the exclusion of all other courts.

77.0 SUSPENSION OF WORKS

- (a) The Contractor shall, on receipt of the order in writing of the Engineer-In-Charge, suspend the progress of the works or any part thereof for such time and in such manner, as the Engineer-In-Charge may consider necessary for any of the following reasons:
 - i) On account of any default on part of the Contractor, or
 - ii) For proper execution of the works or part thereof for reason other than the default of the Contractor, or
 - iii) For safety of the works or part thereof.

The Contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-In-Charge.

- (b) If the suspension is ordered for reasons (ii) and (iii) in sub-para (a) above, the Contractor shall be entitled to an extension of the time equal to the period of every such suspension plus 25%. No adjustment of Contract price will be allowed for reasons of such suspension.
- (c) In the event of the Contractor treating the suspension as an abandonment of the Contract by EPI, he shall have no claim to payment of any compensation on account of any profit or advantage which he may have derived from the execution of the work in full but which he could not derive in consequence of the abandonment.
- (d) The Contractor shall resume work in all earnestness after suspension has been lifted by EPI.

78.0 TERMINATION OF CONTRACT ON DEATH OF CONTRACTOR

If the Contractor is an individual or a proprietorship concern and the individual or the proprietor dies then unless the Engineer-In-Charge is satisfied that the legal representatives of the individual Contractor or of the proprietor of the proprietary concern and in the case of partnership firm, the surviving partners, are capable of carrying out and completing the Contract, the Engineer-In-Charge shall be

entitled to cancel the Contract as to its incomplete part without EPI being in any way liable to payment of any compensation to the estate of the deceased Contractor and/or to surviving partners of the Contractor's firm on account of cancellation of the Contract. Such cancellation of Contract shall be without prejudice to any of the rights & remedies available to the Engineer-In-Charge under the Contract. The decision of the Engineer-In-Charge that the legal representatives of the deceased Contractor or the surviving partners of the Contractor's firm cannot carry out and complete the Contract shall be final and binding on the parties.

79.0 CLARIFICATION AFTER TENDER SUBMISSION

Tenderer's attention is drawn to the fact that during the period, the bids are under consideration, the bidders are advised to refrain from contacting by any means, EPI and/or his employees/ representatives on matters related to the bid under consideration and that if necessary, EPI will obtain clarifications in writing or as may be necessary. The Tender evaluation and process of award of works is done by duly authorized Tender Scrutiny Committee and this committee is authorized to discuss and get clarification from the tenderers.

80.0 ADDENDA/ CORRIGENDA

Addenda/Corrigenda to the Tender Documents may be issued prior to the date of opening of the Tender to clarify or effect modification in specification and/or Contract terms included in various Tender Documents. The tenderer shall suitably take into consideration such Addenda/Corrigenda while submitting his tender. The tenderer shall return such Addenda/ Corrigenda duly signed and stamped as confirmation of its receipt and submit along with the Tender Document. All Addenda/ Corrigenda shall be signed and stamped on each page by the tenderer and shall become part of the Tender and Contract documents.

81.0 QUALITY ASSURANCE PROGRAMME

To ensure that the works/services under the scope of this Contract are in accordance with the specifications, the Contractor shall adopt Quality Assurance Programme to control such activities at the necessary points. The Contractor shall prepare and finalize such Quality Assurance Programme within 15 days from Letter of Acceptance. EPI shall also carry out quality audit and quality surveillance of systems and procedures of Contractor's quality control activities. A Quality Assurance Programme of Contractor shall generally cover the following:

- a) His organization structure for the management and implementation of the proposed Quality Assurance Program.
- b) Documentation control system.
- c) The procedure for procurement of materials and source inspection.

- d) System for site controls including process controls.
- e) Control of non-conforming items and systems for corrective actions.
- f) Inspection and test procedure for site activities.
- g) System for indication and appraisal of inspection status.
- h) System for maintenance of records.
- i) System for handling, storage and delivery.
- j) A quality plan detailing out quality practices and procedures, relevant standards and acceptance levels for all types of work under the scope of this Contract.

All the quality reports shall be submitted by the Contractors in the formats appended hereto. Checklist enclosed here in this document shall be followed while carrying out Construction activities (items). If any item is not covered by the Checklist/ Formats appended hereto, the Format for the same may be developed and submitted to Engineer-In-Charge for approval and the same shall be adopted. These filled in formats shall be prepared in two copies and duly signed by representatives of Contractor and EPI. All the costs associated with printing of Formats and testing of materials required as per technical specifications or by Engineer-In-Charge shall be deemed to be included in the Contractor's quoted rates of various items of work in the Schedule/ Bill of Quantities.

82.0 APPROVAL OF TEMPORARY / ENABLING WORKS

The setting and nature of all offices, huts, access road to the work areas, and all other temporary works as may be required for the proper execution of the works shall be subject to the approval of the Engineer-In-Charge.

All the equipment, labour, material including cement, reinforcement and the structural steel required for the enabling/ temporary works associated with the entire Contract shall have to be arranged by the Contractor only. Nothing extra shall be paid to the Contractor on this account and the unit rates quoted by the Contractor for various items in the Bill of Quantities shall be deemed to include the cost of enabling works.

83.0 CONTRACT COORDINATION PROCEDURES, COORDINATION MEETINGS AND PROGRESS REPORTING

The Contractor shall prepare and finalize in consultation with EPI, a detailed Contract coordination procedure within 15 days from the date of issue of Letter of Acceptance/ Letter of Intent for the purpose of execution of the Contract.

The Contractor shall have to attend all the meetings at any place in India at his own cost with EPI, Owners/ Clients or Consultants of EPI/ Owner/ Client during the currency of the Contract, as and when required and fully cooperate with such persons and agencies involved during these discussions. The Contractor shall not deal in any way directly with the Clients/ Owners or Consultants of EPI/

Owner/ Clients and any dealing/ correspondence if required at any time with Clients/ Owners/ Consultants shall be through EPI only.

During the execution of the work, Contractor shall submit at his own cost detailed Monthly progress report to the Engineer-In-Charge of EPI by 5th of every month. The format of monthly progress report shall be as approved by Engineer-In-Charge of EPI.

84.0 CONTRACT AGREEMENT

The Contractor shall enter into a Contract agreement with EPI within 21 days of the Letter of Acceptance or within such extended timeframe, as may be granted by EPI. The Contractor shall be responsible for the cost of stamp papers, stamp duty, and registration, if applicable, on the Contract. In the event that the Contractor does not sign the agreement as outlined above or does not commence work within the time frame specified in the Memorandum to the Form of Tender, the earnest money shall be forfeited, and the letter of acceptance shall be withdrawn.

85.0 MANNER OF EXECUTION OF AGREEMENT

- i. The agreement as per prescribed Performa as enclosed to the this GCC or Additional Conditions of Contract (as per the clause of Order of Preference of Documents) shall be signed at the office of EPI within time specified in the Memorandum to the Form of Tender or within such extended time. The Contractor shall provide for signing of the Contract, appropriate Power of Attorney in favour of the authorised representative duly attested by notary Public and the requisite documents / materials. Till a formal Contract is prepared and executed, the Letter of acceptance read in conjunction with the Bidding Documents will constitute a binding Contract.
- ii. The agreement will be signed in two originals and three more copies, EPI shall retain the 'Original', the Contractor shall be provided with the other signed original and the remaining three copies will be retained by EPI. In case of a dispute of any kind whatsoever, the 'Original' retained by EPI alone shall be treated as the 'Original Agreement'.

86.0 PURCHASE PREFERENCE TO PUBLIC SECTOR ENTERPRISES

EPI reserves its right to extend Purchase Preference to Central Public Sector Enterprises (CPSEs) as per policy of Government of India, if any, as applicable on this work. The tenderers are requested to go through latest instructions of Government of India on its Purchase Preference Policy for CPSEs before quoting for the Tender.

87.0 CHANGE IN FIRM'S CONSTITUTION TO BE INTIMATED

Where the Contractor is a partnership firm, prior approval in writing of EPI shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu undivided family business

concern such approval as aforesaid shall likewise be obtained before the Contractor enters into any partnership agreement whereunder the partnership firm would have the right to carry out the works hereby undertaken by the Contractor. If prior approval as aforesaid is not obtained, the Contract shall be deemed to have been assigned in contravention of Clause 59.1 hereof and EPI shall be entitled to take action under Clause 72.2 (xi).

88.0 COMPLIANCE WITH ISO PROCEDURES

EPI is an ISO-9001: 2015, ISO 14001 : 2015, ISO 45001 : 2017 and ISO/IEC 27001 : 2013 Company. The conditions of the ISO as applicable shall be followed by the Contractor for implementation & maintaining the established procedures of EPI.

89.0 Work Capital Capacity

Contractor must have working capital i.e. Minimum (2-3 months) for aforesaid works to fund their day-to-day operations, cover expenses, and take on new projects without disrupting cash flow. This will be mandate to keep the Progress of works continue without any hurdle

90.0 Providing plantation of trees at project site and maintenance of the same up to defect liability period

In case of change in layout/fouling with facilities/structure, the same may be replanted & their survival growth shall be ensured by the Contractor as per instruction of EPI/Client.

91.0 THIRD PARTY SAFETY AUDIT:

An experienced and reputed agency shall be engaged/ appointed by the Contractor for periodic audit (On Qtly basis) of Safety measures in the construction work. The scope of work of the agency so engaged shall be as under:

A. Safety Audit and Implementation of Safety Measures.

B. The duties of Safety Audit agency shall further include the following: -

- a) Plan and organize measures necessary for creating a safe working environment for all workmen engaged at site and to prevent any kind of personal injuries and damage to property;
- b) To advise on safety aspects in all job studies, and to carry out detailed job safety studies of selected jobs and to formulate Job Hazard Analysis Report and Safety Manual during initial mobilization stage of the project.
- c) Prepare action proposed to be taken to prevent personal injuries and damage to property.
- d) Conduct site safety inspections, in order to observe the physical conditions of work and the work practices and procedures followed by

workers and to render advice on measures to be adopted for removing the unsafe physical conditions and preventing unsafe actions by workers and to ensure that the same will be implemented at site. To prepare & submit visit report to Engineer-in-charge.

- e) To report and investigate accidents and near misses and to recommend the preventive measures so as to ensure non-occurrence of such cases and to ensure.
- f) To maintain such records as are necessary relating to accidents, dangerous occurrences and industrial diseases.
- g) To organise in association with the concerned departments, campaigns, competitions, contests and other activities which will create awareness and will develop and maintain the interest of the workers in establishing and maintaining safe conditions of work and procedures.
- h) To design and conduct suitable training and educational programme for the prevention of personal injuries.
- i) Visit to workman camps and monitoring & ensuring the total hygienic conditions are provided for workman.

LABOUR SAFETY PROVISIONS

- 1.0 Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and hand-hold shall be provided on the ladder and the ladder shall be given an inclination not steeper than $\frac{1}{4}$ to $1\frac{1}{4}$ horizontal and 1 vertical)
- 2.0 Scaffolding of staging more than 3.6 m (12ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
- 3.0 Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2.0) above.
- 4.0 Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm. (3ft.)
- 5.0 Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. (30ft.) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11½") for ladder upto and including 3 m. (10 ft.) in length. For longer ladders, this width should be increased at least $\frac{1}{4}$ " for each additional 30 cm. (1 foot) of length. Uniform step spacing of not more than 30 cm shall be kept. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit; action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person.
- 6.0 **(a) Excavation and Trenching**

All trenches 1.2 m. (4ft.) or more in depth, shall at all times be supplied with at least one ladder for each 30 m. (100 ft.) in length or fraction thereof, Ladder shall extend from bottom of the trench to at least 90 cm. (3ft.) above the surface of the ground. The side of the trenches which are 1.5 m. (5ft.) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m. (5ft.) of the edges of the trench

or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances, undermining or undercutting shall be done.

(b) Safety Measures for digging bore holes:-

- (i) If the bore well is successful, it should be safely capped to avoid caving and collapse of the bore well. The failed and the abandoned ones should be completely refilled to avoid caving and collapse;
- (ii) During drilling, sign boards should be erected near the site with the address of the drilling contractor and the Engineer-in-charge of the work;
- (iii) Suitable fencing should be erected around the well during the drilling and after the installation of the rig on the point of drilling, flags shall be put 50m around the point of drilling to avoid entry of people
- (iv) After drilling the borewell, a cement platform (0.50m x 0.50m x 1.20m) 0.60m above ground level and 0.60m below ground level should be constructed around the well casing;
- (v) After the completion of the borewell, the contractor should cap the bore well properly by welding steel plate, cover the bore well with the drilled wet soil and fix thorny shrubs over the soil. This should be done even while repairing the pump;
- (vi) After the bore well is drilled the entire site should be brought to the ground level.

7.0 Demolition:-

Before any demolition work is commenced and also during the progress of the work,

- (i) All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- (ii) No electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.
- (iii) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

8.0 All necessary personal safety equipment as considered adequate by the Engineer-in-Charge should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned:- The following safety equipment shall invariably be provided.

- (i) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
- (ii) Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes, shall be provided with protective goggles.
- (iii) Those engaged in welding works shall be provided with welder's protective eye shields.

- (iv) Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- (v) When workers are employed in sewers and manholes, which are in active use, the contractors shall ensure that the manhole covers are opened and ventilated atleast for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measure are adhered to :-
- (a) Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.
- (b) At least 5 to 6 manholes upstream and downstream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manhole for working inside.
- (c) Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.
- (d) Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.
- (e) Safety belt with rope should be provided to the workers. While working inside the manholes, such rope should be handled by two men standing outside to enable him to be pulled out during emergency.
- (f) The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day
- (g) No smoking or open flames shall be allowed near the blocked manhole being cleaned.
- (h) The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.
- (i) Workers should not be allowed to work inside the manhole continuously. He should be given rest intermittently. The Engineer-in-Charge shall decide the time up to which a worker may be allowed to work continuously inside the manhole.
- (j) Gas masks with Oxygen Cylinder should be kept at site for use in emergency.
- (k) Air-blowers should be used for flow of fresh air through the manholes. Whenever called for, portable air blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non sparking gas engines also could be used but they should be placed at least 2 metres away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.

- (l) The workers engaged for cleaning the manholes/sewers should be properly trained before allowing to work in the manhole. The workers shall be provided with Gumboots or non sparking shoes bump helmets and gloves non sparking tools safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing the limbs before working inside the sewer lines.
- (m) putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.
- (n) If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.
- (o) The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.

Workmen descending a manhole shall try each ladder stop or rung carefully before

- (vi) The Contractor shall not employ men and women below the age of 18 years on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, the following precaution should be taken:-
 - (a) No paint containing lead or lead products shall be used except in the form of paste or ready made paint.
 - (b) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint is dry rubbed and scrapped.
 - (c) Overalls shall be supplied by the contractors to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on the cessation of work.
- (vii) Workmen executing work on scaffolds or other structures above specified height shall be provided with full body harness and fall arresters.

9. An additional clause

- (viii) The Contractor shall not employ women and men below the age of 18 on the work of painting with product containing lead in any form, wherever men above the age of 18 are employed on the work of lead painting, the following principles must be observed for such use :
 - a) White lead, sulphate of lead or product containing these pigment, shall not be used in painting operation except in the form of pastes or paint ready for use.
 - b) Measures shall be taken, wherever required in order to prevent danger arising from the application of a paint in the form of spray.
 - c) Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.
 - d) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.
 - e) Overall shall be worn by working painters during the whole of working period.

- f) Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.
- g) Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man appointed by competent authorities of the Consultant.
- h) EPI may require, when necessary medical examination of workers.
- i) Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.

10.0. When the work is done near any place where there is risk of drowning, all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision, should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.

11.0. Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions:-

- (i) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order. Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.
- (ii) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding winch or give signals to operator.
- (iii) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
- (iv) In case of EPI machines, the safe working load shall be notified by the Electrical Engineer-in-Charge. As regards contractor's machines the contractors shall notify the safe working load of the machine to the Engineer-in-Charge whenever he brings any machinery to site of work and get it verified by the Electrical Engineer concerned.

12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided. The worker should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

13. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.
14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.
15. To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the contractor shall be open to inspection by the Labour Officer-or their representatives.
16. Notwithstanding the above clauses from (1) to (15), there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India

Model Rules for the Protection of Health and Sanitary Arrangements for Workers

1. APPLICATION

These rules shall apply to all buildings and construction works in which twenty or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the contract work is in progress.

2. DEFINITION

Work place means a place where twenty or more workers are ordinarily employed in connection with construction work on any day during the period during which the contract work is in progress.

3. FIRST-AID FACILITIES

- (i) At every work place, there shall be provided and maintained, so as to be easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.
- (ii) The first-aid box shall be distinctly marked with a red cross on white back ground and shall contain the following equipment:-
 - (a) For work places in which the number of contract labour employed does not exceed 50- Each first-aid box shall contain the following equipment :-
 1. 6 small sterilised dressings.
 2. 3 medium size sterilized dressings.
 3. 3 large size sterilized dressings.
 4. 3 large sterilized burn dressings.
 5. 1 (30 ml.) bottle containing a two per cent alcoholic solution of iodine.
 6. 1 (30 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
 7. 1 snakebite lancet.
 8. 1 (30 gms.) bottle of potassium permanganate crystals.
 9. 1 pair scissors.
 10. 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
 11. 1 bottle containing 100 tablets (each of 5 gms.) of aspirin.
 12. Ointment for burns.

13. A bottle of suitable surgical antiseptic solution.
- (b) For work places in which the number of contract labour exceed 50. Each first-aid box shall contain the following equipments.
 1. 12 small sterilised dressings.
 2. 6 medium size sterilised dressings.
 3. 6 large size sterilized dressings.
 4. 6 large size sterilised burn dressings.
 5. 6 (15 gms.) packets sterilised cotton wool.
 6. 1 (60 ml.) bottle containing a two per cent alcoholic solution iodine.
 7. 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
 8. 1 roll of adhesive plaster.
 9. 1 snake bite lancet.
 10. 1 (30 gms.) bottle of potassium permanganate crystals.
 11. 1 pair scissors.
 12. 1 copy of the first-aid leaflet issued by the Director General Factory Advice Service and Labour Institutes /Government of India.
 13. A bottle containing 100 tablets (each of 5 gms.) of aspirin.
 14. Ointment for burns.
 15. A bottle of suitable surgical antiseptic solution.
- (iii) Adequate arrangements shall be made for immediate recoupment of the equipment when necessary.
- (iv) Nothing except the prescribed contents shall be kept in the First-aid box.
- (v) The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.
- (vi) A person in charge of the First-aid box shall be a person trained in First-aid treatment in the work places where the number of contract labour employed is 150 or more.
- (vii) In work places where the number of contract labour employed is 500 or more and hospital facilities are not available within easy distance from the works. First-aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.
- (viii) Where work places are situated in places which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or person suddenly taken ill to the nearest hospital.

4. DRINKING WATER

- (i) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.
- (ii) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
- (iii) Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and waterproof.
- (iv) A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. WASHING FACILITIES

- (i) In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
- (ii) Separate and adequate cleaning facilities shall be provided for the use of male and female workers.
- (iii) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

6. LATRINES AND URINALS

- (i) Latrines shall be provided in every work place on the following scale namely :-
 - (a) Where female are employed, there shall be at least one latrine for every 25 females.
 - (b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that, where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto the first 100, and one for every 50 thereafter.
- (ii) Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.
- (iii) Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting nonabsorbent materials and shall be cement washed inside and outside at least once a year, Latrines shall not be of a standard lower than borehole system.
- (iv)
 - (a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men only" or "For Women Only" as the case may be.
 - (b) The notice shall also bear the figure of a man or of a woman, as the case may be.

- (v) There shall be at least one urinal for male workers upto 50 and one for female workers upto fifty employed at a time, provided that where the number of male or female workmen, as the case may be exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.
- (vi) (a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.
(b) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the Public Health Authorities.
- (vii) Water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.
- (viii) **Disposal of excreta :-** Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed of by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn to manure).
- (ix) The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by Municipal or Cantonment Authority for execution of such on his behalf.

7. PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost, four suitable sheds, two for meals and the other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3 metres (10 ft.) from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sq.m. (6 sq ft) per head.

Provided that the Engineer-in-Charge may permit subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

8. CRECHES

- (i) At every work place, at which 20 or more women worker are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a play room for the children and the other as their bedroom.

The rooms shall be constructed Not less than the following: a) Thatched Roof (ii) Mud Floor and walls (iii) Planks spread over the mud floor and covering with matting.

- (ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.

- (iii) The contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the bed room.
- (iv) The contractor shall provide one ayaa to look after the children in the crèche when the number of women workers does not exceed 50 and two when the number of women workers exceeds 50.
- (v) The use of the rooms earmarked as creches shall be restricted to children, their attendants and mothers of the children.

9. CANTEENS

- (i) In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.
- (ii) The canteen shall be maintained by the contractor in an efficient manner.
- (iii) The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.
- (iv) The canteen shall be sufficiently lighted at all times when any person has access to it.
- (v) The floor shall be made of smooth and impervious materials and inside walls shall be lime-washed or colour washed at least once in each year. Provided that the inside walls of the kitchen shall be lime-washed every four months.
- (vi) The premises of the canteen shall be maintained in a clean and sanitary condition.
- (vii) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.
- (viii) Suitable arrangements shall be made for the collection and disposal of garbage.
- (ix) The dining hall shall accommodate at a time 30 per cent of the contract labour working at a time.
- (x) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one square metre (10 sq ft) per diner to be accommodated as prescribed in sub-Rule 9.
- (xi) (a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.
(b) Washing places for women shall be separate and screened to secure privacy.
- (xii) Sufficient table's stools, chair or benches shall be available for the number of diners to be accommodated
- (xiii) (a) 1. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipment necessary for the efficient running of the canteen.

2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.
- (b) 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.
 2. A service counter, if provided, shall have top of smooth and impervious material.
 3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipments.
- (xiv) The food stuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.
- (xv) The charges for food stuffs, beverages and any other items served in the canteen shall be based on 'No profit, No loss' and shall be conspicuously displayed in the canteen.
- (xvi) In arriving at the price of foodstuffs, and other article served in the canteen, the following items shall not be taken into consideration as expenditure namely:-
 - (a) The rent of land and building.
 - (b) The depreciation and maintenance charges for the building and equipments provided for the canteen.
 - (c) The cost of purchase, repairs and replacement of equipments including furniture, crockery, cutlery and utensils.
 - (d) The water charges and other charges incurred for lighting and ventilation.
 - (e) The interest and amounts spent on the provision and maintenance of equipments provided for the canteen.
- (xvii) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

10. ANTI-MALARIAL PRECAUTIONS

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling up of any borrow pits which may have been dug by him.

11. The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contracts.
12. **AMENDMENTS:** EPI may, from time to time, add to or amend these rules and issue directions - it may consider necessary for the purpose of removing any difficulty which may arise in the administration thereof

Contractor's Labour Regulations

1. SHORT TITLE

These regulations may be called the Contractors Labour Regulations.

2. DEFINITIONS

- (i) Workman means any person employed by EPI or its contractor directly or indirectly through a subcontractor with or without the knowledge of EPI to do any skilled, semiskilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment are expressed or implied but does not include any person :-
 - (a) Who is employed mainly in a managerial or administrative capacity: or
 - (b) Who, being employed in a supervisory capacity draws wages exceeding five hundred rupees per mensem or exercises either by the nature of the duties attached to the office or by reason of powers vested in him, functions mainly of managerial nature: or
 - (c) Who is an out worker, that is to say, person to whom any article or materials are given out by or on behalf of the principal employers to be made up cleaned, washed, altered, ornamental finished, repaired adopted or otherwise processed for sale for the purpose of the trade or business of the principal employers and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the control and management of the principal employer.

No person below the age of 18 years shall be employed to act as a workman.

- (ii) Fair Wages means wages whether for time or piece work fixed and notified under the provisions of the Minimum Wages Act from time to time.
- (iii) Contractors shall include every person who undertakes to produce a given result other than a mere supply of goods or articles of manufacture through contract labour or who supplies contract labour for any work and includes a subcontractor.
- (iv) Wages shall have the same meaning as defined in the Payment of Wages Act.

3. WORKING HOURS

- (i) Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.
- (ii) When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week, he shall be paid over time for the extra hours put in by him at double the ordinary rate of wages.
- (iii) (a) Every worker shall be given a weekly holiday normally on a Sunday, in accordance with the provisions of the Minimum Wages (Central) Rules 1960 as amended from time to time irrespective of whether such worker is governed by the Minimum Wages Act or not.
- (b) Where the minimum wages prescribed by the Government under the Minimum Wages Act are not inclusive of the wages for the weekly day of rest, the worker shall be entitled

to rest day wages at the rate applicable to the next preceding day, provided he has worked under the same contractor for a continuous period of not less than 6 day

- (c) Where a contractor is permitted by the Engineer-in-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substituted holiday to him for the whole day on one of the five days immediately before or after the normal weekly holiday and pay wages to such worker for the work performed on the normal weekly holiday at overtime rate.

4. DISPLAY OF NOTICE REGARDING WAGES ETC.

The contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain in a clear and legible condition in conspicuous places on the work, notices in English and in the local Indian languages spoken by the majority of the workers giving the minimum rates of wages fixed under Minimum Wages Act, the actual wages being paid, the hours of work for which such wage are earned, wages periods, dates of payments of wages and other relevant information as Appendix A

5. PAYMENT OF WAGES

- (i) The contractor shall fix wage periods in respect of which wages shall be payable.
- (ii) No wage period shall exceed one month.
- (iii) The wages of every person employed as contract labour in an establishment or by a contractor where less than one thousand such persons are employed shall be paid before the expiry of seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.
- (iv) Where the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.
- (v) All payment of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.
- (vi) Wages due to every worker shall be paid to him direct by contractor through Bank or ECS or online transfer to his bank account.
- (vii) All wages shall be paid through Bank or ECS or online transfer.
- (viii) Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956
- (viii) Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956.

- (ix) A notice showing the wages period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the contractor to the Engineer-in-Charge under acknowledgment.
- (x) It shall be the duty of the contractor to ensure the disbursement of wages through bank account of labour.
- (xi) The contractor shall obtain from the Engineer in-Charge or any other authorized representative of the Engineer in-Charge as the case may be, a certificate under his signature at the end of the entries in the "Register of Wages" or the "Wage-cum-Muster Roll" as the case may be in the following form:-
- (xii) "Certified that the amount shown in column No has been paid to the workman concerned through bank account of labour on at....."

FINES AND DEDUCTIONS WHICH MAY BE MADE FROM WAGES

- (i) The wages of a worker shall be paid to him without any deduction of any kind except the following:- (a) Fines
 - (b) Deductions for absence from duty i.e. from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.
 - (c) Deduction for damage to or loss of goods expressly entrusted to the employed person for custody or for loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to his neglect or default.
 - (d) Deduction for recovery of advances or for adjustment of overpayment of wages, advances granted shall be entered in a register.
 - (e) Any other deduction which the Central Government may from time to time allow.

- (ii) No fines should be imposed on any worker save in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.

Note :- An approved list of Acts and Omissions for which fines can be imposed is enclosed at Appendix-I

- (iii) No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.
- (iv) The total amount of fine which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in a rupee of the total wages, payable to him in respect of that wage period.
- v) No fine imposed on any worker shall be recovered from him by installment, or after the expiry of sixty days from the date on which it was imposed.
- vi) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

LABOUR RECORDS

- (i) The contractor shall maintain a Register of persons employed on work on contract in Form XIII of the CL (R&A) Central Rules 1971 Appendix-B
- (ii) The contractor shall maintain a Muster Roll register in respect of all workmen employed by him on the work under Contract in Form XVI of the CL (R&A) Rules 1971 Appendix-C
- (iii) The contractor shall maintain a Wage Register in respect of all workmen employed by him on the work under contract in Form XVII of the CL (R&A) Rules 1971 AppendixD
- (iv) **Register of accident** - The contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars:
 - (a) Full particulars of the labourers who met with accident.
 - (b) Rate of Wages.
 - (c) Sex
 - (d) Age
 - (e) Nature of accident and cause of accident.
 - (f) Time and date of accident.
 - (g) Date and time when admitted in Hospital.
 - (h) Date of discharge from the Hospital.
 - (i) Period of treatment and result of treatment.
 - (j) Percentage of loss of earning capacity and disability as assessed by Medical Officer.
 - (k) Claim required to be paid under Workmen's Compensation Act.
 - (l) Date of payment of compensation.
 - (m) Amount paid with details of the person to whom the same was paid.
 - (n) Authority by whom the compensation was assessed.
 - (o) Remarks
- (v) The contractor shall maintain a Register of Fines in the Form XII of the CL (R&A) Rules 1971 Appendix-H

The contractor shall display in a good condition and in a conspicuous place of work the approved list of acts and omissions for which fines can be imposed Appendix-I
- (vii) The contractor shall maintain a Register of deductions for damage or loss in Form XX of the CL (R&A) Rules 1971 Appendix-J

- (viii) The contractor shall maintain a Register of Advances in Form XXIII of the CL (R&A) Rules 1971 Appendix-K
- (ix) The contractor shall maintain a Register of Overtime in Form XXIII of the CL (R&A) Rules 1971 (Appendix-L

6. ATTENDANCE CARD-CUM-WAGE SLIP

- (i) The contractor shall issue an Attendance card-cum-wage slip to each workman employed by him in the specimen form at Appendix-E
- (ii) The card shall be valid for each wage period.
- (iii) The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval, before he actually starts work.
- (iv) The card shall remain in possession of the worker during the wage period under reference.
- (v) The contractor shall complete the wage slip portion on the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
- (vi) The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card with himself.

7. EMPLOYMENT CARD

The contractor shall issue an Employment Card in to each worker within three days of the employment of the worker Appendix-F

8. SERVICE CERTIFICATE

On termination of employment for any reason whatsoever the contractor shall issue to the workman whose services have been terminated, a Service certificate in Form Appendix-G

9. PRESERVATION OF LABOUR RECORDS

All records required to be maintained under Regulations Nos. 6 & 7 shall be preserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-in-Charge, or Labour Officer

10. POWER OF LABOUR OFFICER TO MAKE INVESTIGATIONS OR ENQUIRY

The Labour Officer or any person authorized by EPI on their behalf shall have power to make enquires with a view to ascertaining and enforcing due and proper observance of Fair Wage Clauses and the Provisions of these Regulations. He shall investigate into any complaint regarding the default made by the contractor or subcontractor in regard to such provision.

11. REPORT OF LABOUR OFFICER

The Labour Officer or other persons authorized as aforesaid shall submit a report of result of his investigation indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages and other dues be paid to the labourers concerned. In case an appeal is made by the contractor, the actual payment to labourer will be made

- (i) The payments shall be arranged to the labour concerned by Engineer incharge within 45 days from the receipt of the report from the Labour Officer

12. APPEAL AGAINST THE DECISION OF LABOUR OFFICER

Any person aggrieved by the decision and recommendations of the Labour Officer or other person so authorised may appeal against such decision to Zonal chief concerned within 30 days from the date of decision, the decision of the officer shall be final and binding upon the **contractor**.

13. PROHIBITION REGARDING REPRESENTATION THROUGH LAWYER

- (i) A workman shall be entitled to be represented in any investigation or enquiry under these regulations by:-

- (a) An officer of a registered trade union of which he is a member.
- (b) An officer of a federation of trade unions to which the trade union referred to in clause (a) is affiliated.
- (c) Where the employer is not a member of any registered trade union, by an officer of a registered trade union, connected with the industry in which the worker is employed or by any other workman employed in the industry in which the worker is employed.

- (ii) An employer shall be entitled to be represented in any investigation or enquiry under these regulations by :-

- (a) An officer of an association of employers of which he is a member.
- (b) An officer of a federation of associations of employers to which association referred to in clause (a) is affiliated.
- (c) Where the employers is not a member of any association of employers, by an officer of association of employer connected with the industry in which the employer is engaged or by any other employer, engaged in the industry in which the employer is engaged.

- (iii) No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these regulations

14. INSPECTION OF BOOKS AND SLIPS

The contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Officer or any other person, authorized by the Central Government on his behalf.

15. SUBMISSIONS OF RETURNS

The contractor shall submit periodical returns as may be specified from time to time.

16. AMENDMENTS

EPI may from time to time add to or amend the regulations and on any question as to the application/interpretation or effect of those regulations the decision of the zonal chief concerned shall be final.

Appendix – 'A'

Name of work

Name of Contractor

Address of Contractor

Name and Address of Unit

Name of Labour Enforcement Officer

Address of Labour Enforcement Officer

Date:

S. No.	Category	Minimum wage fixed	Actual wages paid	Number present	Remarks

Weekly Holiday

Wage Period

Date of Payment of wages

Working hours

Rest interval

FORM 13

SEE RULE 75

REGISTER OF WORKMEN EMPLOYED BY CONTRACTOR

Name and Address of Contractor

Name and Address of Establishment in/
under which contract is carried on

Nature and location of work

Name & Address of Principal Employer

Sl. No.	Name and surname of workman	Age & sex	Father's Husbands Name	Nature of employment / designation	Permanent home address of the workman (village and Tehsil Taluk and District)	Local address
1	2	3	4	5	6	7

Date of commencement of employment	Signature or thumb impression of the workman	Date of termination of employment	Reasons for termination	Remarks
8	9	10	11	12

Appendix – 'C'

FORM XVI

(See Rule 78(2) (193)

MUSTER ROLL

Name and address of Contractor

Name and address of establishment in/under
which contract is carried on

Nature and location of work

Name and Address of Principal Employer

For the month / fortnight

S.No.	Name of the workman	Sex	Father's / Husband's Name	Dates	Remarks
1.	2	3	4	5.	
				<u>1 2 3 4 5</u>	

FORM XVII

[SEE RULE 78(2) (03)]

REGISTER OF WAGES

Name and address of Contractor

Name and address of establishment in/under
which contract is carried on

Nature and location of work

Name and Address of Principal Employer

Wage period: per month/ fortnightly

S. No.	Name of Workman	Serial No. in the register of workman	Designation nature of work done	Nos. of days worked	Units of work done	Daily rate of wages/ piece rate	Basic Wages
1	2	3	4	5	6	7	8

Dearness allowance	Overtime	Other cash payments (Nature of payments to be indicated)	Total	Duration if any (indicate)	Net Amt paid	Signature thumb impression of the workman	Initial Contractor or his representative
9	10	11	12	13	14	15	16

FORM XIX

[SEE RULE 78 (2) (B)]

WAGE SLIP

Name and address of Contractor

Name and Father's/Husband's Name of workman

Nature and location of work

For the Week/Fortnight/Month ending

1. No. of days worked
2. No. of Units worked in case of piece rate workers
3. Rate of daily wages/piece rate
4. Amount of overtime wages
5. Gross wages payable
6. Deductions if any
7. Net amount of wages paid

Sign of the Contractor

Appendix – 'E'

NAME AND ADDRESS OF CONTRACTOR

DATE OF ISSUE

NATURE OF WORK WITH LOCATION

DESIGNATION

NAME OF WORKMAN

MONTH/FORTNIGHT

RATE OF WAGES

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31

MORNING

RATE

EVENING

AMOUNT

INITIAL

RECEIVED FROM

THE SUM OF RS.

ON ACCOUNT
OF MY WAGON.

SIGNATURE

THE WAGE CARD IS VALID FOR ONE MONTH FROM THE DATE OF ISSUE.

FORM XIV

(SEE RULE 76)

EMPLOYMENT CARD

Name and address of Contractor

Name and address of establishment under which

The contract is carried out

Nature and location of work

Name and address of Principal Employer

1. Name of the workman
2. Name in the register of workman employed
3. Nature of Employment/Designation
4. Wage rate (with particulars of unit in case of piece work)
5. Wage Period
6. Tenure of employment
7. Remarks

Signature of Contractor

FORM XV

(SEE RULE 77)

SERVICE CERTIFICATE

Name and address of Contractor

Nature and location of work

Name and address of workman

Age or date of birth

Identification Marks

Father's/Husband's Name

Name and address of establishment in under which
contract is carried on

Name and address of Principal Employer

Total period of which employed

S.No.	From	To	Nature of work	Rate of wages (with particular s of unit In case of piece work)	Remarks
1	2	3	4	5	6

Signature

Appendix – 'H'

FORM XII

[SEE RULE 78 (2) (D)]

REGISTER OF FINES

Name and address of Contractor

Name and address of establishment in/ under which contract is carried on

Nature and location of work

Name and address of workman

Name and address of Principal Employer

S.No.	Name of workman	Father's/Husband Name	Designation/nature of employment	Act/Omission for which fine imposed	Date of offence
1	2	3	4	5	6

Whether workman showed causes against fine	Name of person in whose presence employees explanation was heard	Wage period and wages payable	Amount of fine Imposed	Date on which fine realized	Remarks
7	8	9	10	11	12

**LIST OF ACTS AND OMISSIONS FOR
WHICH FINES CAN BE IMPOSED**

In accordance with rule of Labour Regulations, to be displayed prominently at the Site of work both in English and local language.

1. Willful insubordination or disobedience, whether alone or in combination with other.
2. Theft, fraud or dishonestly in connection with Contractors beside a business or property of EPI.
3. Taking or giving bribes or any illegal gratifications.
4. Habitual late attendance.
5. Drunk-ness fighting riotous or disorderly or indifferent behavior.
6. Habitual negligence.
7. Smoking near or around the area where combustible or other materials are locked.
8. Habitual indiscipline.
9. Causing damage to work in the progress or to property of EPI or of the Contractor.
10. Sleeping on duty.
11. Malingering or slowing down work.
12. Giving the false information regarding name, age, fathers name etc.
13. Habitual loss of wage cards supplied by the Employer.
14. Unauthorized use of Employers property or manufacturing or making of unauthorized articles at the work place.
15. Bad workmanship in construction and maintenance by skilled workers, which is not approved by EPI for which the Contractors are compelled to undertake rectifications.
16. Making false complaints and/or misleading statements.
17. Engaging on trade within the premises of the establishment.
18. Any unauthorized divulgence of business affairs of the employees.
19. Collection or canvassing for the collection of any money within the premises of an establishment unless authorized by the Employer.
20. Holding meeting inside the premises without previous sanction of the Employers. Threatening or intimidating any workman or employee during the working hours within the premises.

FORM XX

[SEE RULE 78 (2) (D)]

REGISTER OF DEDUCTION FOR DAMAGES OR LOSS..

Name and address of Contractor

Name and address of establishment in/ under which
contract is carried on

Nature and location of work

Name and address of Principal Employer

S.No.	Name of workman	Father's/Husband Name	Designation/nature of employment	Particulars of damage or loss	Date of damage/loss
1	2	3	4	5	6

Whether workman showed cause against deductions	Name of person in whose presence employees explanation was heard	Amount of deduction Imposed	No. of installment	Date of recovery		Remarks
				First Installment	Last Installment	
7	8	9	10	11	12	13

FORM XXII

[SEE RULE 78(2)]

REGISTER OF ADVANCES

Name and address of Contractor

Name and address of establishment in/ under which
contract is carried on

Nature and location of work

Name and address of Principal Employer

S.No.	Name of workman	Father's/Husband Name	Designation/nature of employment	Wages period and wages payable	Date and amount of advance given
1	2	3	4	5	6

Purpose / for which advance made	No. of installments by which advance is to be paid	Date and amount of each installment repaid	Date on which last installment was repaid	Remarks
7	8	9	10	11

FORM XXIII

[See Rule 78(2) (E)]

REGISTER OF OVERTIME

Name and address of Contractor

Name and address of establishment in/ under which contract is carried on

Nature and location of work

Name and address of Principal Employer

S.No.	Name of workman	Father's/Husband Name	Sex	Designation/ nature of employment	Date on which overtime worked
1	2	3	4	5	6

Total overtime worked or production in case of piece rated	Normal rate of wages	Overtime rate of wages	Overtime earning	Rate on which overtime wages paid	Remarks
7	8	9	10	11	12

APPLICATION
APPLICATION FOR EXTENSION OF TIME

(To be completed by the Contractor)

(PART - I)

1. Name of Contractor
2. Name of the work as given in the Agreement
3. Agreement No.
4. Estimated amount put to Tender
5. Date of commencement work as per agreement
6. Period allowed for completion of work as per agreement
7. Date of completion stipulated as per agreement
8. Period for which extension of time has been given previously
Extension granted
 - a) First extension vide Engineer-in-charge letter No.....date Months Days
 - b) 2nd extension vide Engineer-in-charge letter No..... date Months Days
 - c) 3rd extension vide Engineer-in-charge letter No..... date Months Days
 - d) 4th extension vide engineer-in-charge letter No..... date Months Days
- Total extension previously given
9. Reasons for which extension have been previously given (copies of the previous application should be attached)
10. Period for which extension is applied for:
11. Hindrances on account of which extension is applied for with dates on which hindrances occurred, and the period for which these are likely to last.
 - a) Serial No.
 - b) Nature of hindrance

Signature of Contractor

EPI

- c) Date of Occurrence
- d) Period for which it is likely to last
- e) Period for which extension required for this particular hindrance.
- f) Over lapping period, if any, with reference to item
- g) Net extension applied for
- h) Remarks, if any

Total period for which extension is now applied for on account of hindrances mentioned above Month/ days.

- 12. Extension of time required for extra work.
- 13. Details of extra work and on the amount involved:
 - a) Total value of extra work
 - b) Proportionate period of extension of time based on estimated amount put to tender on account of extra work.
- 14. Total extension of time required for 11 & 12 Submitted to the Engineer-In-Charges office.

SIGNATURE OF CONTRACTOR

DATE

Signature of Contractor

EPI

APPLICATION FOR EXTENSION OF TIME

(PART – II)

1. Date of receipt of application from Contractor for the work in the Engineer-In-Charge office.
2. Acknowledgement issued by Engineer-In-Charge vide his letter No dated
3. Engineer-In-Charge remarks regarding hindrances mentioned by the Contractor.
 - i) Serial No.
 - ii) Nature of hindrance
 - iii) Date of occurrence of hindrance
 - iv) Period for which hindrance, is likely to last
 - v) Extension of time period applied for by the Contractor
 - vi) Over lapping period, if any, giving reference to items which over lap
 - vii) Net period for which extension is recommended.
 - viii) Remarks as to why the hindrance occurred and justification for extension recommended.
4. Engineer-In-Charge recommendations.

(The present progress of the work should be stated and whether the work is likely to be completed by the date upto which extension has been applied for. If extension of time is not recommended, what compensation is proposed to be levied under the agreement.

SIGNATURTE OF ENGINEER-IN-CHARGE

APPROVAL OF ZONAL HEAD

Signature of Contractor

EPI

PROFORMA LETTER FOR EXTENSION OF TIME

(PART -III)

To

NAME

ADDRESS OF THE CONTRACTOR

SUBJECT:

Dear Sir(s)

Reference your letter No _____ dated _____, in connection with the grant of extension of time for completion of the work.....

The date of completion for the above mentioned work, isas stipulated in the agreement, dated

Extension of time for completion of the above mentioned work is granted upto _____, without prejudice to the right of EPI to recover compensation for delay in accordance with the provision made in the relevant Clause (s) of the said agreement dated the ____/ ____/ _____. It is also clearly understood that EPI shall not consider any revision in contract price or any other compensation whatsoever due to grant of this extension.

Provided that notwithstanding the extension hereby granted, time is and shall still continue to be the essence of the said agreement.

Yours faithfully,

FOR EPI LTD.

Signature of Contractor

EPI

BANK GUARANTEE IN LIEU OF EARNEST MONEY DEPOSIT

In consideration of Chairman & managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, Lodhi Road, New Delhi Pin-110003. (hereinafter called the EPI) having agreed to accept bank Guarantee of Rs in lieu of EARNEST MONEY DEPOSIT from (hereinafter called the Supplier/ Contractor/ Sub-Contractor, which expression shall include its heirs, successors and assignees) in respect of the Tender for

We, bank having its registered/head office at (hereinafter referred to as the Bank) do hereby agree and undertake to pay to EPI without demur or protest an amount not exceeding Rs. on demand by EPI.

We the above said Bank further agree and undertake to pay the said amount of Rs. without any demur on demand within 48 hours. Any demand made on the Bank by EPI shall be conclusive as regards the amount due and payable by the Bank under this guarantee.

We the above said Bank further agree that the guarantee herein contained shall be in full force and in effect until date

Unless a demand or claim under this guarantee is made on us in writing on or before date, we shall be discharged from all liabilities under this guarantee thereafter.

We, the above said Bank, further agree that EPI shall have full liberty, without our consent and without affecting in any manner our obligation to verify, modify or delete any of the conditions.

We, the above said Bank, lastly undertake not to revoke this guarantee during its currency except with the prior consent of EPI in writing.

Dated.....this day of.....200.

For and on behalf of the Bank

NOTE: on a Non-Judicial stamp paper of Rs. 100/- (Rupees One hundred only)

Signature of Contractor

EPI

INSURANCE SURETY BOND IN LIEU OF EARNEST MONEY DEPOSIT

In consideration of Chairman & managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, Lodhi Road, New Delhi Pin- 110003. (hereinafter called the EPI) having agreed to accept Insurance Surety Bond of ₹..... in lieu of EARNEST MONEY DEPOSIT from (hereinafter called the Bidder, which expression shall include its heirs, successors and assignees) in respect of the Tender for.....

We, [Name of Surety Insurer] having its registered/head office at(hereinafter referred to as the Surety Insurer) do hereby agree and undertake to pay to EPI without demur or protest an amount not exceeding ₹..... on demand by EPI.

We the above said Surety Insurer further agree and undertake to pay the said amount of ₹..... without any demur on demand within 48 hours. Any demand made on the Surety Insurer by EPI shall be conclusive as regards the amount due and payable by the Surety Insurer under this Insurance Surety Bond.

We the above said Surety Insurer further agree that the Surety Bond herein contained shall be in full force and in effect until date unless a demand or claim under this guarantee is made on us in writing on or before..... date , we shall be discharged from all liabilities under this Insurance Surety Bond thereafter.

We, the above said Surety Insurer, further agree that EPI shall have full liberty, without our consent and without affecting in any manner our obligation to verify, modify or delete any of the conditions.

We, the above said Surety Insurer, lastly undertake not to revoke this Insurance Surety Bond during its currency except with the prior consent of EPI in writing.

Dated.....this day of.....20XX.

For and on behalf of the Surety Insurer

NOTE: on a Non-Judicial stamp paper of ₹ 100/- (Rupees One hundred only)

Signature of Contractor

EPI

FORMAT

SECURITY DEPOSIT CUM PERFORMANCE BANK GUARANTEE

The Chairman & Managing Director
(A Govt. of India Enterprise);
Engineering Projects (India) Ltd.
Core-3, SCOPE Complex
7, Institutional Area, Lodhi road
New Delhi - 110 003

Dear Sir,

In consideration of the Chairman & Managing Director, Engineering Projects (India) Ltd. (A Govt. of India Enterprise), Core-3, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi - 110 003 (hereinafter called 'EPI' which expression shall unless repugnant to the subject or context includes its successors and assigns) having agreed under the terms and conditions of Supply Contract/Contract/Sub-Contract no. _____

Dated _____ made between _____ M/s _____

_____ (hereinafter referred to as the said Supplier/Contractor/Sub-Contractor) which expression shall unless repugnant to the subject or context includes its successors and assigns) and EPI in connection with _____ (hereinafter called 'The said Supply Contract/Contract/Sub-Contract') to accept a Deed Security Deposit-cum-Performance Bank Guarantee as herein provided for _____ in lieu of :

- a) The Security Deposit to be made by the said Supplier/Contractor/Sub-Contractor for the due fulfillment by the said Supplier/Contractor/Sub-Contractor of the terms and conditions contained in the said Supply Contract/Contract/Sub-contract, and
 - b) Fulfillment of the conditions of the said Supply Contract /Contract/Sub-Contract by furnishing a security for the performance of the works and/or equipment/materials supplied in accordance with conditions of the said Supply Contract/ Contract/ Sub-Contract.
1. We _____ (hereinafter referred to as "the said bank which expression shall unless repugnant to the subject or context includes its successors and assigns) and having our registered office at _____ do hereby unconditionally and irrevocably undertake and agree to indemnify and keep indemnified EPI from time to time to the extent of (_____) Only against any loss, damages, costs, charges and expenses caused to or suffered by or that may be caused or suffered by EP [I by reason of any breach or breaches by the said Supplier/Contractor/Sub-Contractor of any of the terms and conditions contained in the said Supply Contract/Contract/Sub-Contract and or any amount becoming due for non-

Signature of Contractor

EPI

performance and /or penalty as assessed by EPI and to unconditionally pay the amount claimed by EPI on demand and without demur and protest.

2. We the said Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Supply Contract/Contract/Sub-Contract and till all the dues of EPI under the said Supply Contract/Contract/Sub-Contract or by virtue of any of the terms and conditions governing the said Supply Contract/ Contract/ Sub-Contract have been fully paid and its claims satisfied or discharged and till EPI certifies that the terms and conditions of the said Supply Contract/Contract/Sub-Contract have been fully and properly carried out by the said Supplier/Contractor/Sub-Contractor and accordingly discharge this guarantee subject, however, that EPI shall have no claim under this guarantee after 6 months from the date of expiry of the guarantee unless a notice of the claim under this guarantee has been served on the Bank before the expiry of the said period of 6 months.
3. EPI shall have the fullest liberty without affecting in any way the liability of the said Bank under this Guarantee or indemnity from time to time to vary any of the terms and conditions of the said Supply Contract/Contract/Sub-Contract to extend time of performance of the said Supply Contract/ Contract/ Sub-Contract or to postpone for any time and from time to time any power's exercisable by it against the said Supplier/Contractor/Sub-Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Supply Contract/ Contract/ Sub-Contract or securities available to EPI and the said Bank shall not be released from its liability under these presents by any exercise by EPI of the liberty with reference to the matters aforesaid or by reason of time being given to the said Supplier/Contractor/Sub-Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the said Bank from its such liability.
4. We, the said Bank, further agree that EPI shall be the sole judge of and as to whether the said Supplier/Contractor/Sub-Contractor has committed any breach or breaches of any of the terms and conditions of the said Supply Contract/Contract/ Sub-Contract and the extent of loss, damage, cost, charges and expenses caused to or suffered by or that may be caused to or suffered by EPI on account thereof and the decision of EPI that the said Supplier/Contractor/Sub-Contractor has committed such breach or breaches and as to the amount or amounts of loss, damages, costs, charges and expenses caused to or suffered by EPI from time to time shall be final and binding on the Bank.
5. This guarantee shall be a continuing guarantee and shall remain valid and irrevocable for all claims of EPI and liabilities of the said Supplier/Contractor/Sub-Contractor arising up to and until mid night of _____, subject the claim period as mentioned in para _____.
6. This guarantee shall be in addition to any other guarantee or security whatsoever that EPI may now or at any time anywise may have in relation to the said Supplier/Contractor/Sub-Contractor obligation/liabilities under and/or in connection with the said Supply Contract/Contract/Sub-Contract and EPI shall have full authority to take recourse to or enforce this guarantee in preference to any other guarantee or

Signature of Contractor

EPI

security which EPI may have or obtain and there shall be no forbearance on the part of EPI IN ENFORCING OR REQUIRING ENFORCEMENT OF ANY OTHER SECURITY AND shall not have the effect of releasing the said Bank from its full liability hereunder:

7. EPI shall be at liberty without reference to the said Bank and without effecting the full liability of the said Bank hereunder to take any other security in respect of the said supplier's/Contractor's/sub-Contractor's obligations and/or liabilities under or in connection with the said Supply Contract/ Contract/ Sub-Contract.
8. This guarantee shall not be determined or affected by the liquidation or winding up, dissolution, or change of constitution or insolvency of the said Supplier/Contractor/Sub-Contractor, but shall in all respects and for all purposes be binding and operative until payment of all moneys paid to EPI in terms thereof.
9. The said Bank hereby waives all rights at any time inconsistent with the terms of this guarantee and the obligations of the said Bank in terms hereof shall not be otherwise affected or suspended by reasons of any dispute or disputes having been raised by the said Supplier/Contractor/Sub-Contractor (whether or not pending before any arbitrator, tribunal or court) of any denial or liability by the said Supplier/ Contractor/ Sub-Contractor stopping or preventing or purporting to stop or prevent any payment by the said Bank to EPI in terms hereof. The amount stated in any notice of demand addressed by EPI to the Guarantor Bank as liable to be paid to EPI by the Supplier/ Contractor/ Sub-Contractor on account of any losses or damages or costs, charges and /or expenses shall as between the said bank and EPI be conclusive evidence of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and payable by the said Bank to EPI in terms hereof. We, the said Bank further undertake that we shall pay forthwith the amount stated in the notice of demand to EPI without demur and protest.
10. We, the said bank undertake not to revoke this guarantee during its currency except with the consent of EPI in writing and agree that any change in the constitution of the aid Supplier/Contractor/Sub-Contractor or the said Bank shall not discharge our liabilities hereunder.
11. It shall not be necessary for EPI to proceed against the said Supplier/Contractor/Sub-Contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which EPI may have obtained or obtain from the Supplier/Contractor/Sub-Contractor shall at the time when proceedings are taken against the said Bank hereunder be outstanding or unrealized.
12. Our liability under this guarantee shall be restricted to _____ and this guarantee shall remain in force until midnight of _____ unless a claim to enforce this guarantee is filed with us within six months from _____. (which is date of expiry of this guarantee), we shall be discharged from all liabilities under this guarantee thereafter.

DATED _____ THIS day of _____ 200...

FOR AND ON BEHALF OF BANK

Signature of Contractor

EPI

FORMAT

**SECURITY DEPOSIT CUM PERFORMANCE GUARANTEE IN THE FORM OF INSURANCE
SURETY BOND**

Chairman & Managing Director,
Engineering Projects (India) Ltd.,
(A Govt. of India Enterprise),
Core-3, Scope Complex,
7 Institutional Area, Lodhi Road,
New Delhi 110 003

Dear Sir,

In consideration of the Chairman & Managing Director, Engineering Projects (India) Ltd., (A Govt. of India Enterprise), Core-3, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi 110 003 (hereinafter called 'EPI' which expression shall unless repugnant to the subject or context, includes its successors and assigns) having agreed under the terms and conditions of contract vide LOI No. [] dt [] issued to M/s. [Name of Contractor] (hereinafter referred to as the **Contractor**, which expression shall unless repugnant to the subject or context includes its successors and assigns) in connection with [Name of Project] (hereinafter called the **Contract**) to accept a Performance Security Insurance Surety Bond as herein provided for ₹ [Amount of Performance Security both in figures and in words] in lieu of:

- a) The Performance Security to be made by the said Contractor for the due fulfillment by the said Contractors of the terms and conditions contained in the said Contract, and
- b) Fulfillment of the conditions of the said Contract by furnishing a security for the performance of the works in accordance with conditions of the said Contract.

1. We, [Name of Surety Insurer] (hereinafter referred to as the **Surety Insurer** which expression shall unless repugnant to the subject or context includes its successors and assigns) and having our registered office at [Address of Insurer] do hereby unconditionally and irrevocably undertake and agree to indemnify and keep indemnified EPI from time to time to the extent of ₹ [Amount of Performance Security both in figures and in words] only against any loss, damages, costs, charges and expenses caused to or suffered by or that may be caused or suffered by EPI by reason of any breach or breaches by the said Contractor of any of the terms and conditions contained in the said Contract and or any amount becoming due for non-performance and /or penalty

Signature of Contractor

EPI

as assessed by EPI and to unconditionally pay the amount claimed by EPI on demand and without demur and protest.

2. We the said Surety Insurer further agree that the insurance surety bond therein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and till all the dues of EPI under the said Contract or by virtue of any of the terms and conditions governing the said Contract have been fully paid and its claims satisfied or discharged and till EPI certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said Contractor and accordingly discharge this surety bond subject, however, that EPI shall have no claim under this surety bond after 6 months from the date of expiry of the Surety bond unless a notice of the claim under this surety bond has been served on the Surety Insurer before the expiry of the said period of 6 months.
3. EPI shall have the fullest liberty without affecting in any way the liability of the said Surety Insurer under this surety bond or indemnity from time to time to vary any of the terms and conditions of the said Contract to extend time to performance of the said Contract or to postpone for any time and from time to time any power's exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or securities available to EPI and the said Surety Insurer shall not be released from its liability under these presents by any exercise by EPI of the liberty with reference to the matters aforesaid or by reason of time being given to the said Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the said Surety Insurer from its such liability.
4. We, the said Surety Insurer, further agree that EPI shall be the sole judge of and as to whether the said Contractor has committed any breach or breaches of any of the terms and conditions of the said Contract and the extent of loss, damage, cost, charges and expenses caused to or suffered by or that may be caused to or suffered by EPI on account thereof and the decision of EPI that the said Contractor has committed such breach or breaches and as to the amount or amounts of loss, damages, costs, charges and expenses caused to or suffered by EPI from time to time shall be final and binding on the Surety Insurer.

Signature of Contractor

EPI

5. This surety bond shall be a continuing guarantee and shall remain valid and irrevocable for all claims of the EPI and liabilities of the said Contractor arising up to and until mid-night of [Date of Validity of Performance Security as per tender conditions], subject to claim period as mentioned in para 12.
6. This surety bond shall be in addition to any other guarantee or security whatsoever that EPI may now or any time anywise may have in relation to the said Contractor's obligation/liabilities under and/or in connection with the said Contract and EPI shall have full authority to take recourse to or enforce this surety bond in preference to any other guarantee or security which EPI may have or obtain and there shall be no forbearance on the part of EPI IN ENFORCING OR REQUIRING ENFORCEMENT OF ANY OTHER SECURITY AND shall not have the effect of releasing the Surety Insurer from its full liability hereunder:
7. EPI shall be at liberty without reference to the Surety Insurer and without effecting the full liability of the Surety Insurer hereunder to take any other security in respect of the said Contractor's obligations and/or liabilities under or in connection with the said Contract.
8. This surety bond shall not be determined or affected by the liquidation or winding up, dissolution, or change of constitution or insolvency of the said Contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys paid to EPI in terms thereof.
9. The Surety Insurer hereby waives all rights at any time inconsistent with the terms of this surety bond and the obligations of the said Surety Insurer in terms hereof shall not be anywise affected or suspended by reasons of any dispute or disputes having been raised by the said Contractor (whether or not pending before any arbitrator, tribunal or court) of any denial or liability by the said Contractor stopping or preventing or purporting to stop or prevent any payment by the said Surety Insurer to EPI in terms hereof. The amount stated in any notice of demand addressed by EPI to the Surety Insurer as liable to be paid to EPI by the Contractor on account of any losses or damages or costs, charges and / or expenses shall as between the Surety Insurer and EPI be conclusive evidence of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and payable by the Surety Insurer to EPI in terms hereof. We, the Surety Insurer further

Signature of Contractor

EPI

undertake that we shall pay forthwith the amount stated in the notice of demand to EPI without demur and protest.

10. We, the Surety Insurer undertake not to revoke this surety bond during its currency except with the consent of EPI in writing and agree that any change in the constitution of the said Contractor shall not discharge our liabilities hereunder.
11. It shall not be necessary for EPI to proceed against the said Contractor before proceeding against the Surety Insurer and the surety bond herein contained shall be enforceable against the Surety Insurer notwithstanding any security which EPI may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the said Surety Insurer hereunder be outstanding or unrealized.
12. Our liability under this Surety Bond shall be restrict to ₹ [Amount of Performance Security both in figures and in words] and this Surety Bond shall remain in force until midnight of [Date of Validity of Performance Security as per tender conditions] unless a claim to enforce this surety bond is filled with us within six months from [Date of Validity of Performance Security as per tender conditions] (which is date of expiry of this surety bond), we shall be discharged from all liabilities under this surety bond thereafter.

Dated

Signed by [Name of Surety Insurer]

Signature of Contractor

EPI



Format

ADVANCE BANK GUARANTEE

To

The Chairman & Managing Director,
Engineering Projects (India) Ltd.,
(A Govt. of India Enterprise),
Core-3, Scope Complex,
7, Institutional Area,
Lodhi Road,
New Delhi—110 003.

Dear Sir,

1. In consideration of the Chairman & Managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110 003 (hereinafter called 'EPI' which expression shall include its successors and assigns) having agreed under the terms and conditions of Supply Contract/ Contract/ Sub-Contract No.....dated...(hereinafter referred to as the said Supply Contract/ Contract/ Sub-Contract) made between EPI and... hereinafter called the Supplier/ Contractor/ Sub-Contractor) which expression shall include its successors and assigns to make at the request of the Supplier/ Contractor/ Sub-Contractor a lump sum advance of Rs.....for utilising it only for the purposes of the said Supply Contract/ Contract/ Sub-Contract on his furnishing a guarantee acceptable to EPI.
2. We, the..... Bank (hereinafter referred to as 'the said Bank') a Company under the Companies Act 1956 and having our registered office at..... do hereby guarantee the recovery of the said advance and interest thereon as provided according to the terms and conditions of the said Supply Contract/ Contract/ Sub-Contract. If the Supplier/ Contractor/ Sub-Contractor fails to utilise the said advance for the purposes of the said Supply Contract/ Contract/ Sub-Contract and/or the said advance together with interest thereon as aforesaid is not fully recovered by EPI, we,Bank hereby unconditionally and irrevocably undertake to pay the EPI on demand and without demur or protest to the extent of the said sum of Rs.....any claim made by EPI on us against non-utilisation / misutilisation of the said advance and/or by reason of EPI not being able to recover in full the sum of Rs..... with interest as aforesaid.
3. We..... Bank further agree that EPI shall be the sole judge of and as to whether the said Supplier/ Contractor/ Sub-Contractor has utilised or not utilised the said advance or any part thereof for the purposes of the said Supply Contract/ Contract/ Sub-Contract and/or as to whether the advance or any part thereof with

Signature of Contractor

EPI

interest has been recovered or not and the finding of the EPI in this regard- shall be final and binding on us.

4. We, the said Bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Supply Contract/ Contract/ Sub-Contract and till the said advance with interest has been fully recovered and its claims satisfied or discharged and till EPI certifies that the said advance with interest has been fully recovered from the Supplier/ Contractor/ Sub-Contractor.
5. EPI shall have the fullest liberty without affecting in any way the liability to the said Bank under this guarantee or indemnity from time to time to vary any of the terms and conditions of the said Supply Contract/ Contract/ Sub-Contract, or the advance or to extend time of performance by the said Supplier/ Contractor/ Sub-Contractor or to postpone for any time and from time to time any powers exercisable by it against the said Supplier/ Contractor/ Sub-Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Supply Contract/ Contract/ Sub-Contract or securities available to EPI and the said Bank shall not be released from its liability under these presents by any exercise by EPI of the liberty with reference to the matters aforesaid or by reason of time being given to the said Supplier/ Contractor/ Sub-Contractor or any other forbearance, act or omission on the part of the EPI or any indulgence by EPI to the said Supplier/ Contractor/ Sub-Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the said Bank from its such liability.
6. The Bank hereby waives all rights at any time inconsistent with the terms of this guarantee/Undertaking and the obligations of the Bank in terms hereof shall not be anyway affected or suspended by reasons of any dispute or disputes having been raised by the Supplier/ Contractor/ Sub-Contractor (whether or not pending before any arbitrator, Tribunal or court) or any denial or liability by the Supplier/ Contractor/ Sub-Contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to EPI in terms hereof.
7. The amount stated in any notice of demand addressed by EPI to Bank as liable to be paid to EPI by the Supplier/ Contractor/ Sub-Contractor, shall be conclusive evidence of the amount so liable to be paid to EPI by the Bank.
8. This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever that EPI may now or any time anyway may have in relation to the Supplier's/ Contractor's/ Sub-Contractor's obligations of liabilities under and/or in connection with the said Supply Contract/ Contract/ Sub-Contract, and EPI shall have full authority to take recourse to or enforce this security in preference to any other guarantee or security which EPI may have or obtain and there shall be no forbearance on the part of EPI in enforcing or requiring enforcement of any other security and shall not have the effect of releasing the Bank from its full liability hereunder.
9. It shall not be necessary for EPI to proceed against the said Supplier/ Contractor/ Sub-Contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which EPI may have obtained or obtain from the Supplier/ Contractor/ Sub-Contractor, shall at the time

Signature of Contractor

EPI

when proceedings are taken against the said Bank hereunder be outstanding or unrealized.

10. We,.....the said Bank further undertake that we shall pay forthwith the amount stated in the notice of demand without demur and protest notwithstanding any dispute/difference pending between the parties before the arbitrator Tribunal or Court and/or dispute is being referred to arbitrator.
11. We, the said Bank undertake not to revoke this Guarantee during its currency except with the consent of EPI in writing and agree that any change in the Constitution of the said Supplier/ Contractor/ Sub-Contractor or the said Bank shall not discharge our liability hereunder.
12. This guarantee/undertaking shall be a continuing guarantee/undertaking and shall remain valid and irrevocable for all claims of EPI and liabilities of the Supplier/ Contractor/ Sub-Contractor arising up to and until midnight of.....
13. Notwithstanding anything contained herein above, our liability under this guarantee shall be restricted to Rs..... (Rs.....) and this guarantee shall remain in full force till.....unless a claim is made on us within 3 months from the date of expiry of this guarantee i.e. before all the claims under this guarantee shall be forfeited and we shall be relieved of and discharged from our liabilities hereunder.

Datedday of 200

For and on behalf of Bank

Signature of Contractor

EPI

Format

PERFORMANCE BANK GUARANTEE

To

The Chairman & Managing Director,
Engineering Projects (India) Ltd.,
(A Govt. of India Enterprise),
Core-3, Scope Complex,
7, Institutional Area,
Lodhi Road,
New Delhi—110 003.

Dear Sir,

In consideration of the Chairman & Managing Director, Engineering Projects (India) Limited, (A Govt. of India Enterprise), Core-3, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110 003 (hereinafter called 'EPI' which expression shall include its successors and assigns) having awarded to.....(hereinafter referred to as 'the Supplier/ Contractor/ Sub-Contractor' which expression shall wherever the subject or context so permits include its successors and assigns) a Supply Contract/Contract / Sub-Contract No..... in terms inter alia, of EPI Letter No.dated...and the General Conditions of Contract/ General Purchase Conditions of EPI and upon the condition of the Supplier's/ Contractor's/ Sub-Contractor's furnishing security for the performance of the Supplier's/ Contractor's/ Sub-Contractor's obligations and/or discharge of the Supplier's/ Contractor's/ Sub-Contractor's liability under and/or in connection with the said Supply Contract/ Contract/ Sub-Contract up to a sum of Rs.....(Rupees..... only) amount to.....percent of the total Supply Contract/ Contract/ Sub-Contract Value.

1. We.....(hereinafter called 'the Bank' which expression shall include its successors and assigns) hereby jointly and severally undertake the guarantee to payment to EPI in rupees forthwith on demand in writing and without protest or demur or any and all monies anywise payable by the Supplier/ Contractor/ Sub-Contractor to EPI under in respect of or in connection with the said Supply Contract/ Contract/ Sub-Contract inclusive of all EPI's losses and damages and costs, charges and expenses and other moneys anywise payable in respect to the above as specified in any notice of demand made by the EPI to the Bank with reference to this guarantee up to and aggregate limit of Rs..... (Rupees.....only).

Signature of Contractor

EPI

2. We..... Bank further agree that EPI shall be sole judge of and as to whether the said Supplier/ Contractor/ Sub-Contractor has committed any breach or breaches of any of the terms and conditions of the said Supply Contract/ Contract/ Sub-Contract and the extent of loss, damage, cost, charges and expenses caused to or suffered by or that may be caused to or suffered by EPI on account thereof and the decision of EPI that the said Supplier/ Contractor/ Sub-Contractor has committed such breach or breaches and as to the amount or amounts of loss, damage, costs, charges and expenses caused to or suffered by EPI from time to time shall be final and binding on us.
3. EPI shall be at liberty without reference to the Bank and without effecting the full liability of the Bank hereunder to take any other security in respect of the Supplier's/ Contractor's/ Sub-Contractor's obligations and/or liabilities under or in connection with the said Supply Contract/ Contract/ Sub-Contract and to vary the forms vis-à-vis the Supplier/ Contractor/ Sub-Contractor of the said Supply Contract/ Contract/ Sub-Contract or to grant time and/or indulgence to the Supplier/ Contractor/ Sub-Contractor or to reduce or to increase or otherwise vary the prices of the total Supply Contract/ Contract/ Sub-Contract Value or to release or to forbear from enforcement of all or any of the security and/or any other security(ies) now or hereafter held by the EPI and no such dealing(s) reduction(s) increase(s) or other indulgence(s) or arrangements with the Supplier/ Contractor/ Sub-Contractor or release or forbearance whatsoever shall absolve the bank of the full liability to EPI hereunder or prejudice rights of EPI against the bank.
4. The guarantee/undertaking shall not be determined or affected by the liquidation or winding up, dissolution, or change of constitution or insolvency of the Supplier/ Contractor/ Sub-Contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys made to EPI in terms thereof.
5. The Bank hereby waives all rights at any time inconsistent with the terms of this guarantee/undertaking and the obligations of the Bank in terms hereof shall not be anyway affected or suspended by reasons of any dispute or disputes having been raised by the Supplier/ Contractor/ Sub-Contractor (whether or not pending before any arbitrator, Tribunal or Court) of any denial or liability by the Supplier/ Contractor/ Sub-Contractor stopping or preventing or purporting to stop or prevent any payment by the Bank to the EPI in terms hereof.
6. The amount stated in any notice of demand addressed by EPI to Bank as liable to be paid to EPI by the Supplier/ Contractor/ Sub-Contractor or as suffered or incurred by the EPI on account of any losses or damages or costs, charges and/or expenses shall be conclusive evidence of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and shall be payable by the Bank to EPI in terms hereof.

Signature of Contractor

EPI

7. This guarantee/undertaking shall be a continuing guarantee/undertaking and shall remain valid and irrevocable for all claims of EPI and liabilities of the Supplier/ Contractor/ Sub-Contractor arising up to and until midnight of.....
8. This guarantee/undertaking shall be in addition to any other guarantee or security whatsoever that EPI may now or any time anywise may have in relation to the Supplier's/ Contractor's/ Sub-Contractor's obligations of liabilities under and/or in connection with the said Supply Contract/ Contract/ Sub-Contract, and EPI shall have full authority to take recourse to or enforce this security in preference to any other guarantee of security which EPI may have or obtain and here shall be no forbearance on the part of EPI in enforcing or requiring enforcement of any other security and shall not have the effect of releasing the Bank from its full liability hereunder.
9. It shall not be necessary for EPI to proceed against the said Supplier/ Contractor/ Sub-Contractor before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank notwithstanding any security which the EPI may have obtained or obtain from the Supplier/ Contractor/ Sub-Contractor, shall at the time when proceedings are taken against the said Bank hereunder be outstanding or unrealised.
10. We the said Bank undertake not to revoke this guarantee during its currency except with the consent of EPI in writing and agree that any change in the constitution of the said Supplier/ Contractor/ Sub-Contractor or the said bank shall not discharge our liability hereunder.
11. Wethe said Bank further undertake that we shall pay forthwith the amount stated in the notice of demand without demur and protest notwithstanding any dispute/difference pending between the parties before the arbitrator Tribunal or Court and/or any dispute is being referred to arbitrator.
12. Notwithstanding anything contained herein above, our liability under this guarantee shall be restricted to Rs.....
(Rupees.....) and this guarantee shall remain in force till..... unless a claim is made on us within 3 months from that date, that is before all the claims under this guarantee shall be forfeited and we shall be relieved of and discharged from our liabilities thereunder.

Dated day of 200

For and on behalf of Bank

Signature of Contractor

EPI

FORMAT

**INDEMNITY BOND TO BE EXECUTED BY
THE CONTRACTOR FOR SECURED ADVANCE
AGAINST MATERIALS SUPPLIED FOR THE PROJECT**

(On non-judicial stamp paper of appropriate value)

INDEMNITY BOND

THIS INDEMNITY BOND is made this..... day of..... 20..... by..... (Contractor's Name) a Company registered under the Companies Act, 1956/Partnership firm/Proprietary concern having its Registered Office at..... (hereinafter called as 'Contractor' which expression shall include its successors and permitted assigns) in favour of Engineering Projects (India) Limited, a Company incorporated under the Companies Act, 1956 having its Registered Office at Core-3, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi - 110 003 (hereinafter called "EPI" which expression shall include its successors and assigns) :

WHEREAS EPI has awarded to the Contractor a Contract for the work of..... vide its letter of Intent/Work Order No..... dated..... (hereinafter called the "Contract") in terms of which EPI is required to give "Secured Advance" to the Contractor as per Clause no. 35 of the General Conditions of Contract against supply of materials by the Contractor for the project on the security of materials, the quantities, rates and other particulars of which are detailed in the Bill of Quantities for the said Contract.

And WHEREAS by virtue of Clause no. 35 of the General Conditions of Contract of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of EPI for the amount of "Secured Advance" towards the materials actually supplied by the Contractor for the Contract Work from time to time to EPI for the purpose of performance of the Contract. (hereinafter called the "Materials").

"AND WHEREAS the Contractor has applied to EPI that they may be allowed "Secured Advance" on the security of materials absolutely belonging to them and brought by them to the site of the works for use in construction of the work".

NOW THEREFORE, This Indemnity Bond witnesseth as follows:

1. That in consideration of the "Secured Advance" being given to the Contractor as mentioned in the Contract, for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep EPI indemnified, for the Actual Cumulative Amount of the "Secured Advance" given to the Contractor from time to time against the said Contract. The Contractor hereby acknowledges actual receipt of the materials etc. as per dispatch title documents being /to be handed over to EPI from time to time. The Contractor shall hold such materials in trust as a "Trustee" for and on behalf of EPI.

Signature of Contractor

EPI

2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the materials at EPI's project site against all risks whatsoever till the materials are duly used/erected in accordance with the terms of the Contract and the plant/package duly erected and commissioned in accordance with the terms of the Contract is taken over by EPI and the Secured Advance is fully adjusted/recovered as per terms of the Contract. The Contractor undertakes to keep EPI harmless against all losses, damages, deterioration and shortages that may be caused to the materials.
3. The Contractor undertakes that the materials shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the materials shall be utilized for any other work or purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purposes including legal/penal consequences.
4. That EPI is and shall remain the exclusive owner of the materials free from all encumbrances, charges or liens of any kind, whatsoever. The materials shall at all times be open to inspection and checking by the Engineer – In - Charge or other employees/agents authorized by him in this regard. Further, EPI shall always be free at all times to take possession of the materials in whatever form the materials may be, if in its opinion, the materials are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of EPI to handover the materials without any demur or reservation.
5. That this Indemnity Bond is irrevocable. If at any time any loss or damage occurs to the materials or the same or any part thereof is mis-utilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Engineer-In-Charge of EPI as to assessment of loss or damage to the materials shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and /or damaged materials at its own cost and/or shall pay the amount of 'Secured Advance' to EPI without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to EPI against the Contractor to recover any amount or all the amounts of this Bond from any dues of the Contractor under the Contract or as per the law.
6. This Bond shall remain in force and effect till the completion of the work as per the aforesaid Contract and till all the amount recoverable under this Bond from the Contractor is fully recovered by EPI. The Bond can not be revoked by the Contractor without the written consent of EPI.
7. That Contractor also agrees that any change in the constitution of the Contractor shall not discharge them from their obligation and liability.
8. This Bond shall be treated as an additional addage to the Contract and nothing herein contained shall be construed to adversely affect the rights of EPI in the Contract.

Signature of Contractor

EPI

IN WITNESS WHEREOF, the Contractor has signed this Indemnity Bond through its duly authorized representative on the date and place first above written.

For and on behalf of Contractor

(Contractor's Name)

WITNESS:

1. 1. Signature
2. Name
3. Address
2. 1. Signature
2. Name
3. Address

Signature

Name (Executant)

Designation
(Authorized representative)

Seal

Signature of Contractor

EPI

FORMAT

BANK GUARANTEE
(IN LIEU OF GUARANTEE FOR ANTI-TERMITE TREATMENT)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

Engineering Projects (India) Ltd.,
Core- 3, Scope Complex
7, Institutional Area Lodhi Road,
New Delhi – 110003

In consideration of the EPI (India) Ltd., having its Registered Office at Engineering Projects (India) Ltd, Core-3, Scope Complex, 7, Institute Area, Lodhi Road, New Delhi -110003 (hereinafter called "EPI") which expression shall unless repugnant to the subject or context include its successors and assigns having awarded to M/s.....

.....(hereinafter called "the **Supplier/Contractor**") having its registered Head Office at..... which expression shall unless repugnant to the subject or context includes its successors and assigns) a Contract in terms inter-alia of **EPI's letter NO.....dated.....** and the Contract/Purchase Conditions of EPI and upon the condition of the Supplier/Contractor furnishing Security for the performance of the Supplier's obligations and /or discharge of the contractor's/supplier's liability for **removal of defects in Anti-termite treatment under the said contract upto** a **sum of Rs.....**

(Rupees..... only). We, theBank (hereinafter called "**The Bank**") which expression shall unless repugnant to the subject or context include its successors and assigns having our registered office at.....and branch office at hereby undertake and guarantee payment to EPI forthwith on the same day on demand in writing and without protest or demur of any and all moneys payable by the supplier/contractor to EPI under, in respect or in connection with the said contract inclusive of all the losses, damages, costs, charges and expenses and other moneys payable in respect of the above as specified in any notice of demand made by EPI to the Bank with reference to this guarantee upto and aggregate limit of Rs.....(Rupees.....only) and the bank hereby agree with EPI that:

1. This Guarantee shall be continuing guarantee and shall remain valid and irrevocable for all claims of EPI and liabilities of Supplier/Contractor till the **date of expiry of BG i.e.....** The claim period of the Bank Guarantee shall be for a period of 12 months after the date of expiry of BG.
2. This Guarantee shall be in addition to any other Guarantee or Security whatsoever that EPI now or at any time have in relation to the Supplier's obligations/liabilities under and/or in connection with the said supply/contract, and EPI shall have full authority to take recourse or to enforce this Security in preference to any other Guarantee or Security which EPI may have or obtain and no forbearance on the part of EPI in enforcing or requiring enforcement of any other Security shall have the effect of releasing the Bank from its liability hereunder.
3. EPI shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the

Signature of Contractor

EPI

Supplier's/Contractor's obligations and/ or liabilities under or in connection with the said supply/contract or to grant time and / or indulgence to the supplier / contractor or to increase or otherwise vary the prices or the total contract value or to release or to forbear from enforcement of all or any of the conditions under the said supply / contract and / or the remedies of EPI under any other security/securities now or hereafter held by EPI and no such dealings, increase(s) or other indulgence(s) or arrangement(s) with the supplier / contractor or releasing or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to EPI hereunder or prejudicing rights of EPI against the Bank.

4. This Guarantee shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the supplier / contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to EPI in terms thereof or till expiry of the Bank Guarantee including claim period of Bank Guarantee, whichever is earlier.
5. The Bank Guarantee in no event be terminable, for any change in the constitution of the Guarantor Bank or for any other reasons whatsoever and the liability of the Guarantor Bank hereunder shall not be impaired or discharged by any extension of time or variations or alterations made, given, or agreed with or without knowledge or consent of EPI, by or between Supplier/ Contractor and the Bank.
6. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the Bank in terms hereof shall not be otherwise affected or suspended by reason of any dispute or disputes having been raised by the supplier / contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial or liability by the supplier/ contractor stopping/ preventing or purporting to stop or prevent any payment by the Bank to EPI in terms thereof.
7. The amount stated in any notice of demand addressed by EPI to the Guarantor as liable to be paid to EPI by the supplier/contractor or as suffered or incurred by EPI on account of any losses or damages, costs, charges and / or expenses **incurred in rectification of defects or re- execution of Anti-termite treatment** shall as between the Bank and EPI be conclusive of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and payable by the Guarantor to EPI in terms hereof subject to a maximum of Rs(Rupees only),
8. Unless demand or claim under this Guarantee is made on the Guarantor in writing within 12 months after the date of expiry of the Guarantee i.e. upto the Guarantor shall be discharged from all liabilities under this Guarantee there under.

Signature of Contractor

EPI

Notwithstanding anything contained herein before our liability under this guarantee is restricted to Rs. (Rupees.....only). This guarantee will expire on Any claim under this Guarantee must be received by us within 12 months after the date of expiry.

Place: _____

For and on behalf of the Bank

Date: _____

WITNESS: 1. _____

2. _____

Signature of Contractor

EPI

**GUARANTEE BOND
FOR ANTI-TERMITE TREATMENT**

THIS AGREEMENT made isday of two Thousandbetween M/s(hereinafter called the guarantor of the one part and M/s EPI (India) Limited, hereinafter called the EPI hereinafter called the OWNER of the other part.

Whereas this agreement is supplementary to the contract hereinafter called the contract datedmade between the guarantor of the one part and EPI (India) Ltd., of the other part whereby the contractor inter-alia, understood to render the buildings and structures in the said contract recited, completed, termite proof. And whereas the guarantor agreed to give a guarantee to the effect that the said structure will remain termite proof for TEN YEARS to be so reckoned from the date after the maintenance period prescribed in the contract expires.

During this period of guarantee the guarantor shall make good all defects and for that matter shall replace at his risk and cost such wooden member as may be damaged by termite and in case of any other defect being found, he shall render the building termite proof at his cost to the satisfaction of the Engineer-in-charge and shall commence the works of such rectification within seven days from date of issuing notice from the Engineer-in-Charge calling upon him to rectify the defects falling which the work shall be got done by EPI/ OWNER by some other contractor at the guarantor's cost and risk and in the later case the decision of the Engineer-in-charge as to the cost recoverable from the guarantor shall be final and binding.

That if the Guarantor fails to execute the Anti-Termite treatment or commits breaches hereunder then the Guarantor will indemnify EPI against all losses damages, cost expenses or otherwise which may be incurred by him by reasons of any default on the part of the guarantor in performance and observance of this supplemental Agreement. As to the amount of loss and or damage and/or cost incurred by EPI/ OWNER decision of the Engineer-in-charge will be final and binding on the parties.

In witness where of these presents have been executed by the Guarantorand byfor and on behalf of EPI on the day of month and year first above written.

Signed sealed and delivered by (Guarantor) IN

THE PRESENCE OF:

1.

2.

Signed for and on behalf of EPI by/ in presence of:

1.

2.

Signature of Contractor

EPI

FORMAT

BANK GUARANTEE
(IN LIEU OF GUARANTEE FOR WATER-PROOFING WORKS)

(Judicial Stamp paper of appropriate value as per stamp Act-of respective state)

Engineering Projects (India) Ltd.,
Core- 3, Scope Complex
7, Institutional Area Lodhi Road,
New Delhi – 110003

In consideration of the EPI (India) Ltd., having its Registered Office at Engineering Projects (India) Ltd, Core-3, Scope Complex, 7, Institute Area, Lodhi Road, New Delhi -110003 (hereinafter called "**EPI**") which expression shall unless repugnant to the subject or context include its successors and assigns having awarded to M/s.

..... (hereinafter called "**the Supplier/Contractor**") having its registered Head Office at. which expression shall unless repugnant to the subject or context includes its successors and assigns) a Contract in terms inter-alia of **EPI's letter NO.....dated.....** and the Contract/Purchase Conditions of EPI and upon the condition of the Supplier/Contractor furnishing Security for the performance of the Supplier's obligations and /or discharge of the contractor's/supplier's liability for **removal of defects in Water Proofing treatment under the said contract upto a sum of Rs.....**

(Rupees..... only). We, theBank (hereinafter called "**The Bank**") which expression shall unless repugnant to the subject or context include its successors and assigns having our registered office at.....and branch office at hereby undertake and guarantee payment to EPI forthwith on the same day on demand in writing and without protest or demur of any and all moneys payable by the supplier/contractor to EPI under, in respect or in connection with the said contract inclusive of all the losses, damages, costs, charges and expenses and other moneys payable in respect of the above as specified in any notice of demand made by EPI to the Bank with reference to this guarantee upto and aggregate limit of Rs.....(Rupees.....only) and the Bank hereby agree with EPI that:

1. This Guarantee shall be continuing guarantee and shall remain valid and irrevocable for all claims of EPI and liabilities of Supplier/Contractor till the **date of expiry of BG i.e.....** The claim period of the Bank Guarantee shall be for a period of 12 months after the date of expiry of BG.
2. This Guarantee shall be in addition to any other Guarantee or Security whatsoever that EPI now or at any time have in relation to the Supplier's obligations/liabilities under and/or in connection with the said supply/contract, and EPI shall have full authority to take recourse or to enforce this Security in preference to any other Guarantee or Security which EPI may have or obtain and no forbearance on the part of EPI in enforcing or requiring enforcement of any other Security shall have the effect of releasing the Bank from its liability hereunder.

Signature of Contractor

EPI

3. EPI shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the Supplier's/Contractor's obligations and/ or liabilities under or in connection with the said supply/contract or to grant time and / or indulgence to the supplier / contractor or to increase or otherwise vary the prices or the total contract value or to release or to forbear from enforcement of all or any of the conditions under the said supply / contract and / or the remedies of EPI under any other security/securities now or hereafter held by EPI and no such dealings, increase(s) or other indulgence(s) or arrangement(s) with the supplier / contractor or releasing or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to EPI hereunder or prejudicing rights of EPI against the Bank.
4. This Guarantee shall not be determined or affected by the liquidation or windingup, dissolution or change of constitution or insolvency of the supplier / contractor but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to EPI in terms thereof or till expiry of the Bank Guarantee including claim period of Bank Guarantee, whichever is earlier.
5. The Bank Guarantee in no event be terminable, for any change in the constitution of the Guarantor Bank or for any other reasons whatsoever and the liability of the Guarantor Bank hereunder shall not be impaired or discharged by any extension of time or variations or alterations made, given, or agreed with or without knowledge or consent of EPI, by or between Supplier/ Contractor and the Bank.
6. The Bank hereby waives all rights at any time inconsistent with the terms of this Guarantee and the obligations of the Bank in terms hereof shall not be otherwise affected or superseded by reason of any dispute or disputes having been raised by the supplier / contractor (whether or not pending before any Arbitrator, Tribunal or Court) or any denial or liability by the supplier/ contractor stopping/ preventing or purporting to stop or prevent any payment by the Bank to EPI in terms thereof.
7. The amount stated in any notice of demand addressed by EPI to the Guarantor as liable to be paid to EPI by the supplier/contractor or as suffered or incurred by EPI on account of any losses or damages, costs, charges and / or expenses **incurred in rectification of deficiencies or re- execution of Water Proofing treatment** shall as between the Bank and EPI be conclusive of the amount so liable to be paid to EPI or suffered or incurred by EPI as the case may be and payable by the Guarantor to EPI in terms hereof subject to a maximum of Rs (Rupeesonly).
8. Unless demand or claim under this Guarantee is made on the Guarantor in writing within 12 months after the date of expiry of the Guarantee i.e. upto the

Signature of Contractor

EPI

Guarantor shall be discharged from all liabilities under this Guarantee there under.

Notwithstanding anything contained herein before our liability under this guarantee is restricted to Rs..... (Rupees.....only). This guarantee will expire on Any claim under this Guarantee must be received by us within 12 months after the date of expiry.

Place

For and on behalf of Bank

Date

WITNESS: 1. _____

2. _____

Signature of Contractor

EPI

GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATER PROOFING WORKS

The agreement made thisday ofTwo thousand One and between (hereinafter called Guarantor of the one part) and the EPI (India) Limited (hereinafter called the Execution Agency of the other part).

WHEREAS this agreement is supplementary to a contract (hereinafter called the _____ Contract), datedand made between the GUARANTOR OF THE ONE part and the EPI of the other part, whereby the Contractor, inter-alia, undertook to render the buildings and structures in the said contract recited completely water and leak proof.

AND WHEREAS the Guarantor agreed to give a guarantee to the effect that the said structures will remain water and leak proof for ten years from the date of handing over of the structure of water proofing treatment.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the maintenance period prescribed in the contract.

Provided that the Guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse of roof or alteration and for such purpose.

- a) Misuse of roof shall mean any operation, which will damage proofing treatment, like chopping of fire wood and things of the same nature which might cause damage to the roof.
- b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts
- c) The decision of the Engineer-in-Charge with regard to cause of leakage shall be final

During this period of guarantee, the Guarantor shall make good all defects and in case of any defect being found render the building water proof to the satisfaction of the Engineer-in-Charge at his cost and shall commence the work for such rectification within seven days from the date of issue of notice from the Engineer-in-Charge calling upon him to rectify

Signature of Contractor

EPI

the defects failing which the work shall be got done by the EPI by some

other Contractor at the guarantor's cost and risk. The decision of Engineer-in-Charge as to the cost, payable by the Guarantor shall be final and binding.

That if the Guarantor fails to execute the water proofing or commits breach there-under, then the Guarantor will indemnify the principal and his successors against all laws damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and/ or cost incurred by the EPI, the decision of the Engineer-in-Charge will final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligator,,and by And for and on behalf of the EPI on the day, month and year first above written.

Signed, sealed and delivered by Obligator in the presence of-

1. _____

2. _____

Signed for and on behalf of the EPI (India) Limited by _____

In presence of:

1. _____

2. _____

Signature of Contractor

EPI



FORMAT

AGREEMENT FORM

This agreement made on.....day of (Month) (Year), between **THE ENGINEERING PROJECTS (INDIA) LIMITED (EPI)**, (A Govt. of India enterprise) a company incorporated under the Companies Act, 1956 having its Registered and Corporate Office at Core-3, Scope Complex, 7, Institutional area, Lodhi Road, New Delhi - 110003 (hereinafter referred to as the "EPI" which expression shall include its administrators, successors, executors and assigns) of the one part and **M/s (NAME OF CONTRACTOR)** (hereinafter referred to as the 'Contractor' which expression shall unless the context requires otherwise include its administrators, successors, executors and permitted assigns) of the other part.

WHEREAS, EPI, is desirous of construction of **(NAME OF WORK)** (hereinafter referred to as the "PROJECT") on behalf of the **(NAME OF OWNER/MINISTRY)** (hereinafter referred to as "OWNER"), and had invited Tenders as per Tender Documents vide NIT No. _.

AND WHEREAS **(NAME OF CONTRACTOR)** had participated in the above referred Tender vide their tender dated ___ and EPI has accepted their aforesaid Tender and award the contract for **(NAME OF PROJECT)** on the terms and conditions contained in its Letter of Intent No. _____ and the documents referred to therein, which have been unequivocally and unconditionally accepted by **(NAME OF CONTRACTOR)** vide their Letter of Undertaking dated _____ resulting into a contract.

NOW THEREFORE THIS DEED WITNESSETH AS UNDER:

ARTICLE 1.0 - AWARD OF CONTRACT

1.1 SCOPE OF WORK

EPI has awarded the contract to **(NAME OF CONTRACTOR)** for the work of **(NAME OF WORK)** on the terms and conditions in its Letter of intent No. _____ dated _____ and the documents referred to therein. The award of work has taken effect from **(DATE)** i.e. the date of issue of aforesaid letter of intent. The terms and expressions used in this agreement shall have the same meanings as are assigned to them in the "Contract Documents" referred to in the succeeding Article.

ARTICLE 2.0 - CONTRACT DOCUMENTS

- 2.1 The contract shall be performed strictly as per the terms and conditions stipulated herein and in the following documents attached herewith (hereinafter referred to as "Contract Documents").
- a) EPI Notice Inviting Tender vide No. _____ Tender Documents consisting of:

Signature of Contractor

EPI

S.No.	DESCRIPTION
1.0	Volume -I
1.1	Notice Inviting Tenders & Instruction to tenderers
1.2	General Conditions of Contracts
1.3	Additional Conditions of Contracts
2.0	Volume -II
2.1	Technical Specification, Bill of Quantity
2.2	Tender Drawings
3.0	Volume-III
3.1	Schedule of Rates/ Bill of Quantity (Price -Bid)
4.0	Addendum / Corrigendum if any.

b) **(NAME OF CONTRACTOR)** letter/proposal no. _____ dated _____ and their subsequent communication:

i) **(NAME OF CONTRACTOR)** Letter of Undertaking of Tender Conditions dated _____

ii) **(NAME OF CONTRACTOR)**, Acknowledgement dated _____ on letter of Intent

2.2 EPI's detailed Letter of Intent No. _____ dated _____ including Bill of Quantities. Agreed time schedule, Contractor's Organization Chart and list of Plant and Equipments submitted by Contractor.

2.3 Security Deposit Cum Performance Bank Guarantee received on _____

2.4 All the aforesaid contract documents referred to in Para 2.1 and 2.2 above shall form an integral part of this Agreement, in so far as the same or any part thereof conform, to the Tender Documents and what has been specifically agreed to by EPI in its Letter of Intent. ~~Any matter inconsistent therewith, contrary or repugnant thereto or deviations taken by the Contractor in its "TENDER" but not agreed to specifically by EPI in its Letter of Intent, shall be deemed to have been withdrawn by the Contractor without any cost implication to EPI.~~ For the sake of brevity, this Agreement alongwith its aforesaid contract documents and Letter of Intent shall be referred to as the "Contract".

ARTICLE 3.0 – CONDITIONS & CONVENANTS

3.1 The scope of Contract, Consideration, Terms of Payments, Advance, Retention Moneys, Taxes wherever applicable, Insurance, Agreed Time Schedule, Compensation for delay and all other terms and conditions contained in EPI's Letter of Intent No. _____ dated _____ are to be read in conjunction with other aforesaid Contract Documents. The contract shall be duly performed by the Contractor strictly and faithfully in accordance with the terms of this contract.

3.2 The scope of work shall also include all such items which are not specifically mentioned in the Contract Documents but which are reasonably implied for the satisfactory completion of the entire scope of work envisaged under this contract unless otherwise specifically excluded from the scope of work in the Letter of Intent.

Signature of Contractor

EPI

- 3.3 Contractor shall adhere to all requirements stipulated in the Contract documents.
- 3.4 Time is the essence of the Contract and it shall be strictly adhered to. The progress of work shall conform to agreed works schedule/contract documents and Letter of Intent.
- 3.5 This agreement constitutes full and complete understanding between the parties and terms of the presents. It shall supersede all prior correspondence to the extent of inconsistency or repugnancy to the terms and conditions contained in Agreement. Any modification of the Agreement shall be effected only by a written instrument signed by the authorized representative of both the parties.
- 3.6 The total contract price for the entire scope of this contract as detailed in Letter of Intent is Rs. _____ (Rupees _____ only), which shall be governed by the stipulations of the contract documents.

ARTICLE 4.0 – NO WAIVER OF RIGHTS

- 4.1 Neither the inspection by EPI or the Engineer-In-Charge or Owner or any of their officials, employees or agents nor order by EPI or the Engineer-In-Charge for payment of money or any payment for or acceptance of, the whole or any part of the work by EPI or the Engineer-In-Charge nor any extension of time nor any possession taken by the Engineer-In-Charge shall operate as waiver of any provisions of the contract, or of any power herein reserved to EPI, or any right to damage herein provided, nor shall any waiver of any breach in the contract be held to be a waiver of any other or subsequent breach.

ARTICLE 5.0 – GOVERNING LAWS AND JURISDICTION

- 5.1 The Laws applicable to this contract shall be the laws in force in India and as amended from time to time.

Jurisdiction shall be of the Court (s) stated in the 'Memorandum' to the 'Form of Tender' only.

5.2 Notice of Default

Notice of default given by either party to the other party under the Agreement shall be in writing and shall be deemed to have been duly and properly served upon the parties hereto, if delivered against acknowledgment due or by FAX or by registered mail duly addressed to the signatories at the address mentioned herein above.

IN WITNESS WHEREOF, the parties through their duly authorized representatives have executed these presents (execution whereof has been approved by the Competent Authorities of both the parties) on the day, month and year first above mentioned at New Delhi.

For and on behalf of:

(NAME OF CONTRACTOR)

WITNESS:

For and on behalf of:

M/s. Engineering Projects (I) Ltd.

WITNESS:

1. _____
Signature of Contractor

1

EPI

FORMAT
Annexure LC-1

LOCAL CONTENT CERTIFICATE

(From Statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of supplies other than companies) giving the percentage of local content. For contracts value above Rs.10 Crores).

Ref: NIT No.....Dated.....

Name of tender:

"We..... the statutory auditor (or as the case may be) of M/s. (Name of the bidder) hereby certify that M/s.....(Name of the bidder) meet the mandatory local content requirements of the tender as per Public Procurement (Preference to Make in India) - Local Content policy quoted vide offer no..... dated..... against EPI NIT No..... dated..... by M/s.....(Name of the bidder). The percentage of local content in the bid is... % and the items offered in the bid meets the minimum local content and party shall give details of the location (s) at which the local value addition is made".

Authorized Signatory

Name & Seal of the Issuing Authority

Signature of Contractor

EPI



FORMAT I

ANNEXURE -LC2

UNDERTAKING

(To be submitted by bidder on its Company Letter Head for contracts value up to Rs.10 Crores)

Ref: NIT No.....Dated.....

Name of tender:

"We(Name of the bidder) undertake that we meet the mandatory minimum local content requirement as per Public Procurement (Preference to Make in India) – Local Content policy against EPI NIT No..... dated.....,The percentage of local content in the bid is % and the items offered in the bid meets the minimum local content and shall give details of the location (s) at which the local value addition is made".

Date:

Authorized Signatory

Name & Seal of the Company

Signature of Contractor

EPI

(Applicable for works having value of Rs. 10 Crore & Above)

INTEGRITY PACT

For monitoring of the Integrity Pact, and with the approval of CVC, EPI has appointed the competent and credible Independent External Monitors (IEMs). The task of the IEMs shall be to review independent and objectively whether and to what extent the parties comply with the obligations under the defined Integrity Pact agreement. Threshold limit for integrity pact is Rs.10 Crores for tenders related to Works and Rs. 5 Crores for tenders relating to supply items. It has been made mandatory for all such bidder(s) / contractor(s) to enter into Integrity Pact with EPI, otherwise their bids shall be summarily rejected. EPI will forward proforma Annexure-1, Annexure -2 and Annexure-3 of the Integrity Pact along with the Tender documents. The bidder/contractor shall not change the contents of the Integrity Pact. If, the bidder/contractor is a partnership consortium, the Integrity Pact shall be signed by all the partners or consortium members.

IT division shall update EPI website w.r.t. IEMs detail. In addition to this, IEM's details may also be incorporated in respective NIT's in line with threshold value.

Signature of Contractor

EPI

(Applicable for works having value of Rs. 10 Crore & Above)

Annexure -1

INTEGRITY PACT

To

.....
.....
.....

Sub: NIT No. for the work

.....

Dear Sir,

It is hereby declared that EPI is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the Integrity Agreement/PACT, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement/PACT and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement/PACT on behalf of the EPI.

Yours faithfully

For Engineering Projects India Ltd.

Signature of Contractor

EPI

(Applicable for works having value of Rs. 10 Crore & Above)

Annexure -2

INTEGRITY PACT

To

E.P.I

.....

Sub: Submission of Tender for the work of

.....

Dear Sir,

I/We acknowledge that EPI is committed to follow the principles thereof as enumerated in the Integrity Agreement/PACT enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed Integrity Agreement/PACT, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement/PACT shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by EPI. I/We acknowledge and accept the duration of the Integrity Agreement/PACT, which shall be in the line with section 9.1 of the enclosed Integrity Agreement/PACT. I/We accept that the detail of IEM's has been checked with EPI office/website.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement/PACT, while submitting the tender/bid, EPI shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/ bid.

Yours faithfully,

(Duly authorized signatory of the bidder)

Signature of Contractor

EPI

(Applicable for works having value of Rs. 10 Crore & Above)

Annexure-3

INTEGRITY PACT

Between

Engineering Projects (India) Limited (EPI) hereinafter referred to

as "The Principal", and

..... hereinafter referred
to as "The Bidder/ Contractor"

Preamble

The Principal intends to award, under laid down organizational procedures, contracts/s for

..... The principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness / transparency in its relations with its Bidder(s) and / or Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitors (IEMs) who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

(1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

- a. No employee of the Principal, personally or through family members, will in connection with the tender for , or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
- b. The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
- c. 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 IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and

Signature of Contractor

EPI



in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

- (1) The Bidder(s)/ Contractor(s) commit themselves to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commit themselves to observe the following principles during participation in the tender process and during the contract execution.
 - a. The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - b. The Bidder(s)/ Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - d. The Bidder(s)/Contractors(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidder(s)/Contractors(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupees only.
 - e. The Bidder(s)/ Contractor(s) will, when presenting their bid, disclose any and all payments made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
 - f. The Bidder(s)/ Contractor(s) will, when presenting their bid, disclose any transgressions with any other company that may impinge on the anti corruption principle.
 - g. Bidder(s) /Contractor(s) who have signed the Integrity Pact shall not approach the Courts while representing the matter to IEMs and shall wait for their decision in the matter.
- (2) The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences

Signature of Contractor

EPI



outlined above or be an accessory to such offences.

Section 3 - Disqualification from tender process and exclusion from future Contracts

- (1) If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put their reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or to terminate the contract, if already signed for such reason.
- (2) If the Bidder/ Contractor has committed a serious 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/ Contractor 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 transgressors with 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 3 years.
- (3) If the Bidder/ Contractor 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.

Section 4 – Compensation for Damages

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value or the amount equivalent to Performance Bank Guarantee.

Section 5 – Previous transgression

- (1) The Bidder declares that no previous transgressions occurred in the last three years with any other Company in any country conforming to the anti-corruption approach or with any Public Sector Enterprise in India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process.

Section 6 – Equal treatment of all Bidders / Contractors / Subcontractors

Signature of Contractor

EPI



- (1) In case of joint venture, all the partners of the joint venture should sign the Integrity Pact. In case of Sub- contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the sub-contractor and submit duly signed Integrity Pact by all the sub-contractors.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidder(s) / Contractor(s) / Subcontractor(s)

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8 – Independent External Monitor

- (1) The Principal appoints competent and credible Independent External Monitor for this Pact after approval by Central Vigilance Commission. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- (2) The Monitor is not subject to instructions by the representatives of the parties and performs his/ her functions neutrally and independently. The Monitor would have access to all Contract documents, whenever required. It will be obligatory for him / her to treat the information and documents of the Bidders/Contractors as confidential. He/ she reports to the Chairman, EPI.
- (3) The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his/her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable
- (4) to Sub-contractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sub-contractor(s) with confidentiality. The Monitor has also signed declarations on 'Non-Disclosure of Confidential Information' and of 'Absence of Conflict of Interest'. In case of any conflict of interest arising at a later date, the IEM shall inform Chairman, EPI and recuses himself / herself from that case.
- (5) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- (6) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he/she will so inform the Management of the Principal and request

Signature of Contractor

EPI



the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action. However, the independent External Monitor shall give an opportunity to the Bidder/ Contractor to present its case before making its recommendations to the Principal.

- (7) The Monitor will submit a written report to the Chairman, EPI 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.
- (8) Monitor shall be entitled to compensation on the same terms as being extended to / provided to Independent Directors on the EPI Board.
- (9) If the Monitor has reported to the Chairman EPI, a substantiated suspicion of an offence under relevant IPC/ PC Act, and the Chairman EPI has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
- (10) The word 'Monitor' would include both singular and plural.
- (11) Independent External Monitor shall be required to maintain confidentiality of the information acquired and gathered during their tenure/ role as independent Monitor. Any breach in this regard would be subject to the legal judicial system of India.

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 contract, and for all other Bidders 6 months after the contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings. 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 Chairman of EPI.

Section 10 – Other provisions

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. New Delhi.
- (2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members. 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 intentions.
- (4) Issues like Warranty / Guarantee etc. shall be outside the purview of IEMs.

Signature of Contractor

EPI

(For & On behalf of

Bidder/ Contractor)

(Office Seal)

(Office Seal)

Place

Date

Witness 1:

(Name & Address)

Witness 2:

(Name & Address)

Signature of Contractor

EPI



ANNEXURE-A

PROFORMA FOR INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR DIRECT PAYMENT TO SUB-CONTRACTOR / VENDOR AGAINST EXCEPTIONAL CIRCUMSTANCES.

(This Indenture has to be submitted in a stamp paper (purchased from Delhi only) of Rs 100 and to be signed and notarized at Delhi only)

INDEMNITY BOND

This Indemnity Bond is made on this _____ day of _____, 202

By and Between

_____ (hereinafter called the Contractor/Indemnifier) which expressions shall unless be repugnant to the context include its successors and assigns of the first part.

in favour of

Engineering Projects (India) Limited, a company incorporated under the companies Act, 1956 having its Registered Office at Core -3, Scope Complex, 7, institutional Area, Lodhi Road, New Delhi-110 003 (hereinafter called EPI) which expression shall unless be repugnant to the context include its successors and assigns of the second part.

WHEREAS vide LOA bearing No _____ dated _____ the Contractor was awarded The work of _____ (here in after referred to as "said work").

AND WHEREAS an agreement dated _____ was the re after entered into between the parties regarding the said work (hereinafter called the said agreement).

AND WHEREAS, the Contractor, vide _____ (details of the communication received) has specifically requested EPI to directly make payment amounting to Rs. (the amount to be paid) to _____ (name of the subcontractor/vendor) on behalf of the Contractor, not to be construed as a precedent in any manner.

AND WHEREAS, the Contractor has in continuation to the aforementioned request forwarded the Bank details of _____ (name of the subcontractor/vendor) where EPI is required to make the payment.

AND WHEREAS, in order to indemnify EPI against any loss/claim/dispute arising out of release of the payment of aforementioned amount directly to _____ (name of the subcontractor/vendor) by EPI, the Contractor has agreed to execute an indemnity bond in favour of EPI.

NOW, THEREFORE, THIS INDEMNITY BOND PROVIDES AS FOLLOWS:

- 1) That the Contractor undertakes/certifies that the amount of Rs _____ to

be released directly to _____ (name of the subcontractor/vendor) by EPI has been verified and is found to be payable.

- 2) That the Contractor agrees to the said amount of Rs. Being deducted/ adjusted from any/all payment due or that may become due to the Contractor from EPI.
- 3) That the Contractor undertakes that payment to _____ (name of the subcontractor/ vendor) directly by EPI on its request shall not relieve Contractor from any of its liabilities or contractual obligations towards EPI and such release of payment by EPI shall not give rise to any contractual relations between EPI and _____ (name of the subcontractor/vendor).
- 4) That the Contractor agrees to fully indemnify EPI against any loss/claim/dispute arising out of release of the direct payment to _____ (name of the subcontractor/vendor) on behalf of the contractor.
- 5) That any dispute arising out of this indenture of Indemnity shall be subject to the exclusive jurisdiction of the courts at New Delhi only.
- 6) That the contractor agrees to fully indemnify EPI against any notice/demand issued by any statutory authority arising out of the release of the direct payment to _____ (Name of contractor/vendor)

IN WITNESS WHERE OF the Contractor/Indemnifier here in has here un to set his respective hand and seal on the day, month and year above first written.

Signed Sealed at Delhi and delivered by

For and on behalf of Contractor

(Contractor/Indemnifier Name)

Signature.....

Name (Executant).....

Designation

(Authorized representative)

Seal

Witness

1. Signature

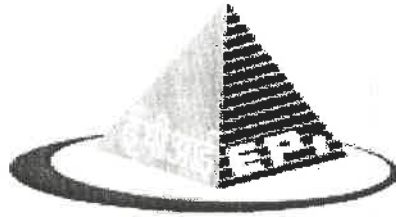
Name

Address.....

2. Signature

Name

Address.....



PROCEDURE FOR TECHNICAL, QUALITY, SYSTEM & HSE AUDITS AT CONSTRUCTION SITES



BY
QUALITY AUDIT DEPARTMENT (QAD)
(UNDER P&M DIVISION)

ENGINEERING PROJECTS INDIA LTD.
CORE-3, SCOPE COMPLEX, LODHI ROAD,
NEW DELHI – 110003

Abbreviations:

QAP	:	Quality Assurance Plan
EPIL	:	Engineering Projects (India)Limited
P&M Div.	:	Planning & Monitoring Division
QAD	:	Quality Audit Department
QAP	:	Quality Audit Procedure
AFC/IFC	:	Approved/Issued for Construction
HSE	:	Health, Safety & Environment
HT	:	High Tension
ITP	:	Inspection & Test Plan
NDT	:	Non-Destructive Testing
QA	:	Quality Assurance
SI	:	Site In-charge
TPQT	:	Third Party Quality Team



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1.0 PURPOSE

- (a). The purpose of this procedure is to provide guidelines for planning & conducting Contractual, Technical, System, Quality & HSE audits during construction phase of a project undertaken by PMD of the respective ROs / PCO.
- (b). An audit is conducted to verify, on sampling basis, the compliance of works done by various contractors vis-à-vis contracts specifications and approved procedures.
- (c). It also covers the surveillance/ verification of inspection of works of contractors done by EPIL personnel to specified requirements and good engineering practices, by means of verification of documents and records and physical Inspection of site works.
- (d). To detect whether the procedures adopted ensuring the quality of works are at Variance With those required by the contract and/or as set out in the NIT and/or the Quality Assurance Plan (QAP).
- (e). To detect the lapse/deficiency in the implementation of the Quality Assurance Plan.
- (f). To guide the field engineers in quality related aspects of the work.

2.0 SCOPE

This procedure is applicable for all construction sites under P & M Division of respective ROs / PCO.

3.0 REFERENCES

- Contract documents/ specifications/ standard and AFC/ IFC drawings.
- Quality management system documents viz. procedures, guidelines etc. Reports of earlier technical audits, if any.

4.0 DEFINITIONS

4.1 AUDIT BY CORPORATE OFFICE

The Quality Audit Department (QAD) will function under flagship of Project & Monitoring (P&M) Division at CO. When HOD (P&M Division), constitutes an audit team for conducting audit at earmarked site/s, the audit is referred to as Internal Contractual/Technical / System /Quality / HSE Audit by Corporate Office.



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5.0 METHODOLOGY AND CONTROLS

- 5.1 The aforesaid mentioned Audit (including HSE Audit) shall be conducted at various earmarked sites as per approved "Annual Quality Audit Schedule" by the Competent Authority.
- 5.2 Audit may be conducted more than once for the same project as per requirements or as directed by the Competent Authority.
- 5.3 The above audit requirements shall be a minimum and may exceed as per contract agreements between EPI & Owner.
- 5.4 **AUDIT TEAM**

An office order shall be issued by the HOD (P&M Division) with approval of competent Authority nominating audit team members, the Audit member and audit dates under intimation to RO In-Charge / Project Head / Site-in-charge and audit team members. The number of personnel comprising the audit team will depend upon the construction progress, volume of work and the duration of audit. The audit team members shall not be nominated from the site to be audited.

5.5 NUMBERING OF AUDIT REPORT

The Divisional Audit Report shall be numbered as follows:

XXX / KK / YYY / LLL / MM-NN / ZZZ

Where:

XXX represents Organization Name, i.e., EPI

KK represents Locations such as CO for Corporate Office

YYY represents Department which conduct Audit such as QAD

LLL represents the project code of the concerned location where Audit has been undertaken

MM-NN represents financial year in which Audit Conducted such as 24-25

ZZZ represents File Number of QAD in ascending order to be assigned by Quality Audit Department (QAD).

For Example:

For File no for QAD will be: EPI/CO/QAD/ 905 //24-25/001



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5.6 ACCEPTED CONDUCT OF AUDITORS

- (a) Auditors shall not discuss or divulge their findings to any-one except the audit team members, Project Heads / Site-in-charge and Head, Quality Audit Division (QAD).
- (b) Auditors shall look only for clarifications/information pertaining to the area(s) allotted to them. Judgmental comments and arguments should be avoided.

5.7 ACCEPTED CONDUCT OF AUDITEE

- 1) Prior to the start of audit, the auditee should check the areas under his control for preparedness for audit purpose. All filing and record keeping should be up to date. Objective evidence should be readily available for compliance with contract requirements.
- 2) Auditee is not authorized to disagree with the Auditor in his interpretation of the standards. However, he may courteously query his decision if he feels that the Auditor does not fully understand the situation.
- 3) Under no circumstances, the auditee should argue with the Auditor. Do not defend the indefensible.

On completion of an area's audit, the audit team leader shall apprise the Project Heads / Site-in-charge of the outcome as soon as possible to enable him to initiate any corrective actions that may be required.

5.8 DOCUMENTS REQUIRED FOR AUDITS

- Tender documents including its amendments, if any.
- Quality System documents like Manuals, Procedures, and Guidelines.
- Approved Job Procedures, Quality Plans and ITPs of contractors.
- Approved Procedures, Guide lines and Project Quality Plan.
- Approved /Issued for Construction drawings.
- Design Mix &approval of sources.
- Circulars/IOMs.
- Test reports/Test certificates.
- Consumption/Reconciliation of materials.
- Processed Concession/Deviation Permits.



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- Correspondence / reports conveying deficiencies of the contractors to them and the compliance reports.
- Correspondences / Reports on Quality Audit at site by Client or its representative/Third Party / TPQA Team and its compliance Report.
- GRIHA / BEE / ECBC NOC & Certifications etc.
- Statutory Clearance/NOCs Certificate (Environment, Fire, Pollution, Forest & other as applicable) from Concerned State & Central government Authorities/Bodies as per contract provision.
- Any other document deemed necessary by the audit team.

5.9 PROCEDURE FOR CARRYING OUT THE AUDIT

- Project Heads / Site-in-charge will nominate himself or a senior person from site as "audit coordinator" for ensuring smooth working of the audit team.
- Audit team shall study relevant drawings, specifications, contract document and other documents before taking up the audit.
- For audit approved procedures, project quality assurance plan and guidelines shall be studied.
- Before reporting any deficiency observed during the course of audit, the observation shall be cross-checked with relevant approved documents. Auditors shall specifically mention all related details viz. affected document, reference document, area, unit etc. General comments are to be avoided.
- On completion of the audit the Audit team leader will appraise Project Heads / Site-in-charge of the audit team's observations.
- If required Project Heads / Site-in-charge may give clarifications on audit observations.

5.10 The audit report consisting of cover sheet and other sheets as per formats given in the annexure along with audit observations shall be submitted by the audit team leader to the Project Head / Site-in-Charge with a copy marked to Head (P&M Division) / D(P) / CMD.

5.11 Corrective Actions on audit observations shall be completed at the earliest but not later than the target compliance dates. In case corrective actions are pending beyond target compliance dates, sufficient reasons shall be given by Project Head / Site-in-charge for the delays.



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- 5.12 Suggestions for improvements, if any, observed during the audit, may also be included in audit report as feedback.
- 5.13 After the completion of the corrective actions, Project Head / Site-in-charge shall send a copy of the compliance reports duly signed by him along with supporting documents to Head (P&M Division).

6.0 DOCUMENTATION AND RECORDS

- 6.1 Audit reports shall be maintained by the respective Audit Team / Quality Audit Department (QAD). These shall be retained till closure of site or Project Code, whichever is earlier.
- 6.2 The copy of the Audit Reports shall be maintained by Audit Team / Quality Audit Department (QAD). The retention period shall be One (01) year after closure of project / Site.



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(A). SAMPLE CHECKLIST FOR CONTRACTUAL AUDIT:

Check the following from Contractual points of view:

- Name of work
- Project Cost
- Brief Scope of Work
- Name of Site In-Charge / Project Head / Zonal Head / RO In-Charge
- Name of Agency / Contractor with Project Code
- LOI / Agreement No. with date
- Stipulated date of start & Completion
- Copy of Agreement
- Approved contract document
- Applicable relevant Specifications along with up-to-date correction slips
- Estimated cost put to tender
- Accepted tendered cost with overall percentage
- Schedule of rates applicable
- % Progress at the time of inspection vis a vis expected as per contract / Milestone
- Reasons for Delay in work, if any
- Status of Extension of Time (EOT) grant
- All contractual obligations being fulfilled by the contractor. In case of non-compliance, suitable action has been taken.
- Status of valid BG's (Mobilization Advance, SDPBG, Retention etc.). Action taken in case of lapsed BG's.
- Status of all applicable permits / Policies / License

(B). SAMPLE CHECKLIST FOR TECHNICAL AUDIT:

Check the following from Technical points of view:

(1). Review of Civil Structural & Finishing items:

- Review of water proofing treatment, anti-termite treatment in buildings. Review whether above mentioned work has been carried out by government registered agency/applicator only.
- Review of structural works, roofing accessories, paint application and Thickness.



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- Review/ examination of finish on floors, wall plaster, painting, hardware & sanitary fixtures/ fittings and other architectural works.
- Observations on floor slopes (especially in Bath, WC, Kitchen, Terrace, Balcony).
- If Cracks, efflorescence observed on plastered surface, then state locations & probable reasons.
- Review of hydro testing of water retaining structures, tests on underground lines including protective coatings.
- Review all the utility/services lines like raceways etc. proposed below floors were laid prior to tiling work.
- Review/ examination of finish on floors, wall plaster, painting, hardware & sanitary fixtures/ fittings and other architectural works.
- Observation on QC for dampness / leakages prevention. If Dampness / leakages noticed, then state locations & probable reasons.
- Check whether chase cutting done prior to plastering or not and all conduits, inserts are placed prior to plastering.
- Groove cutting & chicken mesh provision on junction of masonry & concrete junctions exists as per approved GFC to restrict cracks.

(2). Electrical & Instrumentation Works:

- Check equipment's installation as per approved area classification drawings.
- Check Rating of major electrical equipment's viz. transformers, HT Panels, HT Motors etc.
- Check whether approval of drawings from concerned Statutory Authority (Viz. Electrical Inspector) for HT system is available.
- Check for installation of motors, lighting fixtures, earthing, ELCB, PBS/ welding receptacles etc.
- Permission to energize H.T. System from concerned Statutory Authority.
- Check major electrical equipment's' earthing.
- Aviation lighting etc. fixed on roof shall be checked with proper documentation.
- Check switches yard/ substation/ transformer bays have proper locking arrangements.
- Check safety Boards, fire buckets, rubber mats in substations area.



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- Energization Report.
- Check for specification for instruments/ Cables/ Control panels/ equipment's etc.
- Check with the checklist for spare philosophy.
- Compliance for applicable standards / from manufacturer / Certifying authority.
- Check Instruments/Control panels installations as per approved area classification drawings/SLD.
- Check instruments calibration report.
- Check installation report/ commissioning reports/ operation & maintenance manuals.
- Check simulation test report of all HT motors & annunciation panel available along with the vibration & temperature monitoring reports.
- Warrantee / Guarantee certificate for respective equipment's.
- Check for complete configuration of Batteries/ UPS charger.
- Installation of panels position as per approved drawings.
- Check for signed protocol available for workstation. LVS and emergency push buttons commissioning.

(3). Mechanical & HVAC Works

- Review welding procedure specification. Procedure qualification records, welder qualification records & NDT procedure qualification records.
- Check whether hydro test was conducted at the prescribed test pressure and for the prescribed duration and is certified by both contractor and EPIL representative.
- Check alignment records of rotating equipment's.
- Check surface preparation and paint application records.
- Check vibration and noise of rotating equipment's.
- Physical checking of safety testing of equipment's.
- Compliance with standard and codes of practice of related equipment's.
- Assembly sequence of equipment's.
- Dimensional Accuracy check.
- Lift and escalator certificate to be checked (Commissioning certificate & displays).



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(4). HVAC Works

- Checking of Chilled water supply and return water supply line.
- Checking of AIR Handling units Fan Coil units etc.
- Checking Alignment of HVAC pumps.
- Checking for Hydro testing Pipe line.
- Checking of Chiller Units.
- Checking HVAC performance Certificates with desire temperature.
- Checking of Air Ducts, Diffuser, Dampers etc.

(5). Fire Protection System

- Check for fire safety layout plan & its conformity.
- Pre & Post approvals from statutory authorities including NOC.
- Check for Hydrant system, Fire Sprinkler system.
- Jockey Pump and Main Hydraulic Pump operation checking.
- Maintenance/ operation manual for installed items for the project including responsible authorities.

(C). SAMPLE CHECKLIST FOR SYSTEM AUDIT:

(1). Check the following from System points of view:

- Is approved DPR / DBR available.
- Is Soil Investigation done & report available.
- Availability of Approved Organization chart.
- Availability of Approved Procurement Quality Plan (PQP).
- Availability of approved Contour Plan / Level Sheet,
- Availability of Grid marking pillars & Permanent/Temporary Bench mark available.
- List of ISI marked / approved materials to be used are as per approved make list as per Contract / Client requirements.



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- Action taken for obtaining clearances for site related hindrances (like encroachment, HT line shifting, Shifting of underground utility lines & others, if any) in coordination with local authorities.
- Approval of material Sources / Vendors.
- Approval of Construction Time Schedule. Action taken for failure of Schedule / milestone achievements.
- Evaluation / approval of outside Lab / TPT laboratories (IIT / NIT / Govt. Labs / NABL). Action taken for testing done from non-approved lab.
- Action taken on failure of material / Structure initiated as per contract provisions.
- Review whether government registered / certified specialized agency / applicator engaged for waterproofing work & Anti-Termite works at site & prior approval has been obtained by contractor from EPI / Client.
- Copy of Inspection reports of CTE / TPQT / Client & EPI Officials.
- Weekly & Monthly Progress report status.
- Progress Review meetings and MOM.
- Response to Client Queries
- Response to contractor's queries.
- Contractual communications.

(D). Check the following from Quality points of view:

(a) QAP, Construction Methodology, ITP & Bio-Data/s:

- Check whether QA Plan (QAP) are submitted by contractors & approved by EPIL.
- Check whether approved construction methodology exist for various activities.
- Check whether approved Inspection & Test Plans (ITP) for various activities are available and checks are performed accordingly.
- Check whether Bio-data of personnel as required by contract are available & personnel are actually deployed at site. Action initiated in case of non-compliance as per terms of contract.



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(b) Site Laboratory establishment, Status of Calibration, Material source approval, Design mix, Testing, RMC Plant / Batching Plant etc:

- Availability of well-equipped site laboratory.
- Availability of list of actual Lab Equipment's w.r.t. Contract agreement / Client MOU.
- Calibration status of Lab Equipment's & its related documents.
- Availability of approved Source of construction water & check whether it has been tested @ every 3 months frequency / or as specified in QAP.
- Concrete procured from outside/locally available RMC plant or production done at Batching Plant established at site.
- Calibration status of RMC Plant / Batching Plant.
- Record of quarry site / Crusher Plant visit by EPI / Client Engineer prior to Source approval.
- Review of approved QAP, concrete design mix & material source approval.
- Testing of materials at field laboratory / outside laboratory are as per required frequency as stipulated in QAP.
- Material Samples collected on regular basis for Site Lab / outside laboratory testing as per QAP.
- Are 10% (25% for Concrete work) of all samples for testing taken in Presence of Site In-Charge / Project Head.
- Records of NDT test conducted, if any and are well documented.
- Reconciliation of tests required as per QAP and actually conducted. Any Action / recovery initiated for shortfall, if any, in testing.
- Whether outside Lab / TPT reports are been reviewed for its correctness & Signed by EPI engineers.

(c) Related to Mandatory Site Register/s:

- Material Consumption Register for Cement, Reinforcement Steel, Coarse Aggregate, Fine Aggregate, Waterproofing material, Anti-Termite Material, Bitumen, Paint & other materials etc. Warranty/Guarantee as per contract term shall be done.
- Visitors Register
- Incoming Material Receipt Register (IMRR)



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- Third Party / Outside Lab Testing Register.
- Drawing register & availability of approved GFC / IFC.
- Hindrance Register with valid supporting documents.
- Are these registers checked by Site In-Charge / Project Head periodically with their counter signature & date.

(d) Related to Site Order Book & grant of Extension of Time (EOT) records:

- Available & maintained in standard format as prescribed by CPWD.
- Reviewed by Project Head with their comments
- Notices issued to the contractor with the schedule of defects / damages and its compliance status with date.
- Status of EOT approval as on date of inspection (of EPI / Contractor both).

(e). TEST AUDIT OF RA BILL/S:

- Format of RA Bills in standard format & test checks on measurement.
- List of Deviation / Extra / Substituted items observed.
- Reason for deviation & prior approval of competent authority as well as Client obtained. Technical sanction required for this deviation & if yes, Action taken.
- Comments on secured advance paid with reference to materials lying at site. Indemnity Bond applicability & recovery statement.
- Part Rates-Whether rates held back are adequate. Reason & payable, if any identification.
- Financial documents like payments / Deduction / Withheld / Royalty / SA recovery records as per Contract agreement.

(f). General:

- Carryout any other checks in the QA System that the Audit Team considers important for integrity of the construction.
- Check for Deviations /Waivers observed but not recorded.
- Check whether records of Compliance for instructions given to contractors vide field memos, letters, reports etc. are available.



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- Check whether actual site condition, as certified by EPIL Engineers, matches with recorded data. If not, an explanation for non- matching must be recorded. This must be specifically brought out in the Audit Report.
- Check whether verifiable records are available for periodic checks.
- Check for adherence to statutory requirements.
- Check the calibration status of Instruments / Lab Equipment's / Batching Plant.



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(E). CHECKLIST FOR HSE AUDIT:

Check the status of following from Safety Points of View:

- Approval of HSE Plan & Implementation of Approved HSE plan
- Organization Chart and deployment of Safety Engineer.
- Induction of workers with Safety Training
- Induction of workers for training related to awareness on health & Environmental hazard & its preventive measures
- Records of issuance of PPEs.
- Violation Records for non-usage of PPEs, if any.
- Safety measures adopted / facilities available for:
 - ❖ Electrical Safety like Proper earthing of electrical appliances, Installation of ELCB of 30 m A in Electrical connections etc.
 - ❖ Fire Safety like Fire extinguishers are placed at appropriate locations & are within Easy reach during emergency.
 - ❖ Working at height above 6 feet / Use of Fall protection such as safety harnesses, self-retracting lifelines (SRLs) and shock-absorbing lanyards.
 - ❖ Confirm the availability and use of respiratory protection, such as dust masks and respirators in dusty or fume-filled environments.
 - ❖ Proper usage of Danger Warning sign at Electrical Installation.
 - ❖ Installation of CCTV at site from safety point of view
 - ❖ Labour laws compliance & its related amenities
 - ❖ Material Storage Facilities
- Presence of safety signs, labels and warnings, including hazard warnings, Emergency evacuation routes and site-specific instructions.
- Pre-Testing provisions of lifting appliances.
- First Aid box & its contents inspected frequently.
- General Housekeeping & Hygiene maintenance within construction premises.



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- Schedule of safety audits and implementation.
- Compliance of the of Previous Safety Audits.
- Investigation of all accidents and the measures taken to prevent their recurrence.
- Imposition of penalties for non-compliance to HSE requirements, if any and steps taken to rectify them.
- Any other observation conforming to contractual HSE requirements.

* * *



AN ISO 9001 & 14001 COMPANY

TENDER DOCUMENT

NIT No: EPI/WRO/CON/968/342

FOR

Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”


VOLUME – III

Scope of Work & Technical Specification along with Drawings & List of approved sub-vendors



TENDER INVITING AGENCY

**Engineering Projects (India) Limited
Contracts Division, Western Regional Office,
6A, Bakhtawar, Nariman Point
Mumbai – 400021**

	Design, Engineering, Supply, Erection, Commissioning & Testing of DCS based Control System and Associated Works of FGD system for 1X500 MW Unit No.6 of Ukai		
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1. INTENT OF SPECIFICATION

This specification is intended to cover the requirements for engineering, design, manufacture, supply, erection, commissioning and testing of complete control & monitoring works for Flue Gas Desulphurization system for Ukai Thermal Power Station, Unit No. 6. Erection, testing, inspection & commissioning, Performance guarantee testing and warranty for complete with all accessories shall be as specified in this specification for Wet Limestone Flue Gas Desulphurization Plant for 1X500 MW Unit No. 6 of Ukai TPS.

All materials and equipment including design, manufacturing and installations must fulfil Indian, norms, latest revisions of Indian standards and fire and work safety regulations.

The scope of work for equipment and accessories to be furnished in accordance with this specification shall include design, engineering, manufacturing, inspection and testing at supplier's works, packing forwarding to site unloading, pre-assembly, assembly erection, supervision, pre-commissioning, trial operation, testing and commissioning and performance testing of the equipment.

All the design procedures, systems, and components proposed shall have already been adequately developed and have demonstrated good reliability under similar or more arduous conditions elsewhere.

The Contractor shall be responsible for providing all material, equipment and service, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification.

This specification only states the minimum technical requirement; neither specifying all technical details, nor referring the pertaining code and standard fully. It is the responsibility of the Supplier to advise the buyer in writing of any requirements in conflict with this specification. The Supplier shall guarantee to provide quality products complying with specification and applicable relevant standards.

The Supplier shall provide a list of deviations and/or clarifications to this specification. This list of deviations shall include the specification reference number, the clause in question, and a detailed explanation of the deviation. No deviation from this specification and its referenced documents is permissible without documented approval from the buyer.


The equipment provided by Supplier shall be completely new, advanced, mature and reliable proven by operational practice. No equipment shall be offered that does not have a history of satisfactory performance under similar operating conditions unless the developmental nature of that equipment is made clear and the advantages of its use are itemized. And also, all equipment shall be designed for convenient routine maintenance, reducing outage time to a minimum.

Supplier should have manufactured & supplied at least two numbers (one each at two different project sites) of similar/ equivalent model which must be in successful operation for a period of at least two (2) years as on date of Techno-Commercial bid opening.

After the contract is signed till the date that the Supplier starts fabrication, the buyer is entitled to amend the requirement caused by any change of specification, standards and regulations, which the Supplier shall comply with and the specified items is subject to discussion between the two sides.

English language will be used in all drawings, technical documentation and correspondences in performance of contract.

Metric unit is applied.

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2. PROJECT INFORMATION

2.1 . Site Data:

1	Project Name & Address	Ukai Thermal Power Station with total installed capacity 11MVA comprising of 1X500MW (Unit No. 6)
2	Owner	Gujarat State Electricity Corporation Limited (GSECL) Vidyut Bhavan, Race Course, Vadodara- 390 007, Gujarat
3	Project Location	6H66+R6W, Vagda, Gujarat 394660, Ukai TPS is situated on the bank of river Tapi. This site is in 7 Km distance to Songadh City.
4	Altitude	82.2 mtr above Mean Sea Level
5	Design Temperature of	45 ⁰ C
6	Relative Humidity	60%


2.2. Ambient Conditions

Ambient Temperature	
(a) Design Temperature of ambient air	31°C
(b) Mean Daily maximum ambient temperature during hottest month of the year	40.8°C
(c) Design Ambient Air temperature for electrical equipment	50°C
Design relative humidity	60%

3. SCOPE OF SUPPLY

Contractor shall provide complete DCS Control system with Cabinet with all accessories, auxiliaries and associated equipment's and cables for the safe, efficient and reliable operation of the plant auxiliary systems. This system will be interfaced with proposed FGD DCS Control and Instrumentation system. Bidder shall also include following scope of Supply:

- The system will be linked to plant DCS for integrated monitoring, control & operation. To demonstrate integrated monitoring with existing MAX DNA make DCS, necessary supply/works /changes/modification required in the existing plant DCS.
- Interfacing of new 220 KV switchyard SCADA with FGD DCS.
- Interfacing of new CEMS with FGD DCS
- ON/OFF control, indication, annunciation of incomers and bus-coupler (even if they are not in the scope of the contractor) are also to be performed from Contractor's Control System for each of the plant auxiliary system as applicable.
- Supply, laying and termination of all Instrumentation & Control (I&C) cables, cable trays including hardware from all Control & Instrumentation (C&I) system, sub system as mentioned above.
- All necessary software for FGD DCS system and other C&I sub system as mentioned above.
- All I&C Junction boxes as per specification mention in this section.
- UPS & 24VDC Charger system.

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- i) Necessary Field grounding including supply of material for Instruments and Control & Instrumentation system.


3.1 Interfacing Description

The proposed FGD-DCS shall be interfaced with the existing facilities mentioned below.

SNo.	Description of existing facilities	Make & Model	Tentative Distances	Scope of Work
1	220 KV Switchyard-SCADA	Yet to be finalized	1100 m from switchyard to main plant DCS	Bidder to lay OFC cable & connect the switchyard SCADA with RIO panel located at Main Control Room. The necessary hardwares for the successful interfacing is in bidders scope.
2	Main Plant DCS	BHEL-MAX DNA	N.A	Bidder to furnish all required hardware/software/connectivity modules etc in order to make the interfacing functional without any future commercial implication to EPI/GESCL. Successful bidder have to arrange for the lodging, boarding (or any other arrangements) of managing the executives of respective interfacing areas (as & when required) for arranging & making the interfacing between the FGD-DCS & existing facilities feasible
3	CEMS	Yet to be finalized	1200 m from porta cabin to FGD- DCS	Scope includes interfacing of CEMS data with FGD-DCS
4	Field Instrumentations	Yet to be finalized		Configuring the field instrument data to DCS.

3.2 Electrical Control Philosophy

Sl. No	System/ feeders	To be controlled/monitored/ operated from	New SCADA/DCS to be installed/located	Is Interface with existing SCADA/DCS at Unit control room for monitoring
1	Switchyard transformer bay	Existing Switchyard control room of respective station through new OWS+ C&R Panel + LPBS (for isolator +E/s+CB)	Existing Switchyard control room of respective station.	YES, Bidder scope is determined as per clause 3.1(1)
2	6.6 KV switchgear: a) Incomers-Bus coupler and outgoing transformer	DCS + ECP (hard wired panel to be located at FGD control Room)	FGD Control Room	YES, However, ECP is NOT in bidder scope of supply. Bidder to consider (Supply, lay & commission) the hardwire control cable

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	Feeders.			from respective feeders to FGD-DCS.
3	6.6 KV switchgear: a) All outgoing feeders except above at sr. No 2(a)	DCS + Local control through LPBS+ manually from 6.6 KV panel.	FGD Control Room	YES, Bidder to consider (Supply, lay & commission) the hardwire control cable from respective feeders to FGD-DCS.
4	415V switchgear: all incomers, bus coupler and all Breaker operated outgoing feeders.	DCS + Local control through LPBS for motor feeders + manually from 415 V switchgear	FGD Control Room	YES, Bidder to consider (Supply, lay & commission) the hardwire control cable from respective feeders to FGD-DCS.
5	415V switchgear:DOL starter, MCCB Starter feeders	DCS + Local control through LPBS for motor feeders + manually from 415V switchgear.	FGD Control Room	YES, Bidder to consider (Supply, lay & commission) the hardwire control cable from respective feeders to FGD-DCS.

4. CODES AND STANDARDS

The design, construction and testing of all equipment, facilities, components and systems shall be in accordance with standards/codes issued by Bureau of Indian Standards (BIS) and/or equivalent international standards/ codes. A non-exhaustive list of reputed international standards is given below:

- a) American National Standards Institute (ANSI)
- b) American Petroleum Institute (API)
- c) American Society of Mechanical Engineers (ASME)
- d) American Society of Testing and Materials (ASTM)
- e) American Water Works Association (AWWA)
- f) American Welding Society (AWS)
- g) British Standards (BS)
- h) Deutsches Institut fur Normung (DIN), Germany.
- i) International Electro-technical Commission (IEC).
- k) Institute of Electrical and Electronics Engineers (IEEE).
- l) International Organization for Standardization (ISO).

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j) National Electric Code (NEC), USA.

k) National Electrical Manufacturers Association (NEMA), USA.

l) VDE association for Electrical, Electronic and Information Technologies (VDE), Germany

5. DESIGN CRITERIA


5.1 DDCMIS System

Distributed Digital Control Monitoring & Information System (DDCMIS) based control system with hot redundant controller, redundant power supplies, I/O cards and redundant communication modules for FGD plant and common systems shall be provided. The scope of supply shall include but not limited to following:

The Data Communication System shall include a redundant Main System Bus with hot back-up. Other applicable bus systems like cubicle bus, local bus, I/O bus etc. shall be redundant except for backplane buses which can be non-redundant. The DCS shall have the following minimum features:

- a) Redundant communication controllers shall be provided to handle the communication between I/O Modules (including remote I/O) and DCS and between DCS and operator work station.
- b) The design shall be such as to minimize interruption of signals. It shall ensure that a single failure anywhere in the media shall cause no more than a single message to be disrupted and that message shall automatically be retransmitted. Any failure or physical removal of any station/module connected to the system bus shall not result in loss of any communication function to and from any other station/module.
- c) If the system bus requires a master bus controller philosophy, it shall employ redundant master bus controller with automatic switchover facility.
- d) Built-in diagnostics shall be provided for easy fault detection. Communication error detection and correction facility (ECC) shall be provided at all levels of communication. Failure of one bus and changeover to the standby system bus shall be automatic and completely bump less and the same shall be suitably alarmed / logged.
- e) The design and installation of the system bus shall take care of the environmental conditions as applicable.
- f) Data transmitting speed shall be sufficient to meet the responses of the system in terms of displays, control etc. plus 25% spare capacity shall be available for future expansion.
- g) Passive coaxial cables or fiber optic cables shall be employed. The bidder shall furnish details regarding the communication system like Communication protocol, bus utilization calculations etc.

The reaction time of the programmable control system from input signals at the input cards to output of the associated signals or commands of the output card inclusive of programmed logic processing, comprising

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a mixture of logic gates, arithmetic operations and other internal operations shall be less than 100 milli seconds under the most arduous control system operating conditions.

These specifications shall be read in addition to the detail specification mentioned in General Technical Requirement (GTR) mentioned in this sub-section.

5.2 CONTROLS/OPEN LOOP CONTROL SYSTEM (OLCS) FUNCTIONS

These clauses are applicable for all the Binary controls of DCS included in Contractor's Scope including all the control logics of FGD system.

The OLCS shall include sequence control, interlock & protection for various plant auxiliaries/valves/dampers/drives etc. The sequence control shall provide safe and automatic start up and shutdown of FGD system. The interlock and protection system shall ensure safe operation of FGD system at all times and shall automatically shut down FGD system when unsafe conditions arise.

The OLCS shall be arranged in the hierarchical control structure consisting of unit level, group level, subgroup level & drive level (as applicable).

It shall be possible to perform automatic FGD startup & shutdown by issuing minimum number of commands from OWS. Thus, the unit level shall control all the Control System Blocks and issue appropriate startup & shutdown commands to various blocks of this Control System and receive corresponding commands/check backs/feedbacks.

The group level shall control a set of functional sub-groups of drives. Appropriate start-up and shut down commands shall be issued to the sub-group control and various check-backs shall be received from sub-groups or drives. Each sub-group shall execute the sequential start-up and shut down programs of a set of inter-related drives along with system interlocks and protections associated with that sub-group as well as basic interlocks and protections related to individual drive falling under that sub-group. The drive level shall accept commands from the sub-groups, push buttons (wherever provided), etc., and transmit them to the respective drive, after taking into account various interlocks and protections and the safety of that particular drive. For HT drive, first-up logic shall be incorporated to indicate the cause of protection/trip.

A list of tentative I/O controllers has been mentioned below along with the details of Functional Grouping (FG). Details of functional grouping with respect to process blocks shall be finalized during detailed engineering.

FGD DDCMIS consisting of following:

- Absorber and associated system FG
- Gypsum De watering Handling common system FG.
- Lime stone preparation and handling common system FG.
- Other associated common system including Waste Water System, Water treatment system (as applicable)

SN	Limestone	AI (4~20mA)	RTD (Pt100)	AO (4~20mA)	SOE	DI	DO	Total
	A. Limestone system							
1	Limestone Transfer System	4	0	4	0	48	24	80



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2	Limestone storage system	6	0	6	0	40	22	74
3	Limestone slurry preparation system wet ball mill system "A"	16	18	3	1	83	49	170
4	Limestone slurry preparation system - wet ball mill system "B"	16	18	3	1	82	49	169
5	Limestone slurry storage and feeding system	19	0	0	0	100	64	183
	B. Flue gas system							
6	Flue gas system	88	24	1		268	134	515
7	Booster fan "A" system	12	18	1	1	51	18	101
8	Booster fan "B" system	12	18	1	1	51	18	101
	C. Absorber System							
9	Emergency Absorbent tank	9				49	26	84
10	Absorber system 1	29	3	3		274	176	485
11	Absorber system 2	22	44	5	4	182	106	363
12	Oxidation air system	21	32	2	2	34	20	111
	D. All sump & pump							
13	Draining system	12		0	0	117	64	193
14	Compressed air system	23	2	0	0	50	24	99
15	Process water system	18	0	0	0	84	48	150
16	Cooling water system	5	1	0	0	22	12	40
	E. Waste water system & gypsum system							
17	Waste water system & gypsum system - hydro clone	17	2	0	0	105	62	186
18	waste water system sheet & gypsum system - vacuum belt filter "A"	23	13	1	1	99	44	181
19	waste water system sheet & gypsum system - vacuum belt filter "B"	19	10	0	1	53	15	98
20	waste water system & gypsum system - filtrate water system	5	1	0	0	51	30	87
21	waste water system - Gypsum conveyor	0	0	0	0	30	20	50
22	waste water system - waste water neutralization system	13	3	4	0	84	50	154
23	Electrical power system (Excluding 220 KV system)	20	0	0	0	88	24	132
24	For Employer's I/O	50		50	0	130	130	360
	TOTAL=							4166

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5.3 Sequence Control

1) A sequence shall be used to move a set of groups, sub-groups from an initial steady state (for instance 'OFF') to a final steady state (for instance 'ON'). The sequence initiating command for the unit & group level shall be issued from OWS.

2) A sequence shall be made of steps. The steps shall be executed in predetermined order according to logic criteria and monitoring time consisting of the interlock & protection requirements and check back of previous step which shall act as preconditions before the sequence control can execute the command for that step.

3) Each step shall have a "waiting time" implying that the subsequent step would not be executed unless the specified time elapses. A monitoring time shall also be defined as the maximum time required in executing the commands of any step and the time required for appearance of check back signals. In case, this is not completed within the specified time, a message shall be displayed and programme will not proceed further.

4) Manual intervention shall be possible at any stage of operation and the sequence control shall be able to continue at the correct point in the program on return to automatic control. Protection commands shall have priority over manual commands, and manual commands shall prevail over auto commands.

5) Open or close priority shall be selectable for each drive.

6) The sequence startup mode shall be of the following types.

Automatic Mode

Semi-Automatic Mode


Operator Guide Mode / Test Mode

For the drives, the command shall be provided through redundant O/P module to MCC/SWGR/Actuator as applicable and inputs (status, SWGR & process) shall be acquired through input modules. The failure of one of the redundant output module shall in no way affect the function of the other output module. For open loop control system input/output I/O modules for realizing drive control functions redundancy in input / output and processing modules shall be envisaged for HT drives and critical LT drives (approx. 20 nos.)

The output modules control module shall have the feature that ensures that in case of failure, all the outputs are driven to zero. The 24V DC command outputs to drives for ON/OPEN, OFF/CLOSE shall be separate and independent and inverted outputs shall not be employed. Keeping +24 V DC extended to the relays for these outputs continuously and extending ground/ negative when command is to be issued is not acceptable except some of the auxiliary plants as to be decided during detailed engineering. (if required with proposed system)

For inching type of drives, position transmitter power supply and monitoring of position transmitter signal shall be provided.

The termination for OPEN (ON)/CLOSE (OFF) command for the drive actuator shall be performed in the actuators specified elsewhere in the specification. However, OPEN (ON)/CLOSE (OFF) and disturbance status as a minimum shall be monitored in OLCS.

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The sequence interlock & protection requirements shall be finalized during detailed engineering and the same shall be subject to Employer's approval. However, for a general guideline please find attached "Drive control Philosophy – Document No EPI-I-BE-B01-003-002.

The drive function i.e. basic interlock & protection logic of the drive shall be implemented in redundant controllers. The drive function shall ensure that protection signals for the safety of the drive shall be effective under all conditions and under all modes of operation. The different commands shall be performed according to the priority of protection 'Off', Protection 'On', manual and automatic. The standard functions like running time monitoring, status signaling, alarm/drive annunciation, etc. shall be performed in drive function. The drive function shall prevent hunting of the actuator in the presence of both open & close commands for actuators of the valves & dampers. The drive function shall be implemented in dedicated standard software functional block.

The reversible drives to be controlled under OLCS shall be actuators with integral starters. These actuators will have coupling/interposing relays for accepting commands from OLCS and shall provide check back signals to OLCS. As such, all drive related inputs/outputs for reversible drives shall be available from actuators in field. The 'Open' and 'Closed' limit switches of each actuator shall be monitored with selectable delay time to check & alarm the contradictory condition of both contacts indicating 'Open' or 'Closed' status of actuators. The actuators for valves & dampers shall be interfaced as follows:

The open/close commands and check back signals from limit switches and disturbance signals shall be hardwired to respective OLCS group through I/O modules from actuators in the field.

5.4 MODULATING CONTROLS/CLOSED LOOP CONTROL SYSTEM (CLCS) FUNCTIONS

This Clause is applicable for all analog controls of DCS. The controller capability shall, as a minimum, include


(i) P, PI, PD and PID control functions and their variations (ii) cascade control (iii) feed forward control (iv) On-Off control, (v) Ratio and bias control, (vi) Logical operation.

The loop reaction time (from change of output of the transmitter/temperature element to the corresponding control command output) shall be within 500 milli-seconds. For binary control the response time shall be within 100 milliseconds only.

The control loop shall have enough flexibility and various features to perform feed forwards, balancing of controller, increasing the response to achieve the desired process parameter within prescribed time frame.

The control system shall be bump less transferred to manual on the conditions of Control power supply failure, Failure of redundant controllers, Field input signal not available, Analog input exceeding pre-set value, etc. as a minimum and as finalized during detailed engineering. In the event of failure of active CPU, tasks shall be transferred to the standby CPU within fastest possible transfer time (< 5m sec.) without causing any relays to drop out during the transfer.

Any switch over from auto to manual, manual to auto and switchover from OWS operation to local station operation and vice versa shall be bump less and without resulting in any change in the plant regulations and the same shall be reported to the operator and recorded automatically.

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The System being supplied shall be such that when permissible limits are exceeded, an automatic switchover from an operation governed by maximum efficiency, to an operation governed by safety and availability is affected.

For safety reasons, switchover logics associated with the modulating control loops shall be performed within the closed loop control equipment. Modulating control loops shall be provided with standard features to interface overriding commands from OLCS/Protection System like open, protection open etc.

All controllers shall be freely configurable with respect to requisite control algorithms.

SYSTEM REACTION TIME:

The reaction time of the programmable control system from input signals at the input cards to output of the associated signals or commands of the output card inclusive of programmed logic processing, comprising a mixture of logic gates, arithmetic operations and other internal operations shall be less than 100 milliseconds under the most arduous control system operating conditions.

5.5. DCS I/O LIST (Main Terminal Point) :

The failure of one of the redundant output module shall in no way affect the function of the other output module. For open loop control system input/output I/O modules for realizing drive control functions redundancy in input / output and processing modules shall be envisaged for HT drives and critical LT drives (approx. 20 nos.). The approximate numbers of I/Os wrt to functional groups (FG) has been detailed above (Please refer clause No. 5.2). Bidders to take make necessary arrangements for the supply of actual number of Input/Outputs, without any additional cost implication to GESCL/EPI.

The tentative list of Input/outputs have been provided herewith, bidder to consider the spare I/Os & subsequent spare cards/chassis as per the requirement mentioned in GTR.

However, Input/Output list will be provided to the successful bidder for further detailing.

5.6 NOT USED


6. UPS & 24V DC SYSTEM

The scope of work shall be read in addition to UPS technical specification given in GTR of this section but not limited to the following:

- One 415 V incoming & 230 V AC single phases outgoing, 50 Hz redundant UPS system, complete with all accessories.
 - i. 35 kVA (**Capacity is tentative & same will be finalized at detail Engineering without any further price implication to EPI/GSECL**)
 - ii. 5 KVA mini-UPS
- UPS distribution ACDB panels/boards along with the 24VDC charger system.

7. INSTRUMENTATION CABLE

7.1 SCOPE OF SUPPLY

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Supply of Instrumentation/Automation Control, Signal & Special type of Cable.

Preliminary Cable Distance: - The tentative distances have been illustrated below. Bidder to undertake site visit for final distance layout plan.

SN	From	To	Approx Distance (m)	Remarks
1	New 220V switchyard	Central Control Room	275	
2	Central Control Room	FGD Control Room	950	
3	FGD Control Room	New Chimney	300	
4	FGD Control Room	Limestone & Gypsum Building	100	
5	Switchgear Panel	DCS panel	40	Electrical & switchgear Bldg
6	Thermocouple & Triad Cable from HT motor	DCS panel	200	


7.2 CODES AND STANDARDS

The cables shall be manufactured or tested in line with the latest revisions of the following Indian Standards:

IS 8130: 1984	:	Conductors for insulated electric cables and flexible cords
IS 5831: 1984	:	PVC insulation and sheath of electric cables
IS 2975: 1999	:	Mild steel wires, formed wires and tapes for armoring cables
IS 1554: Part 1: 1988	:	PVC insulated (heavy duty) electric cables Part 1 for working voltage up to and including 1100V
IS 3961: Part 2: 1967	:	Recommended current rating for cables: Part 2 for PVC insulated and PVC sheathed heavy duty cables.
IS 7098: Part 1: 1988	:	Cross linked polyethylene (XLPE) insulated PVC sheathed cables for working voltage up to and including 1.1KV. IEC – 60840 Power cables with extruded insulation & their accessories for rated voltage above 30 KV up to 150 KV.

7.3 DESIGN CRITERIA

1. Cables shall be flame retardant low smoke (FRLS) type. In hazardous areas cables of suitable R/L ratio shall be provided for intrinsic safety.
2. Durable marking shall be provided on the surface of the cable at intervals not exceeding 5 mtrs. Marking shall include Manufacturer's name, Year of manufacture, Voltage grade, Type of cables (Conductor size & no. of pairs/triads / type of compensating /extension cable), Insulation material, FRLS etc.
3. Sequential length marking shall also be provided at every meter interval on outer sheath of cable.
4. Standard seasoned wooden drum containing minimum 500 /1000 M + 5% length. Drum shall be anti rodent, anti termite and smooth finish. Both end of cable shall be capped by means of non-hygroscopic sealing material.

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5. Cables near high temperature zone shall be capable of withstanding high temperature and terminated in junction box / panel in normal temperature zone. Teflon insulated and sheathed thermocouple extension cables and copper conductor cables shall be used in high temperature zone. Conductor and sheath shall be extruded FEP (Teflon) as per VDE 0207 Part 6 and ASTM D 2116. These cables shall be pair, multi pair, triad, multi triad and twisted & shielded.

7.4 THERMOCOUPLE EXTENSION & COMPENSATING CABLE

SL No	Description	Specification
1.	Conductor	Solid conductor
2.	Type	KX (Extension) (Chromel Alumel), RX (Compensating) (Copper-Copper alloy), JX (Extension) (Iron Constantan)
3.	Conductor Insulation	HR PVC Type-C (IS-5831,1984) 0.6 mm thick
4.	Operating Voltage	300V/500V RMS (Core to Earth/Core to Core)
5.	Twisting	Pair twisted with lay of 60 mm (max)
6.	Twisting Direction	All pairs in the same direction. Lapped to from bunch with mylar tape.
8.	Screen (Pair & Overall)	Aluminum mylar tape with a thickness of 28 pm (min.) for individual pair screen and 60 pm (min.) for overall screen with 100% coverage and 25% overlapped edges. Over the individual pair screening tape two laps of 0.05 mm thick (min.) polyester tape shall be applied with minimum overlap of 25%. Metallic side of the screen shall be in contact with drain wire
9.	Drain wire	Annealed tinned copper wire, stranded. Size 0.5 Sq mm. (No. of strands / size: 7 / 0.3mm)
10	Inner Sheath	Extruded FRLS PVC (anti rodent, anti- termite & moisture resistant properties) HR PVC Type ST2 of IS-5831,1984 Thickness as per IS-1554Part-I 1976
11	Rip Cord	Non-metallic under sheath
12	Armouring	GI wire / strip as per IS 3975
13	Outer Sheath	Extruded FRLS PVC (anti rodent, anti- termite & moisture resistant properties) HR PVC Type ST2 of IS-5831,1984 Thickness as per IS-1554Part-I 1976
14	Filler	Non hygroscopic with FRLS property
15	Temperature Range	Up to 85 °C
16	Insulation at 200 C	100 MOhms/Km [Min]
17	Capacitance at 800 Hz	120 nf/km
18	Cross talk	60 dB



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19	Attenuation	1.2 dB/Km
20	Codes & Standards	a) IEC 332-1 b) ANSI MC 96.1 c) IS-8784-1987
21	Tests	Oxygen Index: Min.29 at room temp. (ASTM- D-2863) Acid Gas Gen.: Max.20% by weight as per IEC 754 Part-I Temp Index: Min 250 DEG C at 21Oxy. Ind. (ASTM- D-2863) Smoke Density Rating: Max.60% (ASTM- D-2843). Flammability Test: as per IEC 332 Part-I /IEEE-383 Swedish Chimney Test - SS-424- 1475 F3 High voltage test Core to core- 1.5 KV for 1 min. Core to screen- 1.0 KV for 1 min. Insulation Resistance 100 M Ohm /Km Min Rodent & Termite repulsion test (Presence of lead shall be confirmed) Durable printed or embossed numbering at regular interval of 50mm shall be provided for identification of pairs.

CABLE TYPE	SHEATH COLOR	WIRE	SHEATH COLOR	CONDUCTOR MATERIAL
KX	YELLOW	POSITIVE	YELLOW	NICKEL/ALUMINUM
		NEGATIVE	RED	NICKEL/ALUMINUM
JX	BLACK	POSITIVE	WHITE	IRON
		NEGATIVE	RED	CONSTANTAN
RX	GREEN	POSITIVE	BLACK	COPPER
		NEGATIVE	RED	COPPER NICKEL ALLOY

7.5 INSTRUMENTATION MULTIPAIRED SIGNAL CABLE

SL No.	Description	Specification
1.	Conductor type	Stranded (7) annealed tinned copper
2.	Conductor size	0.5 / 1.0 / 1.5 Sq.mm (as required)
3.	Conductor resistance	39CI/Km/18G/Km/12CI/Km
4.	Conductor Insulation	HR PVC Type-C (IS-5831,1984) 0.6 mm thick



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5.	Operating Voltage	300 / 500V RMS (Core to earth / core to core)
6.	Twisting	Twin twisted with lay of 60 mm
7.	Twisting Direction	All pairs in the same direction. Lapped to form bunch with mylar tape
8.	Screen (Pair & Overall)	Aluminium mylar tape with a thickness of 28 pm (min.) for Individual pair screen and 60 pm (min.) for overall screen with 100% coverage and 25% overlapped edges. Over the individual pair screening tape two laps of 0.05 mm thick (min.) polyester tape shall be applied with minimum overlap of 25%. Metallic side of the screen shall be in contact with drain wire. Analog signals- Individual pair & overall shield to be considered. Binary signals- overall shield to be considered.
9.	Drain Wire	Annealed tinned copper wire, stranded. Size 0.5 Sq.mm (No. of strands / size: 7 / 0.3mm)
10.	Inner Sheath	Extruded FRLS PVC (anti-rodent, anti-termite & moisture resistance properties) HR PVC Type ST2 of IS-5831, 1984 Thickness as per IS-1554, Part-I 1976.
11.	Rip Cord	Non-metallic under sheath
12.	Armouring	GI wire / strip as per IS 3975
13.	Outer Sheath	Extruded FRLS PVC (anti rodent, anti-termite & moisture resistant properties) HR PVC Type ST2 of IS-5831, 1984 Thickness as per IS-1554, Part-I 1976
14.	Filler	Non hygroscopic with FRLS property.
15.	Temperature Range	85° C
16.	Insulation at 20 Deg.C	100 MOhms/Km [Min]
17.	Capacitance at 800 Hz	120 nf/km
18.	Cross talk	60 dB
19.	Attenuation	1.2 dB/Km
20.	Codes & Standards	a) IPCEA-S-61-402 b) BS 5308 c) IEC 332-1 d) ASTM-B-33 e) IS-8130-1984 f) IS 1554 Part-1 g) IS 10810
21.	Sheath colour	Inner- Black and Outer- Gray
22.	Tests	a) Oxygen Index: Min. 29 at room temp. (ASTM-D-2863) b) Acid Gas Gen.: Max. 20% by weight as per IEC 754 Part-I

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		c)Temp Index: Min 250 O C at 21Oxy. Ind. (ASTM-D-2863) d)Smoke Density Rating : Max.60% (ASTM-D-2843). e) Flammability Test : as per IEC 332 Part-I Swedish Chimney Test-SS-424-1475 F3 g) Insulation Resistance 100 M Ohm / Km Min h) High voltage test Core to core- 1.5 KV for 1 min. Core to screen- 1.0 KV for 1 min. Rodent & Termite repulsion test (Presence of lead shall be confirmed)																										
23.	Colour of core for Instrumentation Cable (As per IS-9938)		<table><tr><td>PAIR</td><td>CORE</td><td>COLOR</td></tr><tr><td>1st</td><td>1st</td><td>Blue</td></tr><tr><td>1st</td><td>2nd</td><td>Red</td></tr><tr><td>2nd</td><td>1st</td><td>Gray</td></tr><tr><td>2nd</td><td>2nd</td><td>Yellow</td></tr><tr><td>3rd</td><td>1st</td><td>Green</td></tr><tr><td>3rd</td><td>2nd</td><td>Brown</td></tr><tr><td>4th</td><td>1st</td><td>White</td></tr></table>	PAIR	CORE	COLOR	1st	1st	Blue	1st	2nd	Red	2nd	1st	Gray	2nd	2nd	Yellow	3rd	1st	Green	3rd	2nd	Brown	4th	1st	White	
PAIR	CORE	COLOR																										
1st	1st	Blue																										
1st	2nd	Red																										
2nd	1st	Gray																										
2nd	2nd	Yellow																										
3rd	1st	Green																										
3rd	2nd	Brown																										
4th	1st	White																										

4th 2nd Above 4 Pairs, 4 Pairs making a unit shall have indelible printed colour coded bands like Pink for 1st unit, Orange for 2nd unit and Violet for 3rd unit and so on. In addition, band marking, for example single band for 1st. unit, double band for 2nd. unit and so on, shall be provided on each conductor for identification of unit. Band marking on individual core shall be provided at regular intervals not exceeding 50 mm.

7.6. INSTRUMENTATION MULTIPAIRED CONTROL CABLE

SL No.	Description	Specification
1.	Voltage grade	1.1KV
2.	Duty	Heavy duty
3.	No. of cores	As per requirement given in TS
4.	Cross sectional area	1.5 / 2.5 sq.mm as per requirement to be given in TS
5.	Conductor type	Solid annealed circular stranded copper conductor


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6.	Insulation type	XLPE
7.	Sheath	ST2 PVC Inner and outer sheath shall be extended type up to 7 core Above 7 core inner sheath shall be wrapped.
8.	Armour	Galvanized steel wire armour up to 14 cores. Galvanized formed wire / steel strip above 14 cores.
9.	Spare cores	3, 5 and 7 cores shall have at least one spare. 10 and above shall have two spare cores.
10.	Miscellaneous	Selected cable must satisfy the criteria including the voltage drop and hence calculation must be furnish by the tenderer Cables for temperature detectors shall be of screened type of the required technical parameters with core size not less than 1.5 sqmm
11.	Core identification	Identification shall be provided by embossing on the outer sheath of cable as per following: - Manufacturer's name and trade mark Voltage grade Year of manufacture Type of insulation Core identification (to be provided in a logical manner)

7.7- INSTRUMENTATION MULTIPAIRED TRAILING CABLE

SL No.	Description	Specification
1.	Voltage grade	1.1KV
2.	Duty	Heavy duty
3.	No. of cores	Single or multicore as per requirement
4.	Cross sectional area	As per requirement
5.	Type of conductor	Highly flexible stranded tinned annealed high conductivity copper conductor
6.	Type of Insulation	EPR (Ethylene – propylene Rubber) For higher temperature zone Silicone Rubber

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7.	Shielding	Each individual core to be protected by shielding besides overall shielding
8.	Sheathing	Poly – chloroprene rubber or chloro sulphurated polyethelene
9.	Miscellaneous	One additional core for earthing
10.	Armoring	Generally GI wire armoring

7.8 - TENTATIVE OR INDICATIVE QUANTITY FOR INSTRUMENT & COMMUNICATION CABLES AND CABLE TRAY

SNo.	Cable Description	Tentative Distances	Remarks
1	2P x 0.5 sq.mm, Cu, AR cable	1000 m	All cable & cable tray sizes & quantities are tentative & same shall be finalized at detail engineering without price implication to EPI/GSECL.
2	16P x 1.5 sq.mm, Cu, AR cable	1200 m	
3	4C x 1.5 sq.mm, Cu, AR cable	500 m	
4	7C x 1.5 sq.mm, Cu, AR cable	1000 m	
5	16C x 2.5 sq.mm Cu, AR cable	2000 m	
6	34 C x 2.5 sq.mm Cu, AR cable	1200 m	Bidder is requested to visit site for actual quantity of cable/ tray for fulfilling the tender requirements.
7	Thermocouple Conductor	1000 m	
8	Trailing conductor	500 m	
9	FO Cable	6000 m	Plant Layout plan is enclosed herewith the tender.
	Cable Tray Description		
1	600 mm Perforated	870 m	
2	300 mm Perforated	350 m	
3	150mm perforated	1485 m	
4	75mm perforated	150 m	

8. PAINING


Equipment shall be finished with two (2) under coats of high quality epoxy based primer followed by two coats of epoxy painting. Painting shall be carried out by approved process.

9. TEST CERTIFICATES:

Certified copies of all tests carried out at works and at site shall be furnished in six (6) copies for approval of the Owner/Purchaser.

Equipment shall be dispatched from works only after receipt of Owner/Purchaser's written approval of shop test reports.

Type test certificate on equipment shall be furnished along with the tender. In case the Type Test Certificates of identical equipment of the offered items are not submitted, the bidders shall have to conduct the Type test on the offered equipment before delivery free of charge to the Purchaser. Type test performed beyond (5) years time are not acceptable.

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10. DRAWINGS, DATA AND MANUALS

To be submitted with the Bid :

- Overall Proposed Architecture from DCS or other Aux. System to DCS.
- Bill of Materials (with all details of power supply auxiliaries, Input/Output cards and other hardware considered).
- Technical leaflets on each piece of Electrical equipment and Type test certificate of similar equipment quoted.
- GA Drawing.

To be submitted after award of Contract

- Detail Technical Specification & Bill of Materials indicating make, model no. etc.
- Detail architecture drawing from DCS or other Aux. System to DCS.
- Data Sheet and technical leaflets on each piece of equipment shall be furnished.
- Instruction manuals for the complete system, clearly indicating the salient features of each equipment shall be furnished.
- Hook-up, Loop drawings with FG detailing.
- Bill of Material for FGD control system, mandatory spare quantities for each of the subsystems of DCS indicating make, model no. etc.
- Instrumentation/Control Cable schedule.
- I/O Assignment and logic diagram
- Single Line Diagram for power supply requirements and distribution scheme of DCS (both UPS & 24V DC).
- Grounding Scheme of FGD DCS system.
- Schematic / wiring drawings for all cabinets / systems.
- QAP / FAT / SAT Procedures for tests to be conducted. **(FAT shall be conducted at OEM's workplace)**
- Type Test result/ report/ certificate as applicable.
- Schedule of Alarms
- Sequence of Event Schedule
- HMI Display / Graphics / Mimics / Logs / Reports
- System Software design manual including software listing

The Bidder may note that the drawings, data and manuals listed are minimum requirement only. The Bidder shall ensure that all other necessary write-ups, curves and information required to fully describe the equipment offered are submitted with the bid.

The successful bidder may note that the drawings, data and manuals listed are minimum requirement only. The Bidder/Manufacturer shall ensure that all other necessary write-ups, curves and information required to fully describe the equipment offered are submitted with the bid. However, the detailed drawing/document list is enlisted in this section. The successful bidder shall be provided the following Basic Engineering documents for ready references.

SN	Drawing/Document Description	Category		Drawing Number
1	KKS CODE OF FGD SYSTEM	A	BE	EPI-M-BE-C01-002
2	I & C DESIGN DESCRIPTION	A	BE	EPI-I-BE-D05-001
3	CONTROL PHILOSOPHY OF FGD SYSTEM	A	BE	EPI-I-BE-B01-002



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4	DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM	A	BE	EPI-I-BE-B01-003
5	DCS SYSTEM CONFIGURATION DIAGRAM	A	BE	EPI-I-BE-G11-001
6	I & C EQUIPMENT LIST	A	BE	EPI-I-BE-C13-001
7	IO SUMMARY LIST	A	BE	EPI-I-BE-C14-001
8	INSTRUMENT LIST WITH ALARM & TRIP SET POINT	I	DE	EPI-I-DE-G35-001
9	P&ID FOR FGD SYSTEM	A	BE	

11. SPARES:

This is the comprehensive operation and maintenance (O&M) contract for FGD system installed by bidder for the period of 03 years from the date of successful commissioning of the FGD system.


The spares & consumables required during the O&M of FGD system are NOT in bidder's scope.

The order for the comprehensive O&M for three years for FGD system will be awarded at the later stage vide separate package. Bidder may provide a consolidated amount for O&M in the price bid, however the amount quoted will not be included for the evaluation of the L1 bidder.

Bidder to supply all erection/commissioning spares and special tools & tackles along with the proposal for the FGD system package and equipment. The bidder shall also submit proposals/schedule for the following:

11.1 Mandatory spares

- The list of mandatory spares considered essential by the GESCL is indicated in the list enclosed to this Sub-Section. The Bidder shall indicate the prices for each of the item (except for items not applicable to the Bidders design) in the 'Schedule of Mandatory Spares' whether or not the Bidder considers it necessary for the GESCL/EPIL to have such spares. If the Bidder fails to comply with the above or fails to quote the price of any spare item, the cost of such spares shall be deemed to be included in the contract price. The bidder shall furnish the population of each item in the Bid Forms & Price Schedules. Whenever the quantity is mentioned in "sets" the Bidder has to give the item details and prices of each item.
- Whenever the quantity is indicated as a percentage, it shall mean percentage of total population of that item in the station (project), unless specifically mentioned otherwise, and the fraction will be rounded off to the next higher whole number. Also one set for the particular equipment. e.g. 'set' of bearings for a pump would include the total number of bearings in a pump. Also the 'set' would include all components required to replace the item; for example, a set of bearings shall include all hardware normally required while replacing the bearings.
- The assembly / sub assembly which have different orientation (like left hand, right hand, top or bottom), different direction of rotation or mirror image positioning or any other regions which result in maintaining two different sets of spares to be used for subject assembly /sub-assembly shall be considered as different type of assembly/subassembly.
- The GESCL/EPIL reserves the right to buy any or all the mandatory spare parts.
- The prices of mandatory spares indicated by the Bidder in the Bid Proposal sheets shall be used for bid evaluation purposes. However, the price break-up of mandatory spares as per list enclosed with the section shall be provided by successful bidder.

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- All mandatory spares shall be delivered at site at least two months before scheduled date of initial operation of the first unit. However, spares shall not be dispatched before dispatch of corresponding main equipments.
- Wherever quantity is specified both as a percentage and a value, the Bidder has to supply the higher quantity until & unless specified otherwise.

11.2 **Recommended spares**

- In addition to the spare parts mentioned above, the bidder shall also provide a list of recommended spares for 3 years of normal operation of the plant and indicate the list and total prices in relevant schedule of the Bid Forms & Price Schedules. This list shall take into consideration in the mandatory spares specified in this Sub-section and should be independent of the list of the mandatory spares. The GESCL/EPIL reserves the right to buy or all of the recommended spares. The recommended spares shall be delivered at project site at least two months before the scheduled date of initial operation of unit. However, the spares shall not be dispatched before the dispatch of the main equipment.
- Prices of recommended spares will not be used for evaluation of the bids.
- The price of these spares will remain up to 24 months after placement of Notification of Award for the main equipment. However, the successful bidder shall be liable to provide necessary justification for the quoted prices for these spares as desired by the GESCL/EPIL.

11.3 **Warranty Period**

- Guarantees for equipment and materials – 2 years (24 months) from the day of normal operation of the plant for indigenous origin, and for 5 years (60 months) of normal operation of non-indigenous origin.

11.4 **Special Tools and Tackles:**

- Special tools and tackles including testing, calibrating and measuring instruments required for erection, assembly disassembly and maintenance of all equipment / systems, if any, required for complete operation of system shall be supplied by the Bidder.

12.00 **Packing, Shipping & Training.**


12.1 **General**

This specification is prepared for the suppliers about packing and shipment for FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE FOR **for 1X500 MW Unit No.6 of Ukai TPS** Project.

All the equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. However, storage of the material shall be in supplier scope.

The Supplier shall be responsible for all loss or damage during transportation, handling and storage due to improper packing shall be accompanied by a packing note (in weather proof paper) quoting specifically the name of the Supplier, the number and date of contract and names of the office placing the contract, nomenclature of contents and Bill of Material. Package shall be protected against moisture and water damages.

The Supplier should provide a Design Scheme for Packing during the bidding stage, identifying the modes of package (wooden cases, steel cases, frame cases, bundle, drum, etc.), structural drawing of the package, the type of material used for the package, protection measures for

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5 equipment such as rustproof, mould-proof, moisture-proof, waterproof, shock-proof processes, fixings, etc. the Design Scheme for Packing shall be prepared based on the weight, dimension.

The Supplier shall warrant that the packing would not be damaged and deteriorated within 24 months after the cargoes are delivered to the site. During the warranty period, if the cargoes are damaged due to the Supplier's packing defects, the Supplier shall be responsible for replenishment to the site in a timely manner and bear all costs incurred.

10.02 Shipment

The Supplier shall at its own risk and expense transport all the cargoes to the designated place of delivery by the Purchaser by the mode of transport that the Supplier judges most suitable under all the circumstances.

The Supplier shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the cargoes to the designated place of delivery. The Purchaser shall use its best endeavours in a timely and expeditious manner to assist the Supplier in obtaining such approvals, if requested by the Supplier. The Supplier shall indemnify and hold harmless the Purchaser from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the cargoes to the Site.

10.03 On-site Receipt

The buyer and the Supplier shall witness all off-loading of Supplier furnished materials. Supplier shall provide, with the delivery of equipment, any specialized lifting and handling equipment that may be required to off load and handle equipment at Site.

Material and equipment delivered to the site will arrive at the Power Station front gate. All deliveries (including the bulky items) using road transport to the site shall be agreed with the buyer in advance for overall site vehicle traffic coordination

The offloading procedure will start with the determination of the proper equipment and labor required to do the job safely. If the material cannot be handled with standard equipment, i.e. forklift, the Supplier will prepare a method statement accordingly. This method statement shall be submitted to the buyer for review at least 48 hours in advance.

10.04 It will be supplier responsibility to place all materials to designated store without any damage. Any component / finish product found damaged due to mishandling, same shall be replaced by Supplier without any cost implication to Buyer.

10.05 Training: Arranging for the training of GESCL/STEAG/EPIL personnel of different categories at manufacturer's works as well as plant site.

GUJARAT STATE ELECTRICITY CORPORATION LTD.



Tender Bid Documents for supply, installation, commissioning & testing of FGD system for 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS with comprehensive O&M contract.

SECTION – IV

**TECHNICAL SPECIFICATIONS and
BROAD SCOPE OF WORKS /SERVICES**

Signature of Bidder	Company's Round Seal	Date:	Place:

SECTION – IV

Technical Specifications and Broad Scope of Works/Services

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9.0	WORK & SAFETY REGULATIONS	152

Signature of Bidder	Company's Round Seal	Date:	Place:

SECTION-IV

Technical Specifications and Broad Scope of Works/Services

1.0 Objective/ Intent:

The intent of this specification is to reduce the SO₂ emission level of 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS to the extent possible, as stated in table below, while operating at full load and firing 100% Indian washed coal to meet the requirement of MoEF norms.

Sr. No.	Plant	SO ₂ level as per MoEF & CC norms
1	1x 500 MW Ukai Unit-6	200 mg/Nm ³
2	2 x 250 MW Sikka Unit -3&4	200 mg/Nm ³ (Common for two units)

2.0 Existing Plant Details:

- (a) The Ukai Thermal power project of GSECL located in Sonagadh, Taluka of Tapi district in Gujarat which comprising of 4 nos. of units, with total installed capacity of 1110 MW as indicated hereunder:

Sr. No.	Stage	Unit No.	Capacity	Make	Date of Commissioning
1	Stage-II	Unit No. 3	200 MW	BHEL	21.01.1979
2	Stage-II	Unit No. 4	200 MW	BHEL	11.09.1979
3	Stage-III	Unit No. 5	210 MW	BHEL	30.01.1985
4	Stage-IV	Unit No. 6	500 MW	BHEL	08.06. 2013

0.0 Mtr elevations of Ukai TPS is above 82.2 mtr of MSL

- (b) The Sikka Thermal power project of GSECL located in Sikka Taluka of Jamnagar district in Gujarat which comprising of 2 nos. of units, with total installed capacity of 500 MW as indicated hereunder:

Sr. No.	Stage	Unit No.	Capacity	Make	Date of Commissioning
1	Stage-II	Unit No. 3	250 MW	BHEL	20.3.2015
2	Stage-II	Unit No. 4	250 MW	BHEL	25.9.2015

0.0 Mtr elevations of Sikka TPS is above 10.5 mtr of MSL

3.0 Technical Data:

Signature of Bidder	Company's Round Seal	Date:	Place:

(A) Ukai TPS Unit No: 6

(i) Site Condition:

Sr. No.	Description	Parameter
1	Design Temperature of ambient air	31 Deg. C
2	Relative Humidity	60 %
3	Seismic force as per IS: 1893 -2002	Zone III
4	Plant location from MSL	82.2

Note: Bidder to consider RL for FGD system as 82.2 mtr for installation of FGD for Ukai TPS unit no 6. Accordingly, Bidder to consider leveling and grading of FGD area as the existing plant is at RL 82.2 Mtr.

(ii) Boiler Parameters:

Sr. No.	Description	Parameter
1	Location	Outdoor
2	Operation	Base Load
3	Type	Pularized coal fired, Balance draft, Wet Bottom
4	Boiler Maximum Continuous rating (BMCR)	1625 TPH
5	Steam Pressure at SH outlet	178 kg/cm ²
6	Steam temperature at SH outlet	540 Deg C
7	Steam temperature at RH outlet	540 Deg C
8	Oil for startup & flam stability	LDO/HFO
9	Fuel oil system sizing (LDO/HFO)	LDO – 2125 Kg/hr per gun, HFO – 2250 Kg/hr per gun, LDO - 7.5 % MCR heat input & total 7.5% MCR per elevation. HFO - 7.5 % MCR heat input per elevation, 30 % MCR total in 4 elevations
10	Pulverized coal size	70% through 200 mesh (74 microns) & 98% through 50 mesh (300 microns)
11	Type of pulverizes	XRP-1008 Capacity :62.9 T/hr. (Worst coal)
12	No of Air heaters	02 No Tri-sector 31.5 VIMT 2000
13	No of ID fans	02 No (Radial Fan, Model: NDZV 47, SIDOR) (Performance curve is attached)
14	Availability of sweet water margin as per MoEF norms	315 M3/ Hr

Signature of Bidder	Company's Round Seal	Date:	Place:

	for wet limestone based FGD	
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(iii) Compressor:

Sr. No.	Description	Parameter
1	Type	Oil free, multistage, centrifugal type, water cooled
2	No. of compressor	2 (1 W + 1 S), Capacity: 55 Nm ³ /Min; Pressure: 8.5 Kg/cm ²
3	Air receiver tank	3 Nos. (Capacity:10 M ³ , Pr.: 8 Kg/cm ²)
4	Air Dry Unit	2 (1 W + 1 S) working Pr. 8 Kg/cm ²

(iv) Design Data of ESP:

Sr. No.	Description	Parameter
1	Location	Downstream side of APH
2	Operation	Base Load
3	Type	Rigid discharge frame
4	Rapping	Intermittent
5	Type of ESP	FAA –(37.5M) - 8x37.5M – 2x108140 – 2
6	Gas flow rate to ESP, m ³ /sec	798 m ³ /sec
7	Gas Temperature, Deg. C	140 Deg C
8	Outlet dust concentration, mg/Nm ³	50 mg/Nm ³

(v) Clarified water Analysis:

Parameter	Unit	Value
Calcium Hardness	ppm asCaCO ₃	40-80
Total hardness	ppm asCaCO ₃	80-125
P-Alkalinity	ppm asCaCO ₃	0-5
M-Alkalinity	ppm asCaCO ₃	80-110
Chloride	ppm asCaCO ₃	12-22
Sulphate	ppm asCaCO ₃	5-10
Silica	ppm asCaCO ₃	18-25
pH		7.6-8.6
Turbidity	NTU	4-10
Conductivity	mS/cm	200-310

Signature of Bidder	Company's Round Seal	Date:	Place:

(vi) Blow down water Analysis:

Parameter	Unit	CW Blow down
Calcium Hardness	ppm asCaCO ₃	500
Total hardness	ppm asCaCO ₃	800
P-Alkalinity	ppm asCaCO ₃	0
M-Alkalinity	ppm asCaCO ₃	<200
Chloride	ppm asCaCO ₃	<300
Sulphate	ppm asCaCO ₃	<700
Silica	ppm asCaCO ₃	<150
pH		7.8-8.2
Turbidity	NTU	<100
Conductivity	mS/cm	<3000
FRC	ppm as Cl ₂	0.3-0.5
Total suspended solid	Mg/lit	27
Temperature	Deg C	45
Pressure	Kg/cm ²	Atmospheric

(vii) Coal properties:

Sr. No.	COAL	Worst Coal
	Proximate Analysis (% by weight) (As received basis)	
1	Fixed Carbon	26.00
2	Volatile Matter	22.00
3	Moisture	10.00
4	Ash	42.00
5	Gross calorific value (Kcal/kg)	3500
	Ultimate Analysis (% by weight)	
1	Carbon	35.87
2	Hydrogen	2.66
3	Sulphur	0.60
4	Nitrogen	0.72
5	Oxygen (by diff.)	7.85
6	Moisture	10.0
7	Ash	42.30
8	Grind ability Index (HGI)	50

Signature of Bidder	Company's Round Seal	Date:	Place:

(viii) Basic parameters to be considered for designing of FGD:

Sr. No	Description	Design Point	Guarantee Point
1	Boiler Load in MW	BMCR	500
2	Type of Fuel	Worst Coal	Worst Coal
3	Ambient Conditions		
a	Temperature, Deg C.	45	27
b	Relative humidity, %	60	60
4	Fuel Flow, T/hr	347	318
5	Flue gas flow at ID Fan Outlet, Nm ³ /sec (Wet)	582	517
6	Flue Gas Temperature, Deg C.	150	135
7	Flue Gas Composition at ID Fan Outlet		
a	SO ₂ , % v/v wet	0.069	0.072
b	Moisture, % v/v wet	12.275	9.195
c	CO ₂ , % v/v wet	11.011	11.399
d	O ₂ , % v/v wet	5.844	6.049
e	N ₂ , % v/v wet	70.801	73.285
8	Dust concentration, mg/Nm ³	<200	<80
9	Inlet SO ₂ Concentration, mg/Nm ³ (Wet)	1983.40	2051.42
10	Outlet SO ₂ Concentration mg/Nm ³ (Dry) at 6% O ₂	<200	<200
11	HCL	45 (ppm)-wet	
12	HF	12 (ppm)-wet	

The Flue gas desulphurization (FGD) system shall also be design to achieve SO₂ emission of less than 200 mg/Nm³ (6% O₂ dry) for the range of loads at different operation conditions.

(B) Sikka TPS Unit No: 3 & 4

(i) Site Condition:

Sr. No.	Description	Parameter
1	Design Temperature of ambient air	45 Deg. C
2	Relative Humidity	60 %
3	Seismic force as per IS: 1893 -2002	Zone IV
4	Plant location from MSL	10.5 mtr

Signature of Bidder	Company's Round Seal	Date:	Place:

(ii) Boiler Parameters:

Sr. No.	Description	Parameter
1	Location	semi outdoor type
2	Operation	Base Load
3	Type	Pulverized coal fired, Balance draft, Wet Bottom
4	Boiler Maximum Continuous rating (BMCR)	865 TPH
5	Steam Pressure at SH outlet	155 kg/cm ²
6	Steam temperature at SH outlet	540+/- 5 Deg C
7	Steam temperature at RH outlet	540 Deg C
8	Oil for startup & flam stability	LDO/HFO
9	Fuel oil system sizing (LDO/HFO)	LDO – 1175 Kg/hr per gun HFO – 1646 Kg/hr per gun LDO - 7.5 % MCR heat input & total 7.5% MCR per elevation. HFO -7.5 % MCR heat input per elevation, 30 % MCR total in 3 elevations.
10	Pulverized coal size	Input coal size: <25 mm. Pulverized Coal fineness : 70% thru 200 mesh
11	Type of polarizers	Vertical Spindle, Bowl Mills (XRP - 803) Mill Capacity: 34T/Hr.
12	Nos of Air heaters	02 Nos (Model: Tri-sector 31.5 VIMT 2000)
13	Nos of ID fans	02 Nos (Radial Fan, Model: NDZV 33, SIDOR) (Performance curve is attached)
14	Availability of sweet water margin as per MoEF norms for wet limestone based FGD	150 m ³ /hr

(iii) Compressor:

Sr. No.	Description	Parameter
1	Type	Oil-free, dry screw type, water cooled, horizontal, skid mounted, two (2) stage, rotary screw compressors
2	No. of compressor	3 x 50% -- Instrument air compressor Capacity: 25 Nm ³ /min at pressure 8.0 Kg/cm ² 3 x 50% -- Service air compressor Capacity: 25 Nm ³ /min at pressure 8.0 Kg/cm ²
3	Air receiver	8 No each (Capacity 10 M3)

Signature of Bidder	Company's Round Seal	Date:	Place:

Sr. No.	Description	Parameter
4	Air Drier Unit	Three (3) nos. [2W + 1S] HOC type & capacity : 35 Nm ³ /min

(iv) Design Data of ESP:

Sr. No.	Description	Parameter
1	Location	Downstream side of APH
2	Operation	Base Load
3	Type	Rigid discharge frame
4	Rapping	Intermittent
5	Type of ESP	FAA – 6x37.5M – 2x96135 - 2
6	Gas flow rate to ESP, m ³ /sec	491.5 m ³ /Sec
7	Gas Temperature, Degree Centigrade	150 Deg. C
8	Outlet dust concentration,	100 mg/Nm ³

(v) Clarifier water analysis:

SWEET WATER ANALYSIS (NARMADA RIVER) FOR STPS			
SR. NO.	PARAMETERS	UNIT	RESULTS
1	Conductivity	Micromho/cm	516
2	PH	Unit	8.04
3	P-Alkalinity as CaCO ₃	ppm	0
4	M.O-Alkalinity as CaCO ₃	ppm	122
5	Chloride as Cl	ppm	54
6	Total Hardness as CaCO ₃	ppm	144
7	Calcium Hardness as CaCO ₃	ppm	76
8	Magnesium Hardness as CaCO ₃	ppm	68
9	Silica as SiO ₂	ppm	18
10	Sulphate as SO ₄	ppm	14
11	Turbidity	NTU	14
12	Total Dissolve Salt(T.D.S)	PPM	294.7
13	Temperature	Deg C	Ambient
14	Pressure	Kg/cm ²	5

(vi) Coal properties:

Sr. No.	Parameters	Design Coal (Imported)
		Worst Coal
	Proximate Analysis (% by weight)	
1	Fixed Carbon	24.43%
2	Volatile Matter	40.71%

Signature of Bidder	Company's Round Seal	Date:	Place:

3	Moisture	24%
4	Ash	10.86%
5	Gross calorific value (Kcal/kg)	5000
Ultimate Analysis (% by weight)		
1	Carbon	48.64%
2	Hydrogen	4.24 %
3	Sulphur	0.60%
4	Nitrogen	0.99%
5	Oxygen (By Diff.)	10.77 %
6	Moisture	24%
7	Ash	10.76%
8	Grind ability Index (HGI)	40

(vii) Basic Parameters to be considered for designing of FGD:

Sr. No	Description	Design Point	Guarantee Point
1	Boiler Load	BMCR	250
2	Type of Fuel	Worst Coal	Worst Coal
3	Ambient Conditions		
a	Temperature, Deg C.	45	27
b	Relative humidity, %	60	60
4	Fuel Flow, T/hr	130.4	120.3
5	Flue gas flow at ID Fan Outlet, Nm ³ /sec (Wet)	312	279
6	Flue Gas Temperature, Deg C.	150	140
7	Flue Gas Composition at ID Fan Outlet		
a	SO ₂ , % v/v wet	0.049	0.050
b	Moisture, % v/v wet	14.168	11.209
c	CO ₂ , % v/v wet	10.486	10.848
d	O ₂ , % v/v wet	5.741	5.939
e	N ₂ , % v/v wet	69.556	71.954
8	Dust concentration, mg/Nm ³ Dry Basis	<200	<80
9	Inlet SO ₂ Concentration, mg/Nm ³ (Wet)	1390.82	1437.95
10	Outlet SO ₂ Concentration mg/Nm ³ (Dry) at 6% O ₂	<200	<200
11	HCL	45 (ppm)-wet	
12	HF	12 (ppm)-wet	

Signature of Bidder	Company's Round Seal	Date:	Place:

The Flue gas desulphurization (FGD) system shall also be design to achieve SO₂ emission of less than 200 mg/Nm³ (6% O₂ dry) for the range of loads at different operation conditions (considering common FGD of two units).

(C) Limestone Characteristics:

Chemical Analysis (% By Mass)			
Sr.no	Description	Unit	Value
1	CaO	%	47-51.0
2	MgO	%	0.9-2.0
3	Fe ₂ O ₃	%	0.45-1.0
4	Al ₂ O ₃	%	1.19-2.1
5	SiO ₂	%	2.1-4.5
6	Mn ₂ O ₃	%	<0.12
7	P ₂ O ₅	%	Traces
8	Cl ₂	%	<0.015
9	Na ₂ O	%	<0.16
10	K ₂ O	%	<0.01
11	TiO ₂	%	<0.02
12	Total Sulphur	%	<0.1
13	LOI		38-41.3
Physical Properties			
14	Bond Index	KWh/t	13
15	Granule Size		Small < (20mm)

Note:

- *Guaranteed parameters shall be based on available (reactive) CaCO₃ content of 89%. The design of Flue gas desulphurization system & auxiliaries shall be based on available (reactive) CaCO₃ content of 79%.
- For the purpose of sizing of equipment and guarantee, MgCO₃ shall be considered as un-reactive dolomitic form.
- For the purpose of volumetric computations of limestone handling & storage system the bulk density of limestone shall be taken as 1400 Kg/m³. However for torque, drive & structural load requirements the density of limestone shall be taken as 1700 kg/M³ for the calculation of limestone slurry, the density of limestone shall be taken as 2700 Kg/m³
- For gypsum, the bulk density shall be taken as 900 kg/m³ for volumetric computation and 1250 Kg/m³ for torque, drive & structural load requirements. For density calculation of Gypsum slurry density of Gypsum shall be taken as 2500 Kg/m³.

Signature of Bidder	Company's Round Seal	Date:	Place:

(D) Properties of FO:

Sr No.	Parameter	Unit	Value
1	Acidity, Inorganic	Mg KOH/gm	Nil
2	Ash	% by mass	0.04
3	Gross CV	Cal/g	10350
4	Relative Density@15 deg C	g/ml	0.9600
5	Flash Point	Deg C	75
6	Kinematic Viscosity at 50 deg C	cSt	175
7	Sediment	% by mass	0.02
8	Sulphur	% by mass	3.2
9	Water Content	% by Volume	<0.05
10	Pout Point	Deg C	+6

(E) Properties of LDO:

Sr No.	Parameter	Unit	Value
1	Acidity, Inorganic	Mg KOH/gm	Nil
2	Ash	% by mass	0.01
3	Gross CV	Cal/g	
4	Relative Density@15 deg C	Kg/m3	855
5	Flash Point	Deg C	74
6	Kinematic Viscosity at 40 deg C	cSt	5
7	Sediment	% by mass	0.04
8	Sulphur	% by mass	1.2
9	Water Content	% by Volume	<0.05
10	Pout Point	Deg C	-3
11	Ramsbottom Carbon Residue (RCR)	% by mass	1.30

(F) Soil Bearing Capacity:

Documents for Soil bearing capacities for Ukai & Sikka Thermal Power Station are given Appendix-R.

Note: Soil bearing capacity mentioned, which is meant to indicate kind of soil condition site may have. Contractor is requested to carry out detailed Geotechnical investigation to ascertain soil parameters of the proposed site for the use of planning / designing / construction.

(G) Drawings for vendor's information:

Plot plan of all the both sites and available drawings are attached in this tender bid documents at Appendix-R.

Signature of Bidder	Company's Round Seal	Date:	Place:

4.0 Scope of Supplies and Works/Services:

(A) General Scope / Options for FGD System:

The scope of work for the FGD System, equipment and accessories to be furnished in accordance with this specification shall include design, engineering, manufacturing, inspection and testing at supplier's works, packing forwarding to site unloading, pre-assembly, assembly erection, supervision, pre-commissioning, trial operation, testing and commissioning and performance testing of the equipment / system for FGD system.

The SO₂ level of existing plant needs to be brought down within MOEF norms as mentioned in guaranteed parameter from the present operating emission level. Bidder to visit the site for the checking the feasibility of FGD system in available space and to collect all required data for FGD system. Bidder has to propose Wet Limestone based FGD system only.

The scope of the proposal for Engineering, Supply, Construction, Erection, Testing & Commissioning works of Flue Gas Desulphurization (FGD) System Package for GSECL 500 MW UTPS # 6 and 2x250 MW STPS # 3&4 shall be on the basis of a single point responsibility, completely covering the following activities and services in respect of all the equipment specified and covered under the specifications.

Any item or works though specifically not mentioned in this specification but needed to complete equipment & systems within the scope of FGD system to meet the objective of the specification shall also be furnished.

- a) Basic Engineering of the plant including preparation of Plant Definition Manuals;
- b) Detailed design of all the equipment and system(s) including civil, structure steel works included in bidder's scope.
- c) Providing engineering drawings, equipment sizing & performance data, instruction manuals, as built drawings and other information.
- d) Compliance with statutory requirements and obtaining clearances/approvals from statutory authorities, wherever required.
- e) Complete manufacturing including shop testing/type testing.
- f) Complete Civil, Structural and Architectural works, including survey, providing construction offices, field laboratory and construction equipment.
- g) Packing and transportation from the manufacturer's works to the site including customs clearance & port clearance, port charges, if any.
- h) Receipt, storage, preservation, handling and conservation of equipment at the site.
- i) Fabrication, pre-assembly, if any (in available space), erection, testing,

Signature of Bidder	Company's Round Seal	Date:	Place:

commissioning and completion of facilities including putting into satisfactory operation all the equipment including successful completion of initial operation.

- j) Reliability tests, performance and guarantee tests after successful completion of facilities.
- k) Supply of spares on FOR site basis.
- l) Reconciliation with customs authorities, as required.
- m) Satisfactory conclusion of the contract.
- n) Insurance and other requirements for the complete FGD package in accordance with the provisions of general conditions of contract (Section-III) of the bidding document.
- o) Front end loader / Pay loader / Dozer is required for loading of limestone from storage area to limestone feeding system of FGD, then same is to consider by bidder in their scope of supply. Bidder to consider 02 Nos (01 working + 01 Standby) of adequate size Front-end loader/ Pay Loader / Drozer for each site. Capacity and size will be decided during detailed engineering to meet the system requirement.

The Contractor shall be responsible for providing all material, equipment and service, which are required to fulfill the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. It is not the intent to specify completely herein, all aspects of design and construction of equipment, nevertheless, the equipment shall conform in all aspects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to the Employer, who will interpret the meaning of the specification, drawings and shall have a right to reject or accept any work or material which in his assessment is not complete to meet the requirements of this specification and/or applicable international standards mentioned elsewhere in the specification.

Bidders are requested to carefully examine and understand the specifications and seek clarifications, if required, to ensure that they have understood the specification. The Bidder's offer should not carry any sections like clarifications, interpretations and/or assumptions. In the event of conflict between the Technical Specifications and the Conditions of Contract, the requirements as indicated in the technical specification shall govern, unless confirmed otherwise by the Employer in writing before the award of this contract, based on a written request from the Bidder for such a clarification. However, if the Bidder feels that, in his opinion, certain features brought out in his offer are superior to what has been specified, these may be highlighted separately.

The Bidder may also make alternate offers provided, such offers are superior in his opinion, to the requirements of these specifications in which case,

Signature of Bidder	Company's Round Seal	Date:	Place:

adequate technical information, operating feedback, etc., are to be enclosed with the offer, to enable the Employer to assess the superiority and reliability of the alternatives offered. In case of each alternative offer, its implications on the performance, guaranteed efficiency, auxiliary power consumption etc., shall be clearly brought out for the Employer to make an overall assessment. In any case, the base offer shall necessarily be in line with the specifications. Under no circumstances the specified equipment and services shall be brought out as an alternative offer.

In case, all the above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.

(B) Major auxiliaries:

The following are the equipment's covered in this specification:

Flue gas desulphurization (FGD) system, capable of reducing to the specified limits the emissions of Sulphur Dioxide in flue gas produced by specified coal being fired in boiler, complete with all accessories and auxiliary equipment's as per specification requirements including Absorber for each unit with Slurry re-circulation pumps & Oxidation blowers, common Limestone Grinding system, common Gypsum dewatering system, Booster fan, new wet stack etc. for Wet Limestone based FGD.

Buildings for any pumps/Oxidation blowers, Limestone Grinding System, Gypsum dewatering system & FGD control Room etc and consider elevator for each structure having height more than 15 mtr.

All motors (energy efficient motors only), HT & LT Switchgears, DC System, Transformers, Electrical Actuators, HT & LT power & control cables, DG set (if applicable), cabling, lighting etc.

Associated Control & Instrumentation (C&I) equipment.

Associated Civil, Structural and Architectural works including foundation as specified in Technical Specification.

Wherever a material or article is specified or described by the name of a particular brand, manufacturer or vendor, the specific items mentioned shall be understood to be descriptive only and not restrictive. Such description indicates the equipment type, function and quality desired. Other manufacturer's products may be considered provided sufficient information so as to enable the Employer to determine that the products proposed are equivalent to those named.

Signature of Bidder	Company's Round Seal	Date:	Place:

(C) Additional Requirement:

- a. Before submitting his bid, the Bidder should inspect and examine the site and its surroundings and should satisfy himself as to the nature of the ground and subsoil, the quantities and nature of work, materials necessary for completion of the work and their availability, means of access to site and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his offer. No consequent extra claims on any misunderstanding or otherwise shall be allowed by the Employer.
- b. Bidder shall take all necessary precautions to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to the activities of the contractor on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be immediately made good by the contractor at his own cost to the satisfaction of the Employer. The contractor shall also take all necessary safety measures with specific reference to excavation in rock, at his own cost, to avoid any harm or injury to his workers and staff from the equipment and facilities of the power plant.
- c. For his site office and covered store buildings, the contractor shall adopt pre-engineered / pre-fabricated constructions made of steel with single / double skin, insulated or un-insulated roof and wall coverings (fabricated out of permanently color coated metal sheets). Alternatively, contractor can adopt readymade 'Porta cabin' or similar construction. Contractor shall ensure that all such constructions are well engineered, neatly constructed and overall present a pleasing look.
- d. Contractor shall establish/set up at site suitable repair facilities for construction plant, equipment and machinery (like piling rigs, cranes batching plant, dewatering pumps etc.) In case of piling rigs, cranes, batching plant etc. he will also make arrangements / tie up with equipment manufacturers / suppliers for periodic overhaul/maintenance and for major breakdown, if any. He shall also keep adequate stock of spares at site for various plant, equipment and machinery to meet day to day requirements as recommended by the equipment manufacturer/suppliers or as instructed by the Engineer. Contractor shall deploy dedicated qualified, full time mechanical / electrical foreman/supervisors for manning the repair facilities as specified above.
- e. Supply of Mandatory spares pertaining to the respective option opted as detailed separately in technical specification.
- f. Supply of the required commissioning spares, materials.

Signature of Bidder	Company's Round Seal	Date:	Place:

- g. Services like dismantling / repair / overhaul / retrofitting of various other components / systems / sub-systems as may be required, to ensure sustained, safe commercial operation, and to meet stipulated design / performance guarantee requirements and to meet the overall objectives of FGD system.
- h. The scope of Bidder shall also include supply of all the required materials, Services / works involved and Civil works for removal and restoration of all fouling, obstructions etc for FGD system. Bidder is required to visit the site and assess all the fouling, obstructions etc which can be foreseen for completion of FGD system. All such works are to be completed within the scheduled time period. Any unforeseen fouling, obstructions etc. whatsoever encountered during the execution of the contract is to be removed and restored without any time and cost implication to GSECL. Bidder has to quote the bid accordingly.

(D) Scope of Supply & Erection work for FGD system:

The scope of supply & services is detailed out in the following Sections.

Section	Description	Total pages
Section-VII	Scope of work for Civil works	328-728
Section-VIII	Scope of work for Mechanical equipment and associated system	729-787
Section-IX	Scope of work for Electrical system	788-907
Section-X	Scope of work for Control & Instrumentation system	907-978
Section-XI	Scope of work for Comprehensive operation and Maintenance	979-997

(E) OTHER ITEMS INCLUDED IN THE CONTRACTOR'S SCOPE OF SUPPLY ARE AS UNDER:

(a) Tests:

The scope of the Bidder includes all shop tests, type tests, site tests, routine tests, etc., fulfillment of complete quality assurance & inspection requirements and related activities for all the equipment & systems covered under the scope of work of Bidder as per the stipulations of Technical Specifications.

(b) Special Tools & Tackles and Test / Measuring Equipment:

One set of all special tools and tackles including testing, calibrating and measuring instruments required for erection, assembly, disassembly and maintenance of all equipment / systems covered under the scope of the Contractor shall be supplied by the Contractor. These shall not be used for

Signature of Bidder	Company's Round Seal	Date:	Place:

erection/commissioning purposes and shall be in an unused and new condition, when they are handed over to the Employer. A list of such special tools and tackles shall be submitted along with the offer.

Supply of all instrumentation measuring devices etc. (both test grades as well as standard) needed for conductance of demonstration / commissioning/performance guarantee tests. The instrumentation specifically brought by the contractor for the purpose of various PG testing alone, can be taken back by the contractor after conductance of the PG tests.

(c) Spare parts:

The Contractor's scope of supply includes all the necessary commissioning spares & mandatory spares. The Employer reserves the right to finalize the exact quantities of the spare parts and effect price adjustment on the basis of the rates quoted by the Contractor. The Spare ordered by Employer shall be delivered at the site as per agreed delivery schedule.

(d) Mandatory spares:

The Bidder shall indicate the prices for each & every item (except for items not applicable to the Bidder's design) in the 'Schedule of mandatory spares' whether or not he considers it necessary for the Employer to have such spares. If the Bidder fails to comply with the above or fails to quote the price of any spares items, the cost of such spars shall be deemed to be included in the contract price. The Bidder shall furnish the population per unit of each item. Wherever sets are mentioned, the Bidder has to give the item details & prices of each item

(e) Recommended Spares:

In addition to the spares mentioned above, the Bidder shall also indicate in the 'Schedule of recommended list of spare parts', his recommended list of spare with unit prices, for three years of normal operation of the plant. The Employer reserves the right to buy any or all of the recommended spare parts. The Bidder shall also indicate the service expectancy period for the spare parts under normal operating conditions before the replacement is necessary. In case some of the spares parts become un applicable due to change in design/engineering agreed by the Employer, the Employer reserves the right to procure some other spares whose prices are already available in the initial offer in lieu of such not applicable spares subject to the condition that the total amount of the initial order remains the same.

(f) Commissioning Spares:

It will be the responsibility of the Contractor to assess and furnish a list of all commissioning spars required for successful commissioning of

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all the equipment covered under the contract. Such a list shall be furnished by the Contractor within 4 months from the date of LOI, separately for each equipment and shall be reviewed by GSECL and discussed for mutual agreement. The commissioning spares will be so identified as not to allow the Initial operation to suffer for want of such commissioning spares. The identification of commissioning spares will not in any way relieve the Contractor of any of his responsibilities of satisfactory performance under the provisions of other conditions of contract. All the commissioning spares shall be deemed to be included in scope of the Contractor as a part of the respective equipment package at no extra cost to the Employer.

(g) Packing & Preservations:

Each spare part shall be clearly marked or labeled on the outside of the packing with its description. When more than one spare part is packaged in a single case, a general description of the contents shall be shown on the outside of such a case and other packages must be suitably marked and numbered for the purpose of identification. All cases, containers or packages, are liable to be opened for such examination as may be considered reasonable by the Engineer. In case of equipment supplied with grease/lubricants from imported origin, the supplier shall clearly indicate the indigenous equivalent of the grease/lubricant and source of supply so as to enable the Employer to procure these items from indigenous sources.

(h) First Fill of consumables , Oils & lubricants:

All the first fill and one year's topping requirements of consumable such as grease, oil, lubricants servo fluids etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning/initial operation and to establish completion to facilities shall be furnished by the Contractor, unless specifically excluded under the Exclusions in these specifications and documents.

(i) Paints / Painting:

The Contractor's scope of work includes supply of paints and painting of all equipment and structures which are supplied as per the Employer's standard color coding scheme which shall be furnished to the Contractor during detail engineering stage. The quality and finish of paints shall be as per standards of BIS or equivalent.

- (j)** Any other equipment / system / consumables not covered above but required for the completeness of the specified equipment and services shall also be furnished unless specifically brought out under exclusion therein.

(k) SCOPE OF SERVICES:

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- (1) The scope of services to be provided by the Contractor shall include conductance of all such activities as required to meet the targeted objective and the intent of this specification in totality. The scope shall generally cover, but will not be limited to following:

The scope of services of the Contractor includes complete design and engineering, technical co-ordination (including participation and arranging technical co-ordination meetings), finalization of drawings/documents, submission of engineering drawing/documents and processing of their approvals by the Employer as detailed elsewhere in the technical specification.

Further, the scope shall also include submission, in proper shape & format, of all types of manuals, handbooks & documents in requisite numbers to the Employer at different phases of the project as per the requirement of Employer. Bidder shall furnish all relevant data required by the Employer, at interface points.

The erection requirements and procedures to be followed during the installation of the equipment shall be in accordance with the relevant Indian Boiler Regulations, ASME codes and accepted good engineering practice, the Engineer's Drawings and other applicable Indian recognized codes and laws and regulations of the Government of India.

(2) Pre-commissioning and Commissioning Activities

- (i) Contractor's Scope shall include all pre-commissioning and commissioning activities, required for successful performance of all equipment and systems under this package. Contractor's scope shall also include supply of all materials and services for successful conductance of pre-commissioning and commissioning activities:
- (ii) Complete pre-commissioning work including tests of facilities and all other tests as mutually agreed in the Contractor's quality assurance program.
- (iii) Commissioning and initial operation of the facilities.
- (iv) Supply of all temporary equipment such as piping including supports, valves, blowers and all necessary instrumentation for successful conductance of pre-commissioning and commissioning activities. All temporary equipment, blowers, valves etc. brought to sites, by the Contractor for pre-commissioning / commissioning purpose shall be in good working condition to ensure its safe and reliable operation at site. All such temporary equipment /

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components shall be brought to site at least three (3) months prior to commencement of relevant pre-commissioning/ commissioning activities. On receipt of the temporary equipment / components at site, the same shall be inspected by the Employer to ensure its safe and reliable operation and if in the opinion of the Employer the temporary equipment / components are not in satisfactory conditions to ensure it's safe and reliable operation the same shall be immediately replaced by the Contractor.

- (v) The temporary equipment specifically brought by the Contractor solely for the pre- commissioning and commissioning work shall on completion of these activities, remain the property of the Contractor.
- (vi) The selection of material of all the temporary equipment / instruments shall be compatible with the service conditions expected during pre-commissioning/ commissioning activities.
- (vii) All temporary equipment and instruments shall be clearly listed out in the bid.
- (viii) Supply of all labor, skilled/ semi-skilled supervisors, engineers and any other manpower.
- (ix) The scope of Contractor shall also include necessary approach & Platforms for all the instruments required during commissioning and testing. These approach platforms shall be provided to meet all required safety norms and these shall be permanent nature.

(3) Guarantee Tests:

The Guarantee tests for various equipment and systems shall be carried out as specified under separate sub-section of the tender bid documents. All special equipment, tools and tackles, instruments, measuring devices required for the successful conductance of Guarantee Tests shall be provided by the Contractor, free of cost. All costs associated with the tests shall be included in bid price.

5.0 FACILITIES TO BE PROVIDED BY GSECL:

- (a) The contractor shall submit GSECL within 3 weeks from the date of letter of award about his electrical power requirements, to allow the planning of the same by GSECL. The L.T. / H.T. electric power will be made available at single point. Further extension will have to be carried out by the contractor as per requirement at their cost. The necessary charges will be recovered as per the tariff rate of Dakshin Gujarat Vij Company Limited (DGVCL) / Paschim Gujarat Vij Company Limited (PGVCL) from time to time.

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Power supply for labour and staff colony shall be provided at one point and Contractor shall be charged at rates as referred above.

- (b) Free Supply of Service Water will be made available for construction and drinking purposes as a single point at works site to be decided by GSECL.
- (c) Free Supply of Service air shall be provided at one nearest available point.
- (d) GSECL will provide unfurnished bachelor quarter / hostel to contractor, if available, after meeting the requirement of GSECL's staff. The contractor shall have to pay the rent of the quarter / hostel as per GSECL's rule.

The contractor shall advise GSECL within 3 weeks from the date of letter of award about his exact requirement of space for his office, storage area, pre-assembly and fabrication areas, etc. Above requirements shall be reviewed by GSECL's Engineer and the space as decided by GSECL will be allotted to the Contractors for construction of his temporary structures, facilities like offices, storage sheds, pre-assembly and fabrication areas etc. for contractor's as well as his sub-contractors use.

Land for staff and labour colony shall not be provided by GSECL and Contractor has to make his own arrangement for the same at his own cost.

- (e) All the tools and tackles including Cranes / loading - unloading arrangements/ any other special tools and tackles shall have to be arranged by bidder at their own cost. However, as a backup services, facilities of EOT crane along with operator may be provided on chargeable basis by GSECL at his discretion depending upon the availability of the same, if required during execution of work. However, as GSECL is purely generating company, it does not have any facility for huge / large scale erection works.

The contractor shall have no claims, whatsoever in case of non-availability of the construction equipment being provided by GSECL as back up service and the work shall be carried out by the Contractor as per Schedule.

- (f) Area lighting shall be provided by GSECL as per its own scheme. However, any additional lighting required for the safe execution of the work shall be arranged by the Contractor. Any damage caused due to inadequate lighting shall be made good by the Contractor at his own Cost.
- (g) Oil / lubricants / grease etc including flushing oil required for initial filling will be in the scope of bidder. GSECL shall provide workshop facilities at site, as available, on chargeable basis.
- (h) Repairs / replacement of materials / equipment arising due to damages/ pilferages during transit / storage / erection / commissioning shall be arranged by the contractor well in time to ensure timely completion of the work.
- (i) All the supervisory staff, including necessary skilled, semi-skilled, and unskilled labours required for the work shall be provided by contractor at his own cost.

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- (j) The general purpose tools & tackles, all testing equipment, instruments, etc. required for testing, erection and commissioning of work will be provided by the contractor at his own cost.
- (k) On completion of erection, the same shall be thoroughly inspected by both parties for correctness and completeness and acceptability for pre commissioning test at site.
- (l) On conclusion of satisfactory pre-commissioning tests, the test operation of such plant shall start.
- (m) The medical facilities to the contractor's personnel shall be provided on chargeable basis at the GSECL Hospital.
- (n) The contractor shall provide all the consumable during the erection, testing and commissioning of the plant/ equipment.
- (o) The contractor shall be responsible for the necessary periodic testing, inspection during erection and commissioning of the equipment and shall carry out the work to meet the specific requirements of the relevant statutory regulations as necessary. All fees, charges etc. payable to statutory authorities for carrying out such test shall be borne by the contractor.

6.0 CONTRACTOR'S GENERAL RESPONSIBILITY:

(A) Bidder/contractor shall have to bear following responsibility based on activities involved:

- (a) Bidder has to carry out design , engineering, preparation of drawings / calculations / erections and Commissioning procedures/ PG Test etc. of all the systems /equipment / activities involved in the FGD system.
- (b) The contractor shall supply all the required materials and carry out the works of FGD system to meet GSECL's intent of specification and also provide all construction and transport equipment, tools, tackle, consumables, materials, labour and supervision required for unloading / loading, storing, proper preservation, dismantling and erection of structural steel work and equipment. If necessary suitable temporary approach roads, culverts or slabs over trenches shall be built for transportation and positioning of cranes.
- (c) Unloading, checking, moving to storage yard of site and storing including prompt attendance to all insurance matters as necessary for all components arriving at site. The contractor shall pay all demurrage and / or wharfage charges etc., on account of default on his part.

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- (d) Dismantling works include weighing of the dismantled materials at respective power station Weigh Bridge and transportation to respective power station's scrap yard inside plant premises.
 - (e) Erection work includes handling at site stores / storage yard, shifting to erection location, erection, providing temporary supports, alignment, welding and testing as per standard methods and specification / drawings / FQP. If necessary suitable temporary approach roads or slabs over trenches shall be placed for transportation of fabricated materials to erection location.
 - (f) Erection of new pipe rack and pipes if required during alteration/erection.
 - (g) Transportation of all fabricated pipe rack structures, pipes and other materials to erection location, handling, rigging, assembling, bolting, welding and satisfactory installation of new pipe rack and pipes in proper location according to approved layout / approved erection drawings and/or as directed by the Engineer in Charge.
 - (h) Dismantling / Retrofitting / Replacement of existing pipe and pipe rack (for fuel oil, water, steam, bottom ash etc.) and any fouling to facilitate erection if required. Safety precautions are to be taken to avoid fire hazard.
 - (i) Modification of flue gas outlet duct and support structures to connect the FGD system with existing plant. Required temporary / permanent supports to be provided.
 - (j) Rerouting of Fire hydrant / other pipe lines etc. which are required to be shifted due to erection of FGD system.
 - (k) Aligning, plumbing, leveling, bolting, welding and securely fixing the fabricated steel structures and equipment in accordance with the drawings or as directed by the Engineer.
 - (l) Painting as per specification / instructions of exposed surfaces of all the FGD structure with equipment and piping.
- (B) Bidder/contractor shall also be responsible for the following, based on activities involved:**
- (a) Loading / Unloading of FGD system components with connected ducts, cables, cable Trays, Electrical panels, all accessories and miscellaneous equipment including insulation & any other materials required for erection from Railway Wagons / Trailers / Lorries at the Railway Siding / Railway Station / Transport Godown, Re-loading at Siding / Godown and

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transportation to storage yard / work site using Contractor's own cranes, tractors, trucks, lorries, trailers and other unloading and transporting equipment (having valid permits for their operation) unloading at storage yard and stacking, handling at storage yard for verification and restacking after verification shall be the responsibility of the contractor under this contract.

- (b) It would be responsibility of the contractor to keep in contact with the GSECL authorities at site to find out the arrival of the consignment. The Railway receipt / Lorry Way Bill / Truck Way Bills for the consignments shall be furnished by the Contractor immediately on receipt.
- (c) The Contractor is required to find out from Transport authorities regarding arrival of consignment prior to the receipt of consignment note.
- (d) Payment of all demurrages / wharfages that results due to Contractor's fault would be the responsibility of the Contractor and to his account. If GSECL have to make payment of demurrage / wharfage together with the freight, the amounts so paid as demurrages / wharfage for the reasons stated above shall be paid by the Contractor forthwith or would be recovered from the bills of the Contractor.
- (e) It would be the responsibility of the Contractor to examine the packages, consignments etc., on arrival and bring to the notice of transport Authorities and GSECL Authorities regarding loss / damages, if any, observed in the consignments proposed to be taken delivery of. Before taking delivery, particularly of consignments in "smalls" the weight of the package shall be checked with the invoiced weight of the packages and any discrepancies shall be reported immediately to GSECL / Transport Authorities. In case it becomes necessary to take open delivery from the authorities, Contractor should make all arrangements for taking open deliveries. All expenses connected there with shall be to the account of the Contractor. Any loss that may accrue to GSECL on account of such failures shall be debited to the Contractor's account and recovery affected from his progress bills.
- (f) Any discrepancy / shortage / damage found in the consignment after taking delivery from the carriers after giving clear receipt would be the responsibility of the Contractor and the amount liable to be lost by GSECL on such account is recoverable from the Contractor.
- (g) In case of apparent damages / shortages to / in consignments / packing noticed by the Contractor, such cases shall be brought to the notice of GSECL and cleared only with their knowledge / approval.

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- (h) CONSIGNMENTS coming on Sundays and holidays are also required to be handled by the Contractor. Since the offices and godowns will probably remain closed on these days it will be the responsibility of the Contractor to contact the site Engineer / his authorized representative of GSECL at their residence and obtain instructions.
- (i) GSECL reserves the right to recover from the Contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other causes during transit from the godowns of any lorry depot and GSECL Stores or during unloading at lorry head or during stacking or any time in the custody of the Contractor.
- (j) The Contractor shall make suitable security arrangements including employment of Security personnel (round the clock) to ensure the protection of all materials / equipment and works from theft, fire, pilferage and any other damage and loss at stores / Storage yards till the contract is getting over. The contractor will be responsible for receipt and issue of materials and will maintain proper records. The materials shall be accounted properly by the contractor on completion of contract.
- (k) Unloading from Transport equipment, re-loading and transportation, unloading at storage area of heavy / sophisticated equipment like motors, bearings, electrical panels etc., shall be done in the presence of and as per the direction of GSECL's representative, including stacking and restacking if necessity arises.
- (l) Since the Consignments are expected to arrive during any time of the day, contractor shall have his workmen round the clock at site as well other places required to unload the materials. Contractor's quoted rate shall include all such contingencies.
- (m) Under the scope of this contract, it shall be the responsibility of the Contractor to provide facilities to open the package in the presence of GSECL Engineers, verifying the same, re-packing wherever and whenever necessary, properly stacking them as may be directed by GSECL so as to facilitate proper handling and verification.
- (n) The required bush clearing, filling, drainage etc. to facilitate access to materials in the storage area etc. shall be carried out by the Contractor at his own cost as directed by the Engineer.
- (o) FGD components designated for covered storage, field connection materials, motors, equipment, paint, cement etc., shall be stored on well-designed racks and platforms off the ground.

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- (p) All the materials shall be stored 6" above the ground level using concrete or wooden sleepers or wooden logs. No material shall be allowed to remain on ground at any time. Materials shall not be stacked in low lying areas, where it is likely to get flooded during rain. Wooden / concrete sleepers and tarpaulins wherever deemed necessary, shall be provided by the Contractor at his own cost.
- (q) Stacking of the materials shall be done as per the instruction and to the satisfaction of GSECL Engineers. The materials shall be so stacked that it should facilitate easy handling during erection. In case any negligence or improper stacking is noticed, it shall be the responsibility of the Contractor to re-stack at his cost. Failure to do so may force GSECL to get the job done through other agencies and recover the cost from the Contractor. The stacking should be done in such a way not to cause damage to the materials. On occurrence of damages, the tender should rectify the defect at his own cost.
- (r) The necessary lifting tackles, tools, wire rope slings of suitable capacities and other equipment incidental to carry out this work shall have to be arranged by the Contractor himself.
- (s) The stores shall be handled with care and diligence. Any loss to GSECL due to Contractor's lapse shall have to be made good by the Contractor.
- (t) If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road, kerbs, fence, enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees or any other property belonging to GSECL or their client or to any part of erected equipment, stores components etc., the Contractor shall make good the same at his own expense or in default, the site Engineer may cause the same to be made good by other workmen or by other means and deduct the expense (of which the site Engineer's decision is final) from any sums that may be then or at any time thereafter become due to the Contractor or from his security Deposit or any other money due.
- (u) GSECL will carry out periodic stock verification of materials with respect to receipt and issue records. The tenderer should make available all records in proper form, for easy verification by GSECL officials.
- (v) The contractor should note that all damages / shortages etc., in the lorry way bill / RRs while receipt of materials. Any damages observed on the materials subsequently that are not noted on the LWBs / RRs will be deemed to have been occurred during unloading and stacking of materials and the tenderer shall rectify the damages at his cost and risk.

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7.0 TERMINAL POINTS AND EXCLUSIONS :

(A) TERMINAL POINTS :

a. For UTPS:

Sr. No.	Description	Terminal point (as per tender)
1	Raw Flue gas	Tapping from existing flue gas duct of both the pass after ID fan outlet damper/gate.
2	Clean flue gas	Flue gas Discharge to new chimney (150 mtr height), including construction of new chimney.
3	Clarified water	For APH wash pump line below APH.
4	CW blow down	From CD blow-down line behind ESP. Quantity: 70 M3/hr Bidder to consider booster pump for intake of CW blow down to process water tank.
5	Service water	At single point near DS pump house.
6	Potable water	At single point near DS pump house.
7	Waste water	Considered PH control and discharge waste water in existing ash slurry sump.
8	Firefighting system	At single point near DS pump house
9	Service air	Consider 2x100% compressor & dryer with 25% margin in required capacity for FGD system
10	Instrument air	Bidder to consider 2x100% compressor & dryer with 25% margin in required capacity for FGD system
11	Limestone handling system	Bidder to provide 07 days limestone storage shed and feeding of limestone from storage shed to limestone handling system is in bidders scope
12	Gypsum handling system	Up to gypsum storage shed having gypsum storage capacity of 05 days.
13	Electrical supply	Tapping from exiting 220KV bus bar main -1 and bus bar main-2 (AIS)
14	Lime dosing for Waste water Neutralization	Considering from lime storage room having capacity of 1 month storage and feeding of lime through bucket conveyer.

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b. For STPS:

Sr. No.	Description	Terminal point
1	Raw Flue gas	Tapping from existing flue gas duct of both the pass after ID fan outlet damper/gate.
2	Clean flue gas	Flue gas Discharge to new chimney (150 mtr height), including construction of new chimney.
3	Clarified water	From clarifier water pump house through APH water washing pump: APH wash pump details are as under: 2x100% Vertical pump continuous duty Flow: 280 m ³ /hr TDH: 95 MWC
5	Service water	At single point near ESP Control room
6	Potable water	At single point near ESP Control room
7	Waste water	Consider PH control and discharge waste water in existing ash slurry sump.
8	Firefighting system	From existing line in FGD area
9	Service air	Tapping from existing compressor house
10	Instrument air	Tapping from existing compressor house
11	Limestone handling system	Bidder to provide 07 days limestone storage shed and feeding of limestone from storage shed to limestone handling system is in bidders scope
12	Gypsum handling system	Up to gypsum storage shed having gypsum storage capacity of 05 days.
13	Electrical supply	From 6.6 KV switchgear with extension of bus.

5 M³/min margin is available in existing compressor at STPS. If additional air is required bidder to consider new air compressor system.

Common Note:

- 1. Whatsoever fouling foreseen and unforeseen of major or minor nature, encountered for subject work is in Bidder's scope. Bidders have to submit their offers accordingly.**
- 2. Bidder should make necessary openings for tapping the un-cleaned gas and terminate the clean gas in new wet chimney. However bidder to make necessary isolation system in existing and new duct for isolation and bypass operation of FGD.**
- 3. GSECL will provide clarified water for FGD system at single point, which is to be used as process water & equipment cooling purpose. Accordingly, Bidder has to consider separate tank for cooling water storage with 2x100% pumps and consume the return hot water in the FGD system. If bidder proposed DMCW for equipment cooling, GSECL will provide only**

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make-up DM water from DM water tank; however the clarified water provided for the process water is used as secondary cooling water and consume in the FGD system.

(B). EXCLUSIONS: Nil

8.0 Mandatory Spares, Start-up and commissioning spares and Recommended spares:

(1) General:

The Bidder shall include in his scope of supply all the necessary Mandatory spares, Start-up and commissioning spares and Recommended spares and indicate these in the relevant schedules of the Bid Forms & Price Schedules. The general requirements pertaining to the supply of these spares are given below:

(A) MANDATORY SPARES :

- a) The list of mandatory spares considered essential by the Employer is indicated in the list enclosed to this Sub-Section. The Bidder shall indicate the prices for each of the item (except for items not applicable to the Bidders design) in the 'Schedule of Mandatory Spares' whether or not the Bidder considers it necessary for the Employer to have such spares. If the Bidder fails to comply with the above or fails to quote the price of any spare item, the cost of such spares shall be deemed to be included in the contract price. The bidder shall furnish the population of each item in the Bid Forms & Price Schedules. Whenever the quantity is mentioned in "sets" the Bidder has to give the item details and prices of each item.
- b) Whenever the quantity is indicated as a percentage, it shall mean percentage of total population of that item in the station (project), unless specifically mentioned otherwise, and the fraction will be rounded off to the next higher whole number. Also one set for the particular equipment. e.g. 'set' of bearings for a pump would include the total number of bearings in a pump. Also the 'set' would include all components required to replace the item; for example, a set of bearings shall include all hardware normally required while replacing the bearings.
- c) The assembly / sub assembly which have different orientation (like left hand, right hand, top or bottom), different direction of rotation or mirror image positioning or any other regions which result in maintaining two different sets of spares to be used for subject assembly / sub-assembly shall be considered as different type of assembly/sub-assembly.

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- d) The Employer reserves the right to buy any or all the mandatory spare parts.
- e) The prices of mandatory spares indicated by the Bidder in the Bid Proposal sheets shall be used for bid evaluation purposes.
- f) All mandatory spares shall be delivered at site at least two months before scheduled date of initial operation of the first unit. However, spares shall not be dispatched before dispatch of corresponding main equipments.
- g) Wherever quantity is specified both as a percentage and a value, the Bidder has to supply the higher quantity until & unless specified otherwise.

(B) RECOMMENDED SPARES :

- a) In addition to the spare parts mentioned above, the Contractor shall also provide a list of recommended spares for 3 years of normal operation of the plant and indicate the list and total prices in relevant schedule of the Bid Forms & Price Schedules. This list shall take into consideration the mandatory spares specified in this Sub-Section and should be independent of the list of the mandatory spares. The Employer reserves the right to buy any or all of the recommended spares. The recommended spares shall be delivered at project site at least two months before the scheduled date of initial operation of unit. However, the spares shall not be dispatched before the dispatch of the main equipment.
- b) Prices of recommended spares will not be used for evaluation of the bids.
- c) The price of these spares will remain valid up to 24 months after placement of Notification of Award for the main equipment. However, the Contractor shall be liable to provide necessary justification for the quoted prices for these spares as desired by the Employer.

(C) START-UP AND COMMISSIONING SPARES :

Start-up & commissioning spares are those spares which may be required during the start-up and commissioning of the equipment/system. All spares used till the Plant is handed over to the Employer shall come under this category. The Contractor shall provide for an adequate stock of such start up and commissioning spares to be brought by him to the site for the plant erection and commissioning. They must be available at site before the equipments are energized. The unused spares, if any, should be removed from there only after the issue of Taking Over certificate. All start up

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spares which remain unused at the time shall remain the property of the Contractor.

- (2) The Contractor shall indicate the service expectancy period for the spare parts (both mandatory and recommended) under normal operating conditions before replacement is necessary.
- (3) All spares supplied under this contract shall be strictly inter-changeable with the Parts for which they are intended for replacements. The spares shall be treated and packed for long storage under the climatic conditions prevailing at the site e.g. small items shall be packed in sealed transparent plastic with desiccators packs as necessary.
- (4) All the spares (both recommended and mandatory) shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan.
- (5) The Contractor will provide Employer with cross-sectional drawings, catalogues, assembly drawings and other relevant documents so as to enable the Employer to identify and finalize order for recommended spares.
- (6) Each spare part shall be clearly marked or labeled on the outside of the packing with its description. When more than one spare part is packed in a single case, a general description of the content shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purposes of identification.
- (7) All cases, containers or other packages are to be opened for such examination as may be considered necessary by the Employer.
- (8) The Contractor will provide the Employer with all the addresses and particulars of his sub-suppliers while placing the order on vendors for items / components / equipments covered under the Contract and will further ensure with his vendors that the Employer, if so desires, will have the right to place order for spares directly on them on mutually agreed terms based on offers of such vendors.
- (9) The Contractor shall warrant that all spares supplied will be new and in accordance with the Contract Documents and will be free from defects in design, material and workmanship.
- (10) In addition to the recommended spares listed by the Contractor, if the Employer further identifies certain particular items of spares, the Contractor shall submit the prices and delivery quotation for such spares within 30 days of receipt of such request with a validity period of 6 months for consideration by the Employer and placement of order for additional spares if the Employer so desires.

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(11) The Contractor shall guarantee the long term availability of spares to the Employer for the full life of the equipment covered under the Contract. The Contractor shall guarantee that before going out of production of spare parts of the equipment covered under the Contract, he shall give the Employer at least 2 years advance notice so that the latter may order his bulk requirement of spares, if he so desires. The same provision will also be applicable to Sub-contractors. Further, in case of discontinuance of manufacture of any spares by the Contractor and/or his Sub- Contractors, Contractor will provide the Employer, two years in advance, with full manufacturing drawings, material specifications and technical information including information on alternative equivalent makes required by the Employer for the purpose of manufacture / procurement of such items.

(12) List of Mandatory Spares to be supplied by the Bidder:

List of Mandatory Spares to be supplied by the Bidder is enlisted as under. Bidder has to furnish the details of these Mandatory spares in accordance with the scheme / option offered by him for FGD system, in the prescribed format as per Attachment No.4 enclosed in the tender bid documents and also quote the rates in the prescribed Schedule No. 4A and 4B of Price Bid.

Mandatory Spares for FGD system:

Mandatory Spares

1. Mechanical

Sr. No.	Description	Nos/Sets
A	Booster Fan: (Spares consider if bidder proposed booster Fan for FGD system)	In case Booster Fan Provided
(a)	Fan Assembly (excluding fan body)	1 No.
(b)	Booster Fan motor	1 No
(c)	Fan Bearing	1 Set
(d)	Booster Fan motor Bearing	1 Set
(e)	Spares for blade bearing Assembly	
(i)	Bearing	2 Sets
(ii)	O ring	2 Sets
(iii)	Bushes	2 Sets
(iv)	Metallic rings	2 sets
(v)	Intermediate piece(if applicable)	1 Sets
(f)	Lube oil/ Hydraulic Oil system	
(i)	Pump Assembly	1 Nos
(ii)	Pump Motor	1 Nos of each rating & type
(iii)	Pressure Regulator	2 Nos
(iv)	Filters	2 Nos

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Sr. No.	Description	Nos/Sets
(v)	Coupling between oil pump & motor	1 Nos
(g)	Fan Blade	1 Set
(h)	Coupling between Fan & Motor	1 Sets
(i)	Hydraulic servomotor	1 No
(j)	Booster fan impeller liner	1 Sets
(k)	Booster fan casing liner	1 Set
B	Gates in Flue Gas system	
(a)	Seals for multi lover dampers	1 Set of each type
(b)	Pneumatic Actuator if consider	1 no of each type
(c)	Expansion joint	1 Number for each type and size
(d)	Seals for guillotine gate	1 set for each gate
C	Absorber	
(a)	Liner Material	5% coverage of each material and thickness for one Unit/Absorber
(b)	Absorber Spray/Oxidation nozzles	10 % of each type
(c)	Absorber Mist Eliminator Washing Nozzles	10 % of each type
(d)	Absorber Mist Eliminator	5 % of each type
D	Oxidation Air Compressor	
(a)	Impeller Assembly	1 No
(b)	Bearing	1 No of each type
E	Agitators (For Absorber Oxidation Tank, Mill Separator Tank, Limestone Slurry Preparation Tank and any other Tank provided with agitator)	
(a)	Impeller Assembly	1 No of each type
(b)	Bearing Assembly	1 No of each type
(c)	Motor	1 No of each type
(d)	Belt and pulley (if applicable)	1 No of each type
(e)	Gear Box Assembly(if applicable)	1 No of each type
F	Slurry Pumps (Absorber Slurry Recirculation Pump, Gypsum Bleed Pumps, Mill Circuit Pump, Limestone Slurry Pumps and any other slurry pumps)	
(a)	Impeller Assembly	2 No of each type
(b)	Casing Liners	1 No of each type
(c)	Seals	4 Set of each type
(d)	Bearing	1 No of each type
(e)	Motor	1 No of each type
(f)	Gear Box	1 No of each type

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Sr. No.	Description	Nos/Sets
(g)	Motor Pump Coupling	1 No of each type
G	Hydro-cyclones (Mill, Gypsum Primary Dewatering, Secondary Waste Water and any other Hydro cyclone)	
(a)	Hydro Cyclone Isolation Valve	10 % of each type OR 1 No whichever is higher
(b)	Hydro Cyclone	10 % of each type OR 1 No whichever is higher
(c)	Hydro Cyclone rubber lining	10 % of each type OR 1 No whichever is higher
H	Gravimetric Feeders	
(a)	Belt	2 Set
(b)	Belt Drive motor	1 No
(c)	Belt drive reducer	1 No
(d)	Speed Reducer Assembly	1 Set
(e)	Weighing Instrument	1 Set
(f)	Feeder weighing roll	1 No
(g)	Gravimetric feeder gate actuator assembly	1 No
(h)	Counter assembly of feeder complete	1 No
(i)	Feeder head pulley assembly	1 No
I	Limestone Mills	
(a)	Mill Wear Parts (Liners) & Grinding element Note: One set of Mill Wear Parts (Liners) above is defined as under: 1 Set = (Grinding elements needed for complete replacement of one mill) X (8000x1)/GWL rounded off to nearest higher whole number. Where: GWL = Guaranteed Wear life of Mill Wear Parts as offered by the bidder	1 Sets
(b)	Mill Motor	1 no
(c)	Auxiliary Motor	1 no
(d)	Gear Box internals (including Bearings and Seals)	2 Sets
(e)	Complete Gear Box	1 Sets
(f)	Mill Motor Bearing	1 Sets
(g)	Lube oil/Grease system	
(i)	Pump assembly	1 No each type
(ii)	motor	1 No each type
(iii)	Pressure regulator	1 No each type
(iv)	Filters	2 No each type
(v)	Pump & Motor Coupling	1 No each type

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Sr. No.	Description	Nos/Sets
J	Slurry Valves	2 no of each type and size
K	Slurry Line Bends	4 no of each type and size
L	Vacuum Belt Filter	
(a)	Filter cloth	4 Sets
(b)	Belt	1 Sets
(c)	Vacuum Box seals	2 Sets
(d)	Drive Motor (if applicable)	1 No
M	Vacuum Pumps	
(a)	Pump impeller Assembly	1 No
(b)	Pump Bearing	1 Set
(c)	Seals	1 Set
(d)	Motor	1 No.
N	Vacuum Breaker Valves	
(a)	Valve Assembly	1 No.
(b)	Actuator	1 No.
O	Sump Pump	
(a)	Complete impeller Assembly	1 no of each type
(b)	Casing Liners	1 set of each type
(c)	Bearing	1 set
(d)	Motor	1 No of each type
(e)	Pump discharge valve assembly	1 no of each type
P	Horizontal/Vertical Centrifugal Pumps	
(a)	Complete Impeller Assembly	1 no of each type
(b)	Casing Liners	1 set of each type
(c)	Bearing	1 set
(d)	Motor	1 no of each type
(e)	Pump discharge valve assembly	1 no of each type

2. Electrical:

Sr No.	Item Description	Quantity
A.	LT Switchgear:	
1	Complete Breaker	10% of each type & rating (Min 1 No)
2	Ammeter	2 Nos. of each type and range
3	Voltmeter	2 Nos. of each type and range
4	Relays	10% of each type (min 2 Nos.)
5	Bus bar support insulators	10 Nos.
6	Spring charging motor	3 Nos. of each type and rating
7	Aux contact set	6 sets of each type & rating

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8	Limit switches	10 no of each type
9	Arc chutes	10% of each type & rating
10	Fixed contact set	3 nos. sets of each rating & type
11	Moving contact set	3 nos. sets of each type & rating
12	Arcing contact	3 nos. sets of each type & rating
13	Charging spring	2 Nos. of each type and rating
14	Current Transformer	3 Nos. of each type and rating
15	Closing coil	6 Nos. of each type and rating
16	Trip coil	6 Nos. of each type and rating
17	Voltage Transformer	3 Nos. of each type and rating
18	Control Supply Transformer	3 Nos. of each type and rating
19	Power Contactor and coil	2 Nos. of each type and rating
20	Air break switch/MCCBs	3 Nos. of each type and rating
21	DP air break switches (DC)	3 Nos. of each type and rating
22	Control fuses & neutral link	Total 50 No (fuses) & 10 Nos. (Neutral links), to cover all ratings.
23	Indicating Lamp	Total 30 Nos. to cover all the type & rating
24	Vertical Bus bar dropper support insulator	25 Nos.
25	Bus duct flexible connectors (both transformer and switchgear end)	1 Set for three phases of each type & size
26	Primary disconnect in MCC (Bus bar end (male/Female)	Total 15 Nos. proportionately divide for all rating
27	Secondary disconnect in MCC (cable end)	Total 15 Nos. proportionately divide for all rating
28	Push buttons	10 Nos. of each type
29	Power fuses	Total 20% proportionately divide for all rating (min 3 Nos.)
30	Thermal Bimetal relays	Total 5% proportionately divide for all rating (min 1 Nos.)
31	Current transducers	2 Nos. of each type & rating
32	Voltage transducers	2 Nos. of each type & rating
33	Busbar aluminum flat piece	12 meters of each type & rating
34	Busbar angles/formed pieces for breaker	2 Nos. of each type
35	Terminal blocks	12 Nos. of each type & rating.
B Electrical Actuators		
1	Actuators	1 no of each type and rating
C Lighting		
1	Led fixture	5 Nos. of each type & rating (Min 1 No.)
D MV Switchgear:		
1	Breaker of each rating	10% of each type & rating (Min 1 No.)
2	Numerical Relay	10% of each type (Min 2 No.)
3	Aux Relay/ Lock out Relays/ Timers (if applicable)	10% of each type (Min 2 No.)

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4	Busbar support insulators	12 Nos.
5	Energy meter of each type & range	1 Nos. of each type.
6	Spring charging motor complete	2 Nos. of each type.
7	Current Transformer of each type & ratio	3 Nos. of each type
8	Potential Transformer of each type and rating	3 Nos. of each type
9	Shunt Trip coil	5 Nos. of each type & rating
10	Closing coil	5 Nos. of each type & rating
11	Moving contact assembly of each rating (One set means complete replacement for one breaker)	2 sets
12	Stationary (fixed) contact assembly of each rating (One set means complete replacement for one breaker)	2 sets
13	Bus seal off bushing	3 Nos. of each type & rating
14	Limit switch	10 Nos. of each type
15	Control switch	2 Nos. of each type
16	Selector switch	2 Nos. of each type
17	Isolation switch for control supply	2 Nos.
18	Circuit breaker auxiliary contact assembly	6 Nos. of each type & rating
19	Indicating lamps with holders	20 Sets
20	Fuse base and fuse links	12 Nos.
21	Isolation contact (fixed and moving) (one set means male & female contacts of one complete breaker)	4 sets of each rating
22	Terminal blocks	6 Nos.
23	Multiple pin plug contact assembly with cables (male and female)	6 Nos.
24	Inter phase barrier	2 Nos. of each rating
25	Vacuum contactors with HRC fuses (if applicable)	2 sets (one set =Three fuses)
26	Surge arresters	3 Nos. of each rating
E	MV Bus duct:	
1	Support insulators of each type	10 Nos.
2	Three phase set of flexible terminal connectors for switchgear end of each type & rating	1 set
3	Three phase set of flexible terminal connectors for Transformer end of each type & rating	1 set
4	Seal off bushing of each type & rating	3 Nos.
F	Transformer:	
1	HV bushing with metal parts and gasket	2 Nos.

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2	LV bushing with metal parts and gasket	2 Nos
3	LV neutral bushing with metal parts and gasket	2 Nos
4	WTI with contact	1 No.
5	OTI with contact	1 No.
6	Pressure relief device	1 No.
7	MOG	1 No.
8	Buchholz relay complete	1 No.
9	Set of gaskets (All gaskets of transformer)	1 Sets
10	Set of valves	2 No. of each type/Size
11	Air cell for conservator	1 No.
12	Neutral Grounding Resistor without supporting structure	1 No.
G	Elevator	
1	Friction Block	2 No
2	Guide roller of each type	20% of total population or 3 nos. of each type whichever is higher
3	Contactors of each type	2 nos
4	Control Transformer	1 nos of each type
5	Time device	2 no of each type
6	Rectifier	4 no of each type
7	Over current Relay	2 no of each type
8	Auxiliary relay	3 no of each type
9	Resistor	3 no of each type
10	Fuses of each rating	20% of total population
11	Limit switches of each type	3 no
12	Push Button	3 no of each type
13	Contact device	3 No of each type
14	Brake Motor	2 no of each type
15	Transmitter	2 no of each type
16	Switches of each type	3 no
17	Receivers	2 no of each type
18	Bearing of each type and size	2 no
19	Roller of each type	3 no
20	Worm Gear spares	
21	'o' rings	3 sets
22	Sealing ring of each type	3 sets
23	Spare for brake	
24	Fan	2 no of each type
25	Magnetic coil	3 no of each type
26	Brake disc	2 Sets
27	Brake pad	2 Sets
28	Bushing (for door front)	2 Sets
29	Pinion	2 no of each type

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30	Elevator Motor with VVVF drive	1 no of each type
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3. Control and Instrumentation:

Sr No	Description	Nos/Set
A	Measuring Instrument	
(a)	All type of Transmitters including sensors	10% or 1 No each type and model whichever is more.
(b)	RTD of each type & length (with head assembly, terminal block & nipple)	10% or 2 nos each type and length l whichever is more.
(c)	Thermocouples of each type like K-type, R-type etc (with head assembly, terminal block & nipple)	10% or 2 nos each type and length l whichever is more
(d)	Cold junction compensation boxes of each model (if applicable)	10% or 2 nos whichever is more
(e)	Thermostatic units for each model of CJC Box (if applicable)	10% or 2 nos whichever is more
(f)	Temperature Transmitters	10% of each type and length
(g)	Thermowell	10% or 1 nos each type and length l whichever is more(to be divided into various insertion lengths in proportion to main population)
B	Limit switches for isolation valves	2 no of each type
C	Local indicators like temperature gauge, pressure gauges, differential Pressure gauge, flow gauges, flow meters etc.	5% or 1 no of each make, model and type whichever is more (to be divided to various ranges in proportion to main of all make ,model ,type population)
D	Process Actuated Switch Devices include all type of Pressure differential pressure, flow ,temperature, differential temperature, level switch devices	5 % or 1 no of each make, model and type whichever is more
E	Any other instrument (flow Transmitters, Density meter)	10% or 1 no of each type and model whichever is more.
F	Analyzers (SO ₂ ,ph) for FGD system	10% or 2 Nos each type complete with accessories
G	Process Connection Piping (For impulse Piping/ Tubing and Air Supply Piping as Applicable)	
(a)	Valves of all types and models	10% or 1 no of each type, class, size and model whichever is more.
(b)	2 way, 3 way., 5 way valve manifolds	10% or 1 no of each type, class,

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		size and model whichever is more.
(c)	Fitting	10% or 1 packet each type, class, size and model whichever is more.
(d)	Purge Meters	5% of each model or 1 no whichever is more.
(e)	Filter regulators	20% each model or 2 nos whichever is more.
H	Cables	
(a)	Pre-Fabricated cable of each type	10% or 1 no of each type and model whichever is more.
(b)	Other cables	5% of each type, pair and size of actual installed quantity.
I	24 V DC Power Supply System	
(a)	AC/DC isolator, contactors, timers, relays	10% of each type and rating.
(b)	Fuses of each type and rating	200%
(c)	Fuse free Circuit breakers	5% of each type and rating.
(d)	Electronic modules of all types	10% of each type
(e)	Cooling Fan	2 Nos of each type
(f)	Relays of all types including overload relays	10% of each type and rating
(g)	Capacitor	1 set
J	PLC Control System	
(a)	Power Supply unit	1 no of each type and model
(b)	Electronics modules of each type and model for control system (This shall include all type of cards like I/O cards, controller cards, CPU modules or card, Logic Cards., Communication modules etc.	20% or 2 nos of each type and model whichever is more.
(c)	Interconnecting cable	10% of each type and size
(d)	Cooling Fan in PLC system/cabinet	2 Nos
(e)	Indication Lamps of all types	100%
(f)	Keyboards & mouse	2 Nos of each type
(g)	Printer and their parts	
1	Color laser printer (A4)	1 No
2	Long term storage unit	1 No
(h)	HMI/PLC Devices	
1	Work station with licensed software loaded along with monitor	2 Nos of each type and model
2	Server for unit LAN or information work Station (as applicable)	1 Nos
3	Network components like Switch/ repeaters/ hubs/ media converter etc. (as Applicable)	2 nos of each type and model.
4	Bulk Storage drive unit	2 nos

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(i)	Cables and connectors:	
1	Prefab interconnecting cables with connector	2 no of each type and length
2	System bus cable with connectors	2 no of each type and length
3	I/O bus cable with connectors for remote I/O units	2 no of each type and length
4	Power supply modules & power packs for control system	10% of each type and model
(j)	Bus couplet/ interface hardware and other communication devices.	10% of each type and model
(k)	Relays	10% of each type and model
(l)	Batteries used for battery backup of RAMs	10% of each type and model
(m)	Fused	10% of each type and model
(n)	Cooling fans for power supply	10% of each type and model
K	Other Related Control and instruments/ Equipment Lime Feeders:	
(a)	Motion monitor	10% or 2 whichever is more.
(b)	Speed pick up	10% or 2 whichever is more
(c)	Torque switch (if applicable)	10% or 2 whichever is more
(d)	Load cell	10% or 2 whichever is more
(e)	Electronic cards & Power Supply cards	10% or 2 whichever is more
(f)	Clutch (if applicable)	10% or 2 whichever is more
(g)	Load indication lamps	200%
(h)	Panel meters	10% or 2 whichever is more
(i)	Limit switch assembly for lime-on-belt, no lime flow, shear pin failure etc.	10% or 2 whichever is more
L	Control Valves, Actuator & Accessories (Following item shall be provided under this clause for all modulating control valves being supplied under this package)	
(a)	Pneumatic and electro- hydraulic actuator assembly	10% or 1 no of each type, model and rating, whichever is more
(b)	Valve trim (including cage, plug, stem, seat ring, guide bushings etc.)	1 set for each type of control valve
(c)	Diaphragms, O rings, seals etc for all types make etc.	100%
(d)	Pressure gauge of all types, make, rating etc	10% or 2 no of each type whichever is more
(e)	Solenoid Valves (if applicable)	10% or 2 no of each type whichever is more
(f)	Positioner units (complete units) & accessories (link assembly)	10% or 1 no of each type whichever is more
(g)	Pneumatic air filter/ Regulator of each type, make rating etc.	10% or 2 no whichever is more
(h)	Airlock relays	10% or 2 no of each type

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		whichever is more
M	Pneumatics Isolation / Block Valves, Actuator & Accessories (for all ON/OFF valves supplied under this package)	
(a)	Pneumatic actuator assembly	10% or 2 no of each type , ,model and rating whichever is more
(b)	Diaphragms, O rings, seals etc for all types make etc.	100%
(c)	Limit Switches (complete unit) & accessories (link assembly)	10% or 2 nos whichever is more.
(d)	Solenoid Valves (if applicable)	10% or 2 no of each type whichever is more
N	Vibration Monitoring System	
(a)	sensors	10% or minimum 02 nos whichever is more
(b)	Power Supply Module Cards	10% or minimum 02 nos whichever is more
(c)	Driver/ interface Cards & all other electronic cards.	10% or minimum 02 nos whichever is more
(d)	Prefab sensor Cable & Connectors of alltype, makes, range	10% or minimum 02 nos whichever is more
O	Uninterrupted Power Supply including Static Switch (if applicable)	
(a)	Silicon Controlled Thyristor, Diodes and power transistors.	100%
(b)	Capacitors	1 Set
(c)	CTs, CVT's, VT's chokes, AC/DC isolators, Contactors, timers, relays,	10 % of each type
(d)	Fuse of each type and rating	200%
(e)	Fuse free Circuit Breaker	5%
(f)	Electronic modules	10% of each type
(g)	Indicating lamp	100
(h)	Lamp Holders with series resistor, if any	10%
(i)	Cooling Fan	2 nos of each type
(j)	Digital/analog panel meters/indicators	1 no of each type
(k)	Relays of all types including overload relays.	10%

4. Cranes and Hoists:

Sr No	Description	Quantity
	Miscellaneous Cranes	
1.1	One set consisting of 2 nos. bearing for:	
	a) CT wheel	1 set
	b) LT wheel	1 set

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Sr No	Description	Quantity
1.2	One set consisting of 2 nos. brake linings with rivets for each type and size of brake :	1 Set
1.3	One set consisting of 2 nos. brake shoes with lining for each type and size of brake ::	1 set
1.4	One set consisting of 6 nos. carbon brushes for each type of Motor:	1 set
1.5	One set consisting of 3 nos. brush holders for each type of Motor:	1 set
1.6	Fixed and moving contacts for each type of contactor	1 set
1.7	No volt coil for each type of contactor	1 set
1.8	Overload relay for each type of Motor	2 no
1.9	Motor bearings for each type of motor	4 Nos
1.10	Bearing for each type and size of pulley	2 Nos
1.11	HOISTS (for each type and rating, hoists)	
1.11.1	Bearings for long travel wheels	2 sets
1.11.2	Bearings for gear boxes for each type of hoist	2 sets
1.11.3	Break liners for all the brakes	100% of total population of each type & size
1.11.4	Oil seals	100% of total population of each type, size rating
1.11.5	Brake springs for all brakes	-do-
1.11.7	Solenoid coils for brakes	2 sets
1.11.8	Overload relay for motors	2 Nos.
1.11.9	Limit switches for hoists and travel mechanisms	2 sets
1.11.10	Spare motors for hoists	2 Nos.
1.11.11	Long travel machinery	
	i. Gear wheel	1 set
	ii. Internal clip	2 Nos.
	iii. Pinion	1 No.
1.11.12	Chain pulley block	
	i. Load chain wheel	1 No.
	ii. Load chain stripping fork	5 Nos.
	iii. Hand chain wheel	2 Nos.
	iv. Ratchet pawl	1 No.
	v. Locking ratchet wheel	2 Nos.
	vi. Guide roller	2 Nos.
	vii. Brake disc	2 Nos.

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5. List of mandatory spares for compressor:

Sr No	Description	Quantity
1.	HP Stage Compressor	
(a)	HP Element	1 Set
(b)	Packing sheet	1 Set
(c)	All bearing	1 Set
(d)	All Seal	1 Set
(e)	Timing Gear	1 Set
2.0	LP Stage Compressor	
(a)	LP Element	1 Set
(b)	Packing Sheet	1 Set
(c)	All Bearing	1 Set
(d)	All seal	1 Set
(e)	Timing Gear	1 Set
(f)	Suction and Discharge valve	1 Set
3.0	Air intake filter element with Gasket	4 Set
4.0	Oil Filter Element with Gasket and sheet	4 Set
5.0	Compressor Coolers	
(a)	Gasket and seal for inter cooler and after cooler	4 Set
6.0	Oil Pump complete assembly	1 No
7.0	Oil cooler gasket and seal	4 No
8.0	Power contractor complete assembly	1 Set
9.0	Motor for compressor	1 No
10.0	Instrument and Gauge	10% of total quantity or 1 No whichever is higher

Note:

- Wherever 'set' is indicated, it shall mean complete replacement for one main equipment.
- "Total Population" as mentioned in the table, refers to the total population of the corresponding item as installed for all the units.
- Quantity mentioned in percentage (%) is the % of total installed.
- If percentage comes as fraction next higher integer should be considered for the purpose of quantity required.
- The bidder shall furnish itemized list of recommended spare parts that will be required

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for three years operation along with the unit and total prices as called in the bid proposal sheets.

6. Whether included in bidder's recommendations or not, prices of the mandatory spares as per the list above shall be quoted which shall be considered in evaluation.
7. Wherever, quantity is indicated as % or set in the above list, the bidders are required to provide the quantity in Nos. of each item based on the installed quantities/ defining the items contained in that set.
8. Wherever quantity has been specified as percentage (%), the quantity of mandatory spares to be provided by contractor shall be the specified percentage (%) of the total population of the plant. In case, the quantity so calculated happens to be in fraction, the same shall be rounded off to next higher whole number.
9. Whenever the quantity have been indicated for each type, size, thickness, material, radius, range, etc. these shall cover all the items supplied and installed and the break up for these shall be furnished in the bid.
10. In case, spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities generally in line with approach followed in the above list.

9.0 WORK & SAFETY REGULATIONS :

(1) General :

- (i) The GENERAL SAFETY RULES and TERMS AND CONDITIONS REGARDING INDUSTRIAL LAWS AND OTHER RELATED MATTER are to be strictly observed by the contractor as per Appendix-O and Appendix-P respectively, attached in the tender bid documents.
- (ii) The Contractor shall comply with all the requirements of "The Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act," 1996 and its Central Rule 1998 / State Rules and any other statutory requirements as applicable.
- (iii) The Contractor shall follow GSECL Safety Rules as issued from time to time with respect to safety in construction & erection.
- (iv) The Contractor shall have the approved Safety; Health and Environment (SHE) Policy in respect of Safety and health of Building Workers and it shall be circulated widely and displayed at conspicuous place in Hindi and local language understood by the majority of the workers. A copy of the safety policy should be submitted to Engineer in charge.

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- (v) The Contractor shall prepare the safety plan comprising of methods to implement the Safety Policy/ Rules, Risk assessment and ensuring Safety at work areas, Safety audits, inspections and its compliance, Supervision and responsibility to ensure Safety at various levels, Safety training to employees, review of Safety and accident analysis, ensure Health and Safety Procedures to prevent accidents and submit to Engineer I/C for approval.
- (vi) The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to the Owner or to others, working at the Site.
- (vii) All equipments used in construction and erection by the Contractor shall meet BIS / International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipments shall be strictly operated and maintained by the Contractor in accordance with manufacturer's operation manual. The Contractor should also follow Guidelines / Rules of the Owner in this regard.
- (viii) The Contractor shall provide suitable latest Personal Protective Equipments of prescribed standard to all their employees and workmen according to the need. The Engineer I/c shall have the right to examine these safety equipments to determine their suitability, reliability, acceptability and adaptability. The Contractor should also ensure these before their use at worksite.
- (ix) The Contractor shall provide safe working conditions to all workmen and employees at his workplace including safe means of access, railings, stairs, and ladders, scaffolding, work platforms, toe boards etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection of scaffolds, access, work platforms etc. shall be good and the Contractor shall use standard quality of material.
- (x) The Contractor shall follow and comply with all the Safety Rules, standards, code of practices of GSECL and relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any protest or contest or reservation. In case of any unconformity between statutory requirement and the Safety Rules of the Owner referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent. As and when required he can refer / obtain copy of GSECL safety documents as stated above.

Signature of Bidder	Company's Round Seal	Date:	Place:

- (xi) The Contractor shall have his own arrangements with nearby hospitals for shifting and treatment of sick and injured.

The medical examination of the workers employed in hazardous areas shall be conducted as per Rule 223 Of The Building and Other Construction Worker (Regulation of Employment and Condition of Service) Central Rule 1998. Their health records shall be maintained accordingly and to be submitted to Engineer I/c when asked for. If any worker found suffering from occupational health hazard, the worker should be shifted to suitable place of working and properly treated under intimation to Engineer I/c. The medical fitness certificate to be submitted to Engineer (I/c)

- (xii) First Aid boxes equipped with requisite articles as specified in the Rule 231 of The Building and Other Construction Worker (Regulation of Employment and Condition of Service) Central Rule 1998 shall be provided at construction sites for the use of workers. Training has to be provided on first aid to workmen & office bearers working at site.

(2) Emergency Action Plan :

The Contractor shall prepare an emergency action plan approved by his competent authority to handle any emergency occurred during construction work. Regular mock drills shall be organized to practice this emergency plan. The Emergency Action Plan should be widely circulated to all the employees and suitable infrastructure shall be provided to handle the emergencies.

(3) Scaffolding :

The Contractor shall take all precautions to prevent any accidental collapse of scaffolding or fall of persons from scaffolding. The Contractor should ensure that scaffolding is designed by a competent person and its erection and repairs should be done under the expert supervision. The scaffolding shall meet the required strength and other requirements for the purpose for which the scaffold is erected. The material used for scaffold should conform to the BIS / International standards.

(4) Opening:

The Contractor shall ensure that there is no opening in any working platform/any floor of the building, which may cause fall of workers or material. Whenever an opening on a platform/any floor of the building is unavoidable, the opening should be suitably fenced and necessary measures for protection against falling objects or building workers from such platform are taken by providing suitable safety nets, safety belts or other similar means.

Signature of Bidder	Company's Round Seal	Date:	Place:

(5) Explosives:

The Contractor shall take all precautions while handling, using, storing or transporting of all explosives. Before usage of any explosive necessary warning / danger signals are erected at conspicuous places to warn the workers and general public. The Contractor should strictly ensure all measures and precautions required to be complied for use, handling, storing or transportation of explosives under the rules framed under the Explosives Act, 1884.

(6) Fencing of Machinery:

The Contractor shall provide suitable fencing or guard to all dangerous and moving parts of machinery.

The Contractor shall not allow any of the employees to clean, lubricate, repair, adjust or examine during machinery in motion, which may cause injury to the person.

(7) Carrying of Excessive Weight by a Worker:

The worker shall not be allowed to lift by hand or carry over his head, back or shoulder more than the maximum limit set by the prescribed rules for the construction Workers.

(8) Dangerous and Harmful Gases / Equipment :

The Contractor shall ensure that the workers are not exposed to any harmful gases during any construction activity including excavation, tunneling, confined spaces etc.

The Contractor should not allow any worker to go into the confined space unless it is certified by Engineer (I/c) to be safe and fit for the entry to such work place. Proper record and work permits should be followed to carry out such works.

(9) Overhead Protection :

The Contractor shall ensure that any area exposed to risk of falling materials, articles or objects is roped off or cordoned off or otherwise suitably guarded from inadvertent entry of any person.

Wherever there is a possibility of falling of any material, equipment or construction workers while working at heights, a suitable and adequate safety net should be provided. The safety net should be in accordance with BIS Standards.

(10) Working at Heights:

Signature of Bidder	Company's Round Seal	Date:	Place:

Necessary safety permits for working at height, confined space, hazardous area etc. will be strictly followed when issued from GSECL.

All working platforms, ways and other places of construction work shall be free from accumulations of debris or any other material causing obstructions and tripping.

Wherever workers are exposed to the hazard of falling into water, the Contractor shall provide adequate equipment for saving the employees from drowning and rescuing from such hazards. The Contractor shall provide boat or launch equipped with sufficient number of life buoys, life jackets etc. manned with trained personnel at the site of such work.

Every opening at elevation from ground level through which a building worker, vehicle, material, equipment etc. may fall at a construction work shall be covered and/or guarded suitably by the Contractor to prevent such falls.

Wherever the workers are exposed to the hazards of falling from height, the Contractor shall provide full harness safety belts fitted with fall arresting systems to all the employees working at higher elevations and life line of 8 mm diameter wire rope with turn buckles for anchoring the safety belts while working or moving at higher elevations. Safety nets shall also be provided for saving them from fall from heights and such equipment should be in accordance with BIS standards.

Wherever there is a possibility of falling of any material, equipment or construction workers while working at heights, a suitable and adequate safety net should be provided. The safety net should be in accordance with BIS Standards.

The Contractor shall provide standard prefabricated ladders on the columns where the workers are required to use them as an access for higher elevations till permanent staircase is provided. The workers shall be provided with safety belts fitted with suitable fall arresting system (Fall arrestors) for climbing/getting down through ladders to prevent fall from height.

(11) Handling of Hazardous Chemicals:

The Contractor will notify well in advance to the Engineer I/c of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. GSECL shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The Engineer I/c shall have the right at his sole discretion to inspect any such container or such construction plant / equipment for which material in the container is required to be used and if in his opinion, its use is not safe; he may

Signature of Bidder	Company's Round Seal	Date:	Place:

forbid its use. No claim due to such prohibition shall be entertained by GSECL and GSECL shall not entertain any claim of the Contractor towards additional safety provisions / conditions to be provided for / constructed.

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

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

The Contractor shall be fully responsible for the safe storage of his and his Sub-Contractor's radio-active sources in accordance with BARC/DAE (Bhabha Atomic Research Centre/ Department of Atomic Energy, Govt. of India) Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by the contractor.

The Contractor shall provide suitable personal protective equipment to the workers who are handling the hazardous and corrosive substances including alkalis and acids. As a precautionary measure the Contractor should keep the bottles filled with distilled water in cupboard / Boxes near work place for emergency eye wash by worker exposed to such hazardous chemicals.

(12) Eye Protection:

The Contractor shall provide suitable personal protective equipment to his workmen depending upon the nature of hazards and ensure their usage by the workers engaged in operations like welding, cutting, chipping, grinding or similar operations which may cause injuries to his eyes.

(13) Excavation:

The Contractor shall take all necessary measures during excavation to prevent the hazards of falling or sliding material or article from any bank or side of such excavation which is more than one and a half meter above his footing by providing adequate piling, shoring, bracing etc. against such bank or sides.

Signature of Bidder	Company's Round Seal	Date:	Place:

Adequate and suitable warning signs shall be put up at conspicuous places at the excavation work to prevent any persons or vehicles falling into the excavation trench. No worker should be allowed to work where he may be stuck or endangered by excavation machinery or collapse of excavations or trenches.

(14) Electrical Hazards:

The Contractor should ensure that all electrical installations at the construction work comply with the requirements of latest electricity acts / rules. The Contractor shall take all adequate measures to prevent any worker from coming into physical contact with any electrical equipment or apparatus, machines or live electrical circuits which may cause electrical hazards during the construction work.

The Contractor shall provide the sufficient ELCBs / RCCBs for all the portable equipment, electrical switchboards, distribution panels etc. to prevent electrical shocks. The Contractor should ensure use of single / double insulated hand tools or low voltage i.e., 110 volts hand tools.

The Contractor should also ensure that all temporary electrical installations at the construction works are provided with earth leakage circuit breakers.

(15) Vehicular Traffic:

The Contractor should employ vehicle drivers who hold a valid driving license under the Motor Vehicles Act, 1988.

(16) Lifting Appliances, Tools & Tackles, Lifting Gear And Pressure Plant & Equipment etc.:

The Contractor shall ensure all the lifting appliances, tools & tackles including cranes etc., lifting gear including fixed or movable and any plant or gear, hoists, Pressure Plant and equipment etc. are in good condition and shall be examined by competent person and only certified shall be used at sites. Periodical Examination and the tests for all lifting / hoisting equipment & tackles shall be carried out. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Engineer I/c or by the person authorized by him.

(17) Excessive Noise, Vibration :

The Contractor shall take adequate measures to protect the workers against the harmful effect of excessive noise or vibration. The noise should not exceed the limits prescribed under the concerned rules, Noise Pollution (Regulation and Control) Rules, 2000.

(18) Electrical Installations :

Signature of Bidder	Company's Round Seal	Date:	Place:

The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Owner or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by the Engineer I/c to handle such fuses, wiring or electrical equipment.

Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or the GSECL, he shall:

Satisfy the Engineer I/C that the appliance is in good working condition; inform the Engineer I/C of the maximum current rating, voltage and phases of the appliances; Obtain permission of the Engineer I/C detailing the sockets to which the appliances may be connected.

The Engineer I/C will not grant permission to connect until he is satisfied that:

The appliance is in good condition and is fitted with suitable plug; having earth connection with the body.

Wherever armored / metallic sheathed multi core cable is used, the same armor / sheath should be connected to earth.

No repair work shall be carried out on any live equipment. The Engineer I/c must declare the equipment safe and a permit to work shall be issued by the GSECL / Contractor as the case may be to carry out any repair / maintenance work. While working on electric lines / equipment whether live or dead, suitable type and sufficient quantity of tools will have to be provided by the Contractor to electricians / workmen / Officers

The Contractor shall employ necessary number of qualified, full time Electricians / Electrical Supervisors to maintain his temporary electrical installation.

The installations shall be provided with suitable ELCBs and RCCBs wherever required. Temporary power supply connection will be released after submission of prescribed format duly filled & signed by contract supervisor having electrical qualification / license.

(19) Safety Organization:

- (i) The Contractor employing more than 250 workmen whether temporary, casual, probationary, regular or permanent shall employ at least one full time safety officer exclusively to supervise safety aspects of the equipment and workmen, who will coordinate with the GSECL Safety Officer. Further requirement of safety officers, if any, shall be guided by Rule 209 of The Building and Other Construction Worker (Regulation of Employment and Conditions of Service) Central Rule 1998. In case the work is being carried

Signature of Bidder	Company's Round Seal	Date:	Place:

out through sub-Contractor, the employees / workmen of the sub-Contractor shall also be considered as the Contractor's employees/workmen for the above purpose.

- (ii) In case of Contractor deploying less than 250 workmen he should designate one of his Engr / supervisor or the Contractor himself (if he is directly supervising the work) as safety officer in addition to his existing responsibilities. The Engr./ supervisor should get at least 2 days safety training from any reputed organization or from GSECL before resuming the work. If already trained in past the declaration along with training certificate to be furnished to GSECL safety officer.

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

(20) Reporting of Accident and Investigation:

In case any accident occurs during the construction / erection or other associated activities undertaken by the Contractor thereby causing any near miss, minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer I/C, GSECL's Safety Officer with a copy to Head of Project of GSECL in the prescribed form and also to all the authorities envisaged under the applicable laws.

(21) Right to stop Work:

- (i) The Engineer I/C shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipments. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury / accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.
- (ii) The Contractor shall not be entitled for any damages / compensation for stoppage of work, {Sub-Clause (i) above} due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the work and will not be the ground for waiver of levy of liquidated damages.

Signature of Bidder	Company's Round Seal	Date:	Place:

(22) Fire Protection:

The Contractor shall provide sufficient fire extinguishers at place /s of work. The fire extinguishers shall be properly maintained as per relevant BIS Standards. The employees shall be trained to operate the fire extinguishers / equipment.

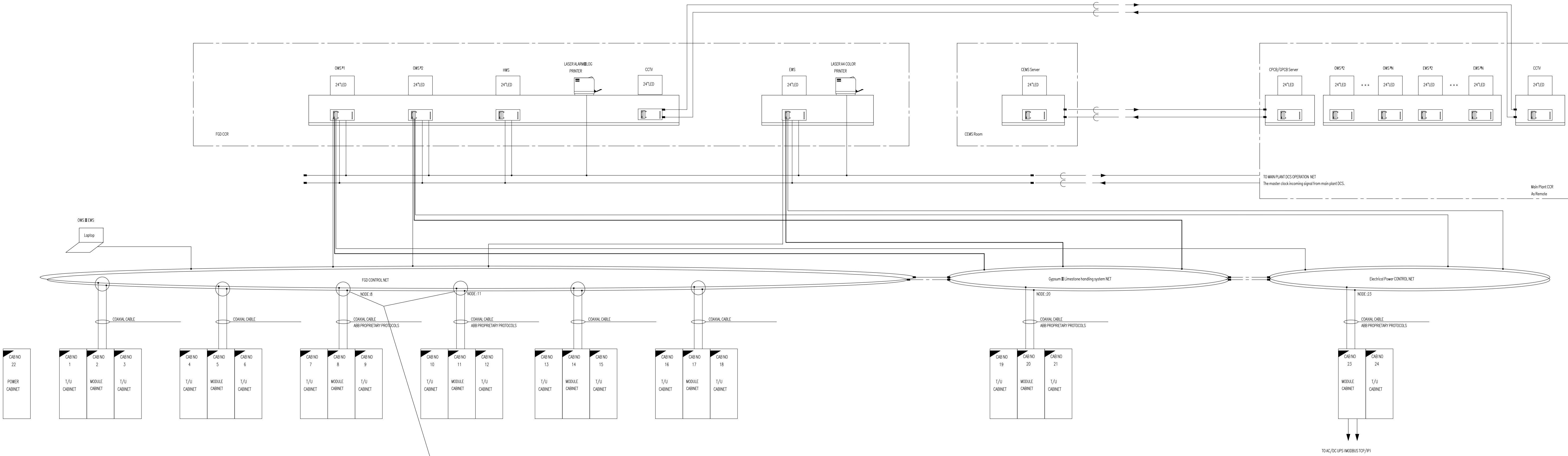
(23) Penalties:

- (i) If the Contractor fails in providing safe working environment as per the Safety Rules of GSECL or continues the work even after being instructed to stop the work by the Engineer I/C as provided in sub-Clause 21 above, the Contractor shall be penalized suitably till the instructions are complied with and so certified by the Engineer I/C.
- (ii) If the Contractor does not take all safety precautions and / or fails to comply with the Safety Rules as prescribed by the Owner or under the applicable law for the safety of the plant and equipment and for the safety of personnel and the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors, or GSECL's employees or any other person who are at the Site or adjacent thereto, the Contractor shall be responsible for payment of suitable penalty to GSECL

The penalty mentioned above shall be in addition to the compensation payable to the workmen / employees under the relevant provisions of the Workmen's Compensation Act' 1923 and rules framed there under or any other applicable laws as applicable from time to time.

- (iii) If any Contractor worker found working without using the safety equipment like safety helmet, safety shoes, safety belts, etc. or without anchoring the safety belts while working at height, the Engineer I/c / Safety Officer of GSECL shall have the right to penalize the Contractor suitably and such worker shall be sent out of the workplace immediately and shall not be allowed to work on that day. Engineer I/c / Safety Officer of GSECL will also issue a notice in this regard to the Contractor.

Signature of Bidder	Company's Round Seal	Date:	Place:

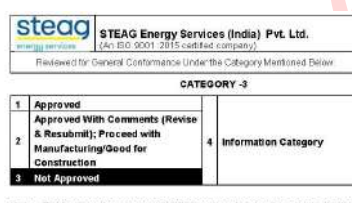


- ABBREVIATION LIST
- 1.EWS: ENGINEERING WORKSTATION
 - 2.OWS: OPERATOR WORKSTATION
 - 3.HWS: HISTORY WORKSTATION
 - 4.T/U: TERMINATION UNIT
 - 5.FO: FIBER OPTICAL
 - 6.LED: LED INDUSTRIAL MONITOR






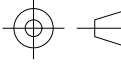
- NOTES:
- 1.THE DRWAING REFER TO ABB DCS CONFIG & CONTROL NETWORK DIAGRAM. IT WILL BE UPDATED AS THE VENDOR DRAWING.
 - 2.NTCL01 IS A NODE TYPE OF ABB DCS.
 - 3.230VAC UPS POWER SUPPLY WITH REDUNDANCY.
 - 4.REDUNDANCY CONTROLLER WILL BE SUPPLIED IN EACY MODULE CABINET.
 - 5.LAPTOP WITH LATEST CONFIGURATION, LOADED WITH ENGINEERING SOFTWARE SHALL BE FURNISHED & CAN BE WORKED AS EWS CUM OWS.
 - 6.ALL EQUIPMENT OF CONTROL SYSTEM SHOULD BE POWERED BY UPS SUPPLY WITH REDUNDANT SUPPLY ONLY.
 - 7.CPUS / CONTROLLERS SHALL NOT BE LOADED TO OVER 60% OF THEIR CAPACITY EVEN UNDER WORST DATA LOADING CONDITIONS.
 - 8.THE CONTROLLER IN THE MODULE CABINET,THE IO CARD IN THE T/U CABINET.
 - 9. THE DETAILS OF THE PRINTERS PROVIDED IN THE DCS TECHNICAL SPECIFICATION.

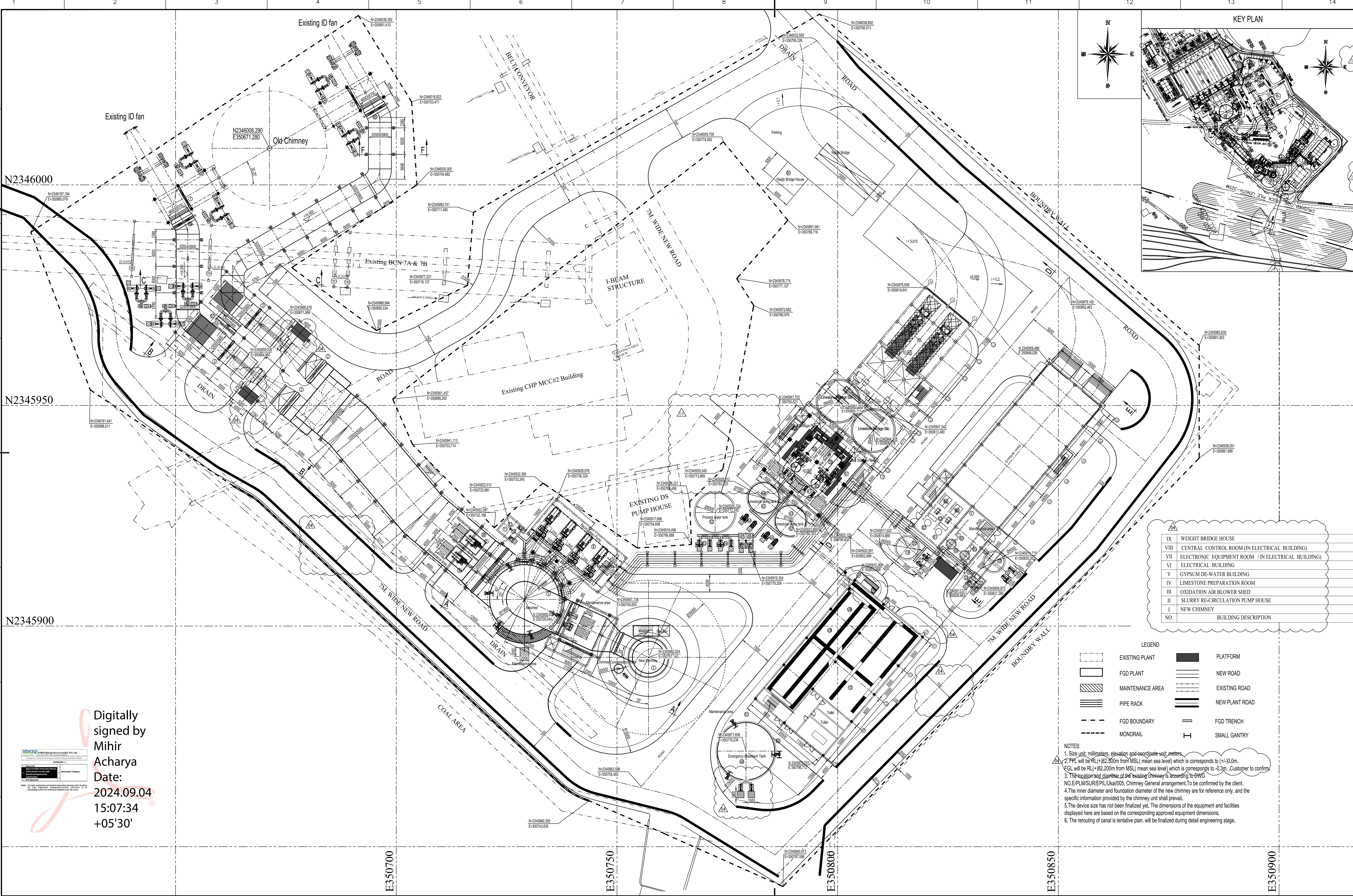
LEGENDS

- DCS CABINET
- MODULE CABINET
- MODULE CABINET
- T/U CABINET
- TERMINATION UNIT CABINET
- FO TO TCP CONVERTER
- OPC PROTOCOL
- MODBUS TCP/IP PROTOCOL
- ETHERNET HUB
- FIBER OPTICAL CABLE
- COAXIAL CABLE



Digitally signed
by Mihir Acharya
Date: 2025.02.28 10:11:44 +05'30'

02	2024-12-20	J ying.				Revised as per comment. Overall updated
01	2024-10-12	J ying.				Revised as per comment
00	2024-08-27	J ying.				First Issue
REV.	DATE	Prepared	Checked	Approved		Details of Revision
Owner		 Gujarat State Electricity Corporation Limited (GSECL)				
Consultants		 STEAG Energy Services				
Contractor		 Engineering Projects (India) Ltd. (EPIL)				
QFGDM		 ASTIC Environmental Engineering Co.,LTD				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract						
Drawing name: PLC (DCS) SYSTEM CONFIGURATION DIAGRAM					Project No.: IA23001	
Design: J ying.	Check: 	App: S. Acharya	EPI Drawing No.: EPI-BE-G11-001-001			
Scale:	Size:	Unit:	ASTIC Drawing No.: IA23001-D-10105-001		REV. 02	










NO.	EQUIPMENT DESCRIPTION	Sets
67	FGD COMMON DUCT DAMPER (MULTI LOUVER TYPE)	1
66	FGD INLET DAMPER (MULTI LOUVER TYPE)	2
65	ELEVATOR	2
64	AIR COMPRESSOR	2
63	AIR DRYER	2
62	INSTRUMENT AIR RECEIVER	2
61	SERVICE AIR RECEIVER	1
60	NEUTRALIZATION TANK PUMP	2
59	NEUTRALIZATION TANK AGITATOR	2
58	NEUTRALIZATION TANK	2
57	SILCO DUST FILTER	2
56	LIME BUCKET ELEVATOR	2
55	LIME STORAGE SILO	2
54	MIST ELIMINATOR WASH PUMP	2
53	PROCESS WATER PUMP	2
52	PROCESS WATER TANK	2
51	EMERGENCY SLURRY TANK PUMP	2
50	EMERGENCY SLURRY TANK AGITATOR	1
49	EMERGENCY SLURRY TANK	1
48	MILL CIRCUIT HYDRO CYCLONE	2
47	LIMESTONE SLURRY PREPARATION AREA SUMP PUMP	2
46	LIMESTONE SLURRY PREPARATION AREA SUMP AGITATOR	1
45	LIMESTONE SLURRY PREPARATION AREA SUMP	1
44	LIMESTONE SLURRY PUMP	2
43	LIMESTONE SLURRY TANK AGITATOR	2
42	LIMESTONE SLURRY TANK	2
41	MILL CIRCUIT PUMP	4
40	MILL SEPARATOR TANK	2
39	WET BALL MILL	2
38	GRAYMETRIC BELT FEEDER	2
37	LIMESTONE STORAGE SILO	2
36	LIMESTONE SEEDS BELT CONVEYOR	2
35	LIMESTONE BUCKET ELEVATOR	2
34	LIMESTONE BELT CONVEYOR	1
33	GYPNUM DEWATERING AREA SUMP PUMP	2
32	GYPNUM DEWATERING AREA SUMP AGITATOR	1
31	GYPNUM DEWATERING AREA SUMP	1
30	FILTRATE WATER PUMP	2
29	FILTRATE WATER TANK AGITATOR	1
28	FILTRATE WATER TANK	1
27	GYPNUM CONVEYOR	2
26	CAKE WASH PUMP	4
25	CLARIFIED WATER TANK	2
24	VACUUM RECEIVER	2
23	VACUUM PUMP	2
22	VACUUM BELT FILTER	2
21	PRIMARY HYDROCYCLONE FEED TANK	1
20	WASTE WATER TANK AGITATOR	1
19	WASTE WATER TANK	1
18	SECONDARY HYDRO CYCLONE	2
17	SECONDARY HYDRO CYCLONE FEED PUMP	2
16	SECONDARY HYDRO CYCLONE FEED TANK AGITATOR	1
15	SECONDARY HYDRO CYCLONE FEED TANK	1
14	PRIMARY HYDRO CYCLONE	2
13	ABSORBER AREA SUMP PUMP	2
12	ABSORBER AREA SUMP AGITATOR	1
11	ABSORBER AREA SUMP	1
10	EMERGENCY WATER TANK	1
9	GYPNUM BLEED PUMP	2
8	OXIDATION AIR BLOWER	2
7	SLURRY RE-CIRCULATION PUMP	4
6	ABSORBER AGITATOR	5
5	ABSORBER	1
4	BOOSTER FAN	2
3	BOOSTER FAN OUTLET DAMPER (GUILLotine TYPE)	2
2	BOOSTER FAN INLET DAMPER (GUILLotine TYPE)	2
1	BYPASS DAMPER (MULTI LOUVER TYPE)	2

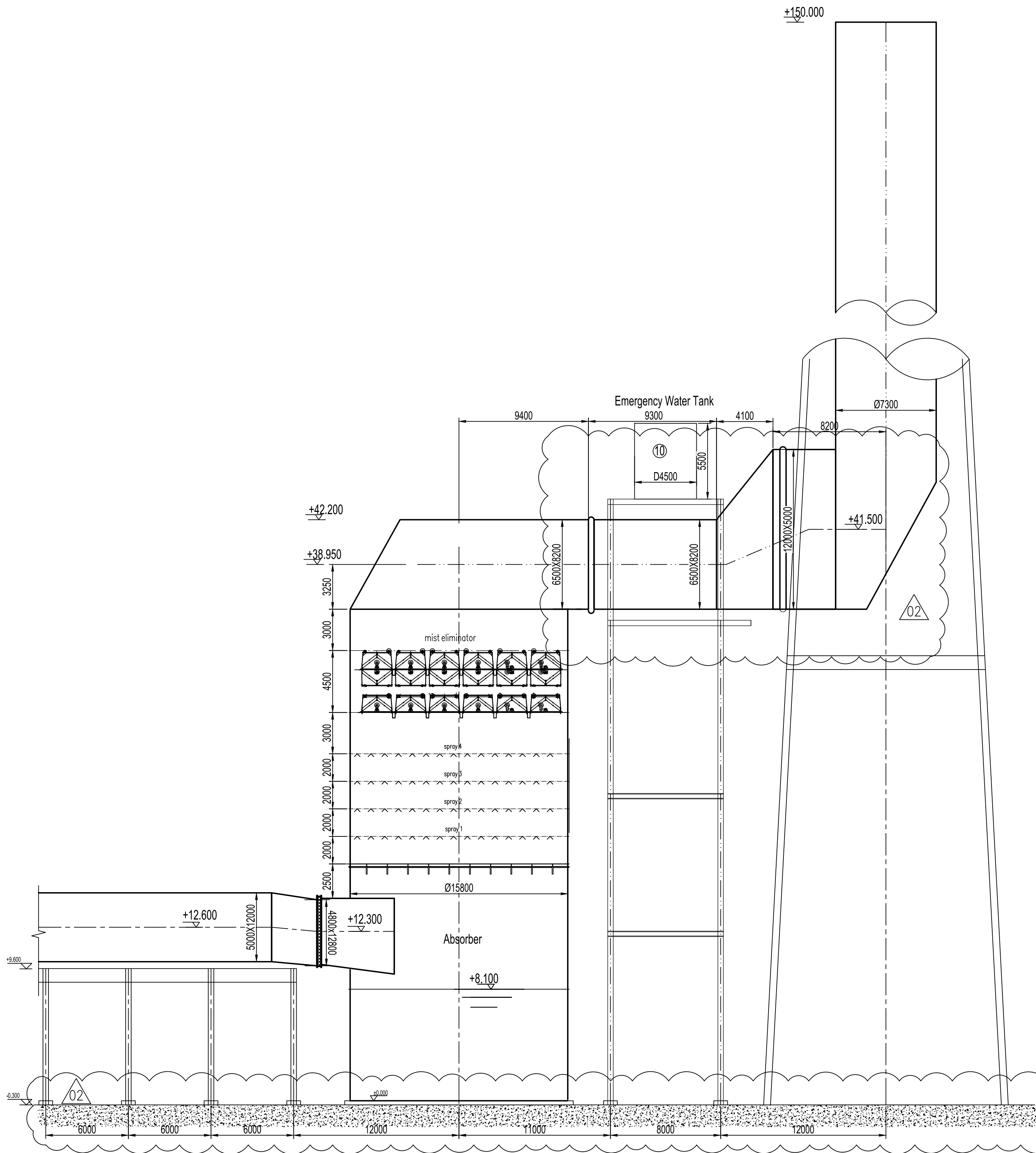
NO.	BUILDING DESCRIPTION
IX	WEIGHT BRIDGE HOUSE
VIII	CENTRAL CONTROL ROOM (IN ELECTRICAL BUILDING)
VII	ELECTRONIC EQUIPMENT ROOM (IN ELECTRICAL BUILDING)
VI	ELECTRICAL BUILDING
V	GYPNUM DE-WATER BUILDING
IV	LIMESTONE PREPARATION ROOM
III	OXIDATION AIR BLOWER SHED
II	SLURRY RE-CIRCULATION PUMP HOUSE
I	NEW CHIMNEY

LEGEND	
	EXISTING PLANT
	FGD PLANT
	MAINTENANCE AREA
	PIPE RACK
	FGD BOUNDARY
	MONORAIL
	PLATFORM
	NEW ROAD
	EXISTING ROAD
	NEW PLANT ROAD
	FGD TRENCH
	SMALL GANTRY

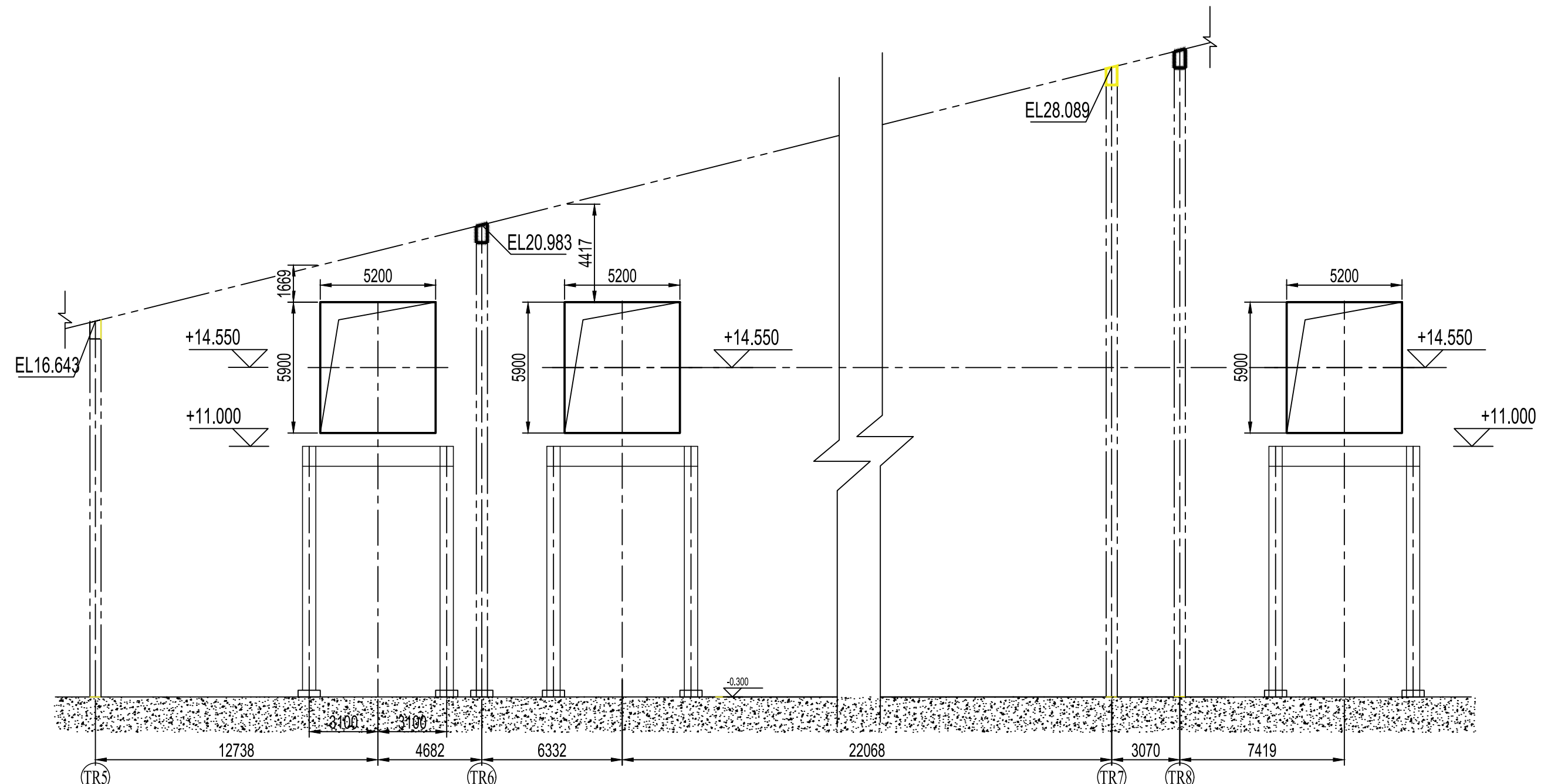
NOTES:
1. Size unit: millimeters, elevation and coordinate unit: meters.
2. PPL will be RL(+82.200m from MSL (mean sea level) which is corresponds to (+/-)0.0m.
FGL will be RL(+82.200m from MSL (mean sea level) which is corresponds to -0.3m. Customer to confirm.
3. The location and diameter of the existing chimney is according to BWG.
4. The inner diameter and foundation diameter of the new chimney are for reference only, and the specific information provided by the chimney unit shall prevail.
5. The device size has not been finalized yet. The dimensions of the equipment and facilities displayed here are based on the corresponding approved dimensions.
6. The rerouting of canal is tentative plan, will be finalized during detail engineering stage.

Digitally signed by
Mihir Acharya
Date:
2024.09.04
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+05'30'

04	2024.07.12	J. Wang	Prepared	Checked	Approved	Revised as per comments
03	2024.04.18	J. Wang	Prepared	Checked	Approved	Revised as per comments
02	2024.01.18	J. Wang	Prepared	Checked	Approved	Re-Arrange for FGD Area changed
01	2023.11.28	J. Wang	Prepared	Checked	Approved	Re-Arrange for FGD Area changed
00	2023.10.16	J. Wang	Prepared	Checked	Approved	First Issue
REV.	DATE	Prepared	Checked	Approved	Details of Revision	
Owner		 Gujarat State Electricity Corporation Limited (GSECL)				
Consultants		 STEAG Energy Services				
Contractor		 Engineering Projects (India) Ltd. (EPIL)				
QFGDM		 ASTIC Environmental Engineering Co.,LTD				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract						
Drawing name: FGD GENERAL ARRANGEMENT PLAN						Project No.: IA23001
Design: J. Wang	Check: 	App: 	EPI Drawing No.: EPI-M-BE-B01-001-001			
Scale: 1:350	Size:	Unit:	ASTIC Drawing No.: IA23001-D-L0101-001			REV. 04

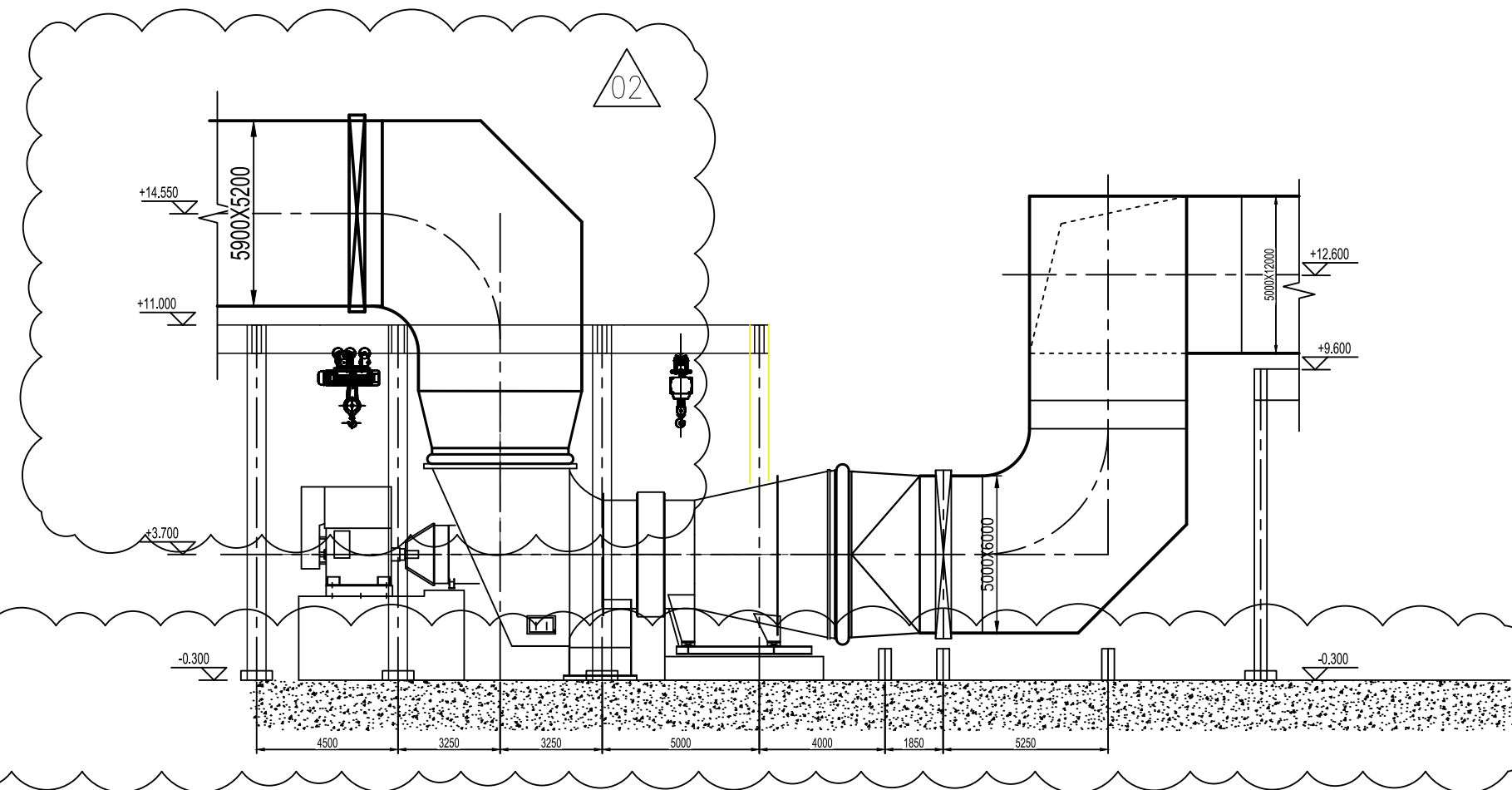


SEC A-A



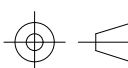
SEC C-C

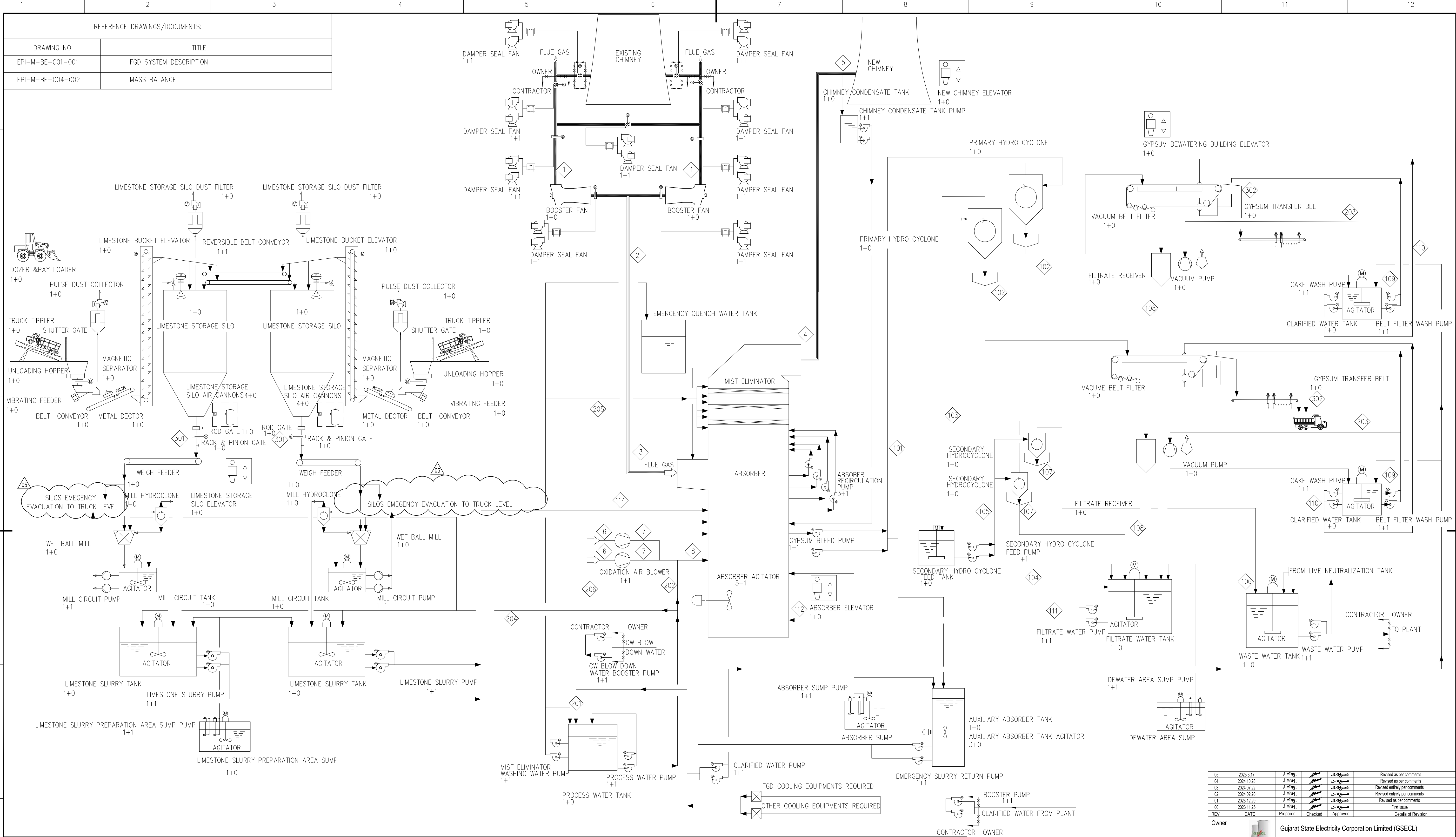
SEC F-F



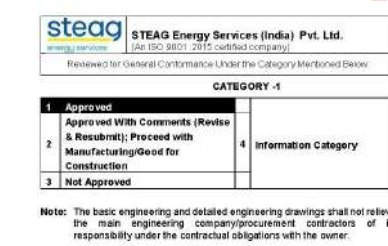
SEC B-B

NOTES:
1. Size unit: millimeters, elevation and coordinate unit: meters.
2. FFL will be RL(+)82.500m from MSL(mean sea level) which is corresponds to (+/-)0.0m.
FGL will be RL(+)82.200m from MSL(mean sea level) which is corresponds to -0.3m . Customer to confirm.












02	2024.07.12	J. Wang	Prepared	Checked	Approved	Revised as per comments
01	2024.04.08	J. Wang	Prepared	Checked	Approved	Revised as per comments
00	2023.10.16	J. Wang	Prepared	Checked	Approved	First Issue
REV.	DATE	Prepared	Checked	Approved	Details of Revision	
Owner		Gujarat State Electricity Corporation Limited (GSECL)				
Consultants		STEAG Energy Services				
Contractor		Engineering Projects (India) Ltd. (EPI)				
QFGDM		ASTIC Environmental Engineering Co.,LTD				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract						
Drawing name: FGD ABSORBER AREA A-A B-B C-C SECTION						Project No.: IA23001
Design: J. Wang	Check: S. Bhandari	App: S. Bhandari	EPI Drawing No.: EPI-M-BE-B01-001-002			
Scale: 1:200	Size:	Unit:	ASTIC Drawing No.: IA23001-D-L0101-002			
					REV. 02	











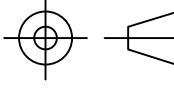
G	LOGISTICS NUMBER	1	2	3	4	5	6	7	8	301	302	101
	LOCATION	BOOSTER FAN INLET	BOOSTER FAN OUTLET	ABERSOBER INLET	ABSORBER OUTLET	WET STACK INLET	OXIDATION FAN INLET	OXIDATION FAN OUTLET	OXIDIZED AIR AFTER COOLING	LIMESTONE DOSAGE	GYPSUM PRODUCTION	ABSORBER DISCHARGES GYPSUM SLURRY
	DESIGN DATA	TOTAL VOLUME FLOW(WET) 2,095,200Nm ³ /hr PRESSURE 100,056Pa	TOTAL VOLUME FLOW(WET) 2,095,200Nm ³ /hr PRESSURE 102,727Pa	TOTAL VOLUME FLOW(WET) 2,095,200Nm ³ /hr PRESSURE 102,456Pa	TOTAL VOLUME FLOW(WET) 2,255,441Nm ³ /hr PRESSURE 100,456Pa	TOTAL VOLUME FLOW(WET) 2,255,441Nm ³ /hr PRESSURE 100,406Pa	TOTAL VOLUME FLOW(WET) 8,716Nm ³ /hr PRESSURE 188,341Pa	TOTAL VOLUME FLOW(WET) 8,716Nm ³ /hr PRESSURE 187,541Pa	TOTAL VOLUME FLOW(WET) 9,152Nm ³ /hr PRESSURE 187,541Pa	TOTAL FLOW 8.43ton/hr	TOTAL FLOW 14.14ton/hr	TOTAL FLOW 81.95ton/hr
	LOGISTICS NUMBER	102	103	104	105	106	107	108	109	110	111	112
	LOCATION	PRIMARY HYDROCYCLONE UNDERFLOW	PRIMARY HYDROCYCLONE OVERFLOW	CYCLONE OVERFLOW TO FILTRATE TANK	SECONDARY CYCLONE FEED	WASTE WATER	SECONDARY CYCLONE UNDERFLOW	VACUUM BELT CONVEYOR FILTRATE	FILTER CLOTH WASHING WATER	FILTER CAKE WASHING WATER	FILTRATE WATER	FILTRATE TO ABSORBER
	DESIGN DATA	TOTAL FLOW 28.49ton/hr	TOTAL FLOW 53.45ton/hr	TOTAL FLOW 38.66ton/hr	TOTAL FLOW 14.80ton/hr	TOTAL FLOW 8.49ton/hr	TOTAL FLOW 6.30ton/hr	TOTAL FLOW 24.39ton/hr	TOTAL FLOW 5.00ton/hr	TOTAL FLOW 5.00ton/hr	TOTAL FLOW 70.35ton/hr	TOTAL FLOW 70.35ton/hr
H	LOGISTICS NUMBER	114	201	202	203	204	205	206				
	LOCATION	LIMESTONE SLURRY TANK TO ABSORBER	PROCESS WATER	PROCESS WATER TO OVERFL. DEOXIDIZE AIROW	VACUUM PUMP SEAL WATER	PROCESS WATER TO LIMESTONE SLURRY TANK	MIST ELIMINATOR RINSE WATER	PROCESS WATER TO ABSORBER MAKE-UP WATER				
	DESIGN DATA	TOTAL FLOW 28.10ton/hr	TOTAL FLOW 132.51ton/hr	TOTAL FLOW 1.00ton/hr	TOTAL FLOW 11.00ton/hr	TOTAL FLOW 19.67ton/hr	TOTAL FLOW 40.00ton/hr	TOTAL FLOW 52.64ton/hr				



Digitally signed by Mihir Acharya
Date: 2025.03.24 16:41:01 +05'30'

05	2025.3.17	J. Acharya		U. Acharya	Revised as per comments
04	2024.10.28	J. Acharya		U. Acharya	Revised as per comments
03	2024.07.22	J. Acharya		U. Acharya	Revised as per comments
02	2024.02.20	J. Acharya		U. Acharya	Revised entirely per comments
01	2023.12.29	J. Acharya		U. Acharya	Revised as per comments
00	2023.11.25	J. Acharya		U. Acharya	First Issue
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner					
		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants					
		STEAG Energy Services			
Contractor					
		Engineering Projects (India) Ltd. (EPII)			
QFGDM					
		ASTIC Environmental Engineering Co.,LTD			
Project:					
Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name:					Project No.:
PROCESS FLOW DIAGRAM					IA23001
Design:	Check:	App:	EPI Drawing No.:		
J. Acharya		S. M. Acharya	EPI-M-C04-001		
Scale:	Size:	Unit:	ASTIC Drawing No.:		
/			IA23001-D-M0103-001		
					REV. 05

DRIVE CONTROL PHILOSOPHY

00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
					
Consultants		STEAG Energy Services			
					
Contractor		Engineering Projects (India) Ltd. (EPIL)			
					
QFGDM		ASTIC Environmental Engineering Co.,LTD			
					
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM					Project No.: IA23001
Design: J ning.	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-001		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-001		REV. 00

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A												
B												
C												
D												
E												
F												
G												
H												

SHEET NO.	DESCRIPTION	REVISION
01	INDEX FOR DRIVE CONTROL PHILOSOPHY	A
02	UNIDIRECTIONAL LT DRIVE – ACB OPERATED (110 KW & ABOVE)	A
03	INTERFACE FOR UNI–DIRECTIONAL LT DRIVE (CONTACTOR CONTROLLED)	A
04	INTERFACE FOR BI–DIRECTIONAL LT DRIVE (CONTACTOR CONTROLLED)	A
05	INTERFACE FOR UNIDIRECTIONAL HT DRIVE	A
06	INTERFACE FOR VFD DRIVE	A
07	INTERFACE FOR MODULATING TYPE PNEUMATIC DAMPER	A
08	INTERFACE FOR DUAL COIL SOV	A
09	INTERFACE FOR SINGLE COIL SOV WITH LIMIT SWITCHES	A
10	INTERFACE FOR SINGLE COIL SOV WITHOUT LIMIT SWITCH	A
11	INTERFACE FOR CONTROL VALVE WITH SMART POSITIONER	A
12	INTERFACE FOR ON OFF PNEUMATIC VALVE	A
13	415V SWGR ACB I/C FOR PMCC/MCC	A
14	415V SWGR ACB B/C FOR PMCC/MCC	A
15	415V SWGR ACB CONTROLLED MOTOR FEEDER	A
16	415V SWGR ACB OUTGOING FEEDER–REMOTE CONTROLLED	A
17	415V SWGR BUS PT	A
18	HT MOTOR TEMP. (WINDING) INTERFACE SCHEME	A
19	HT MOTOR TEMP. (BEARING) INTERFACE SCHEME	A
20	INTERFACE FOR ELECTRIC VALVE	A

00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner	Gujarat State Electricity Corporation Limited (GSECL)				
Consultants	STEAG Energy Services				
Contractor	Engineering Projects (India) Ltd. (EPIL)				
QFGDM	ASTIC Environmental Engineering Co.,LTD				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INDEX FOR DRIVE CONTROL PHILOSOPHY					Project No.: IA23001
Design: 	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-002		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-002		REV. 00

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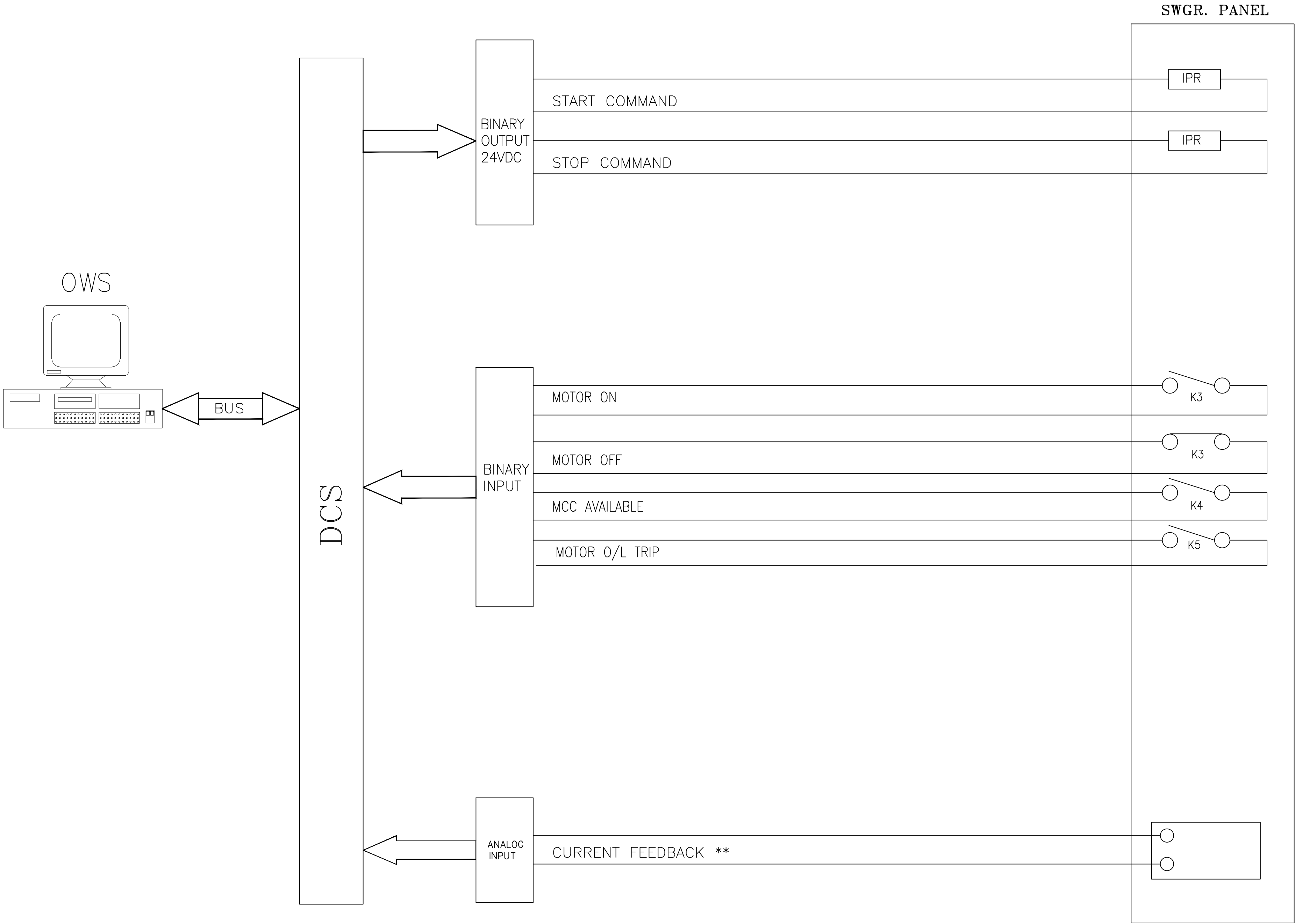
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








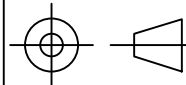
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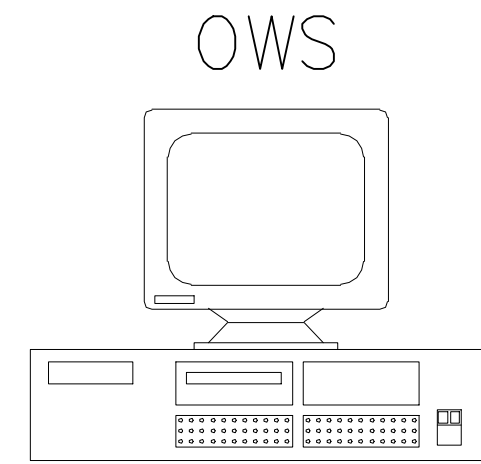
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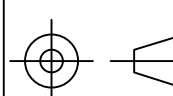


1. LV SWITCHGEAR AND MCC SHALL BE INTERFACE WITH DCS VIA IEC 61850 HAVE AUTO AND MANUAL CHANGEOVER FACILITIES.
2. ** : AS APPLICABLE

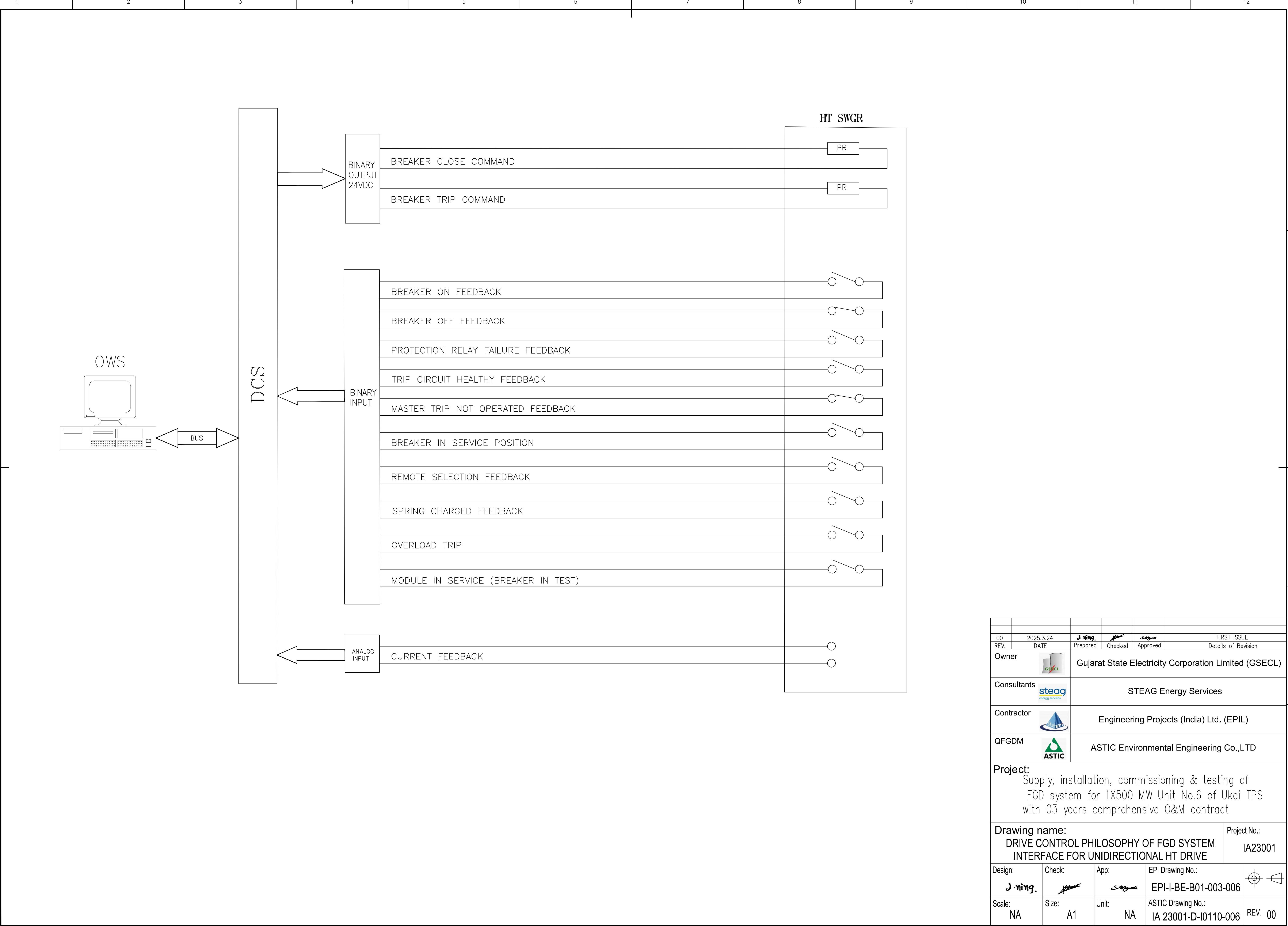
00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM UNIDIRECTIONAL LT DRIVE - ACB OPEATED (110 KW & ABOVE)					Project No.: IA23001
Design: 	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-003		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-003		REV. 00










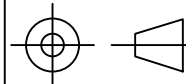


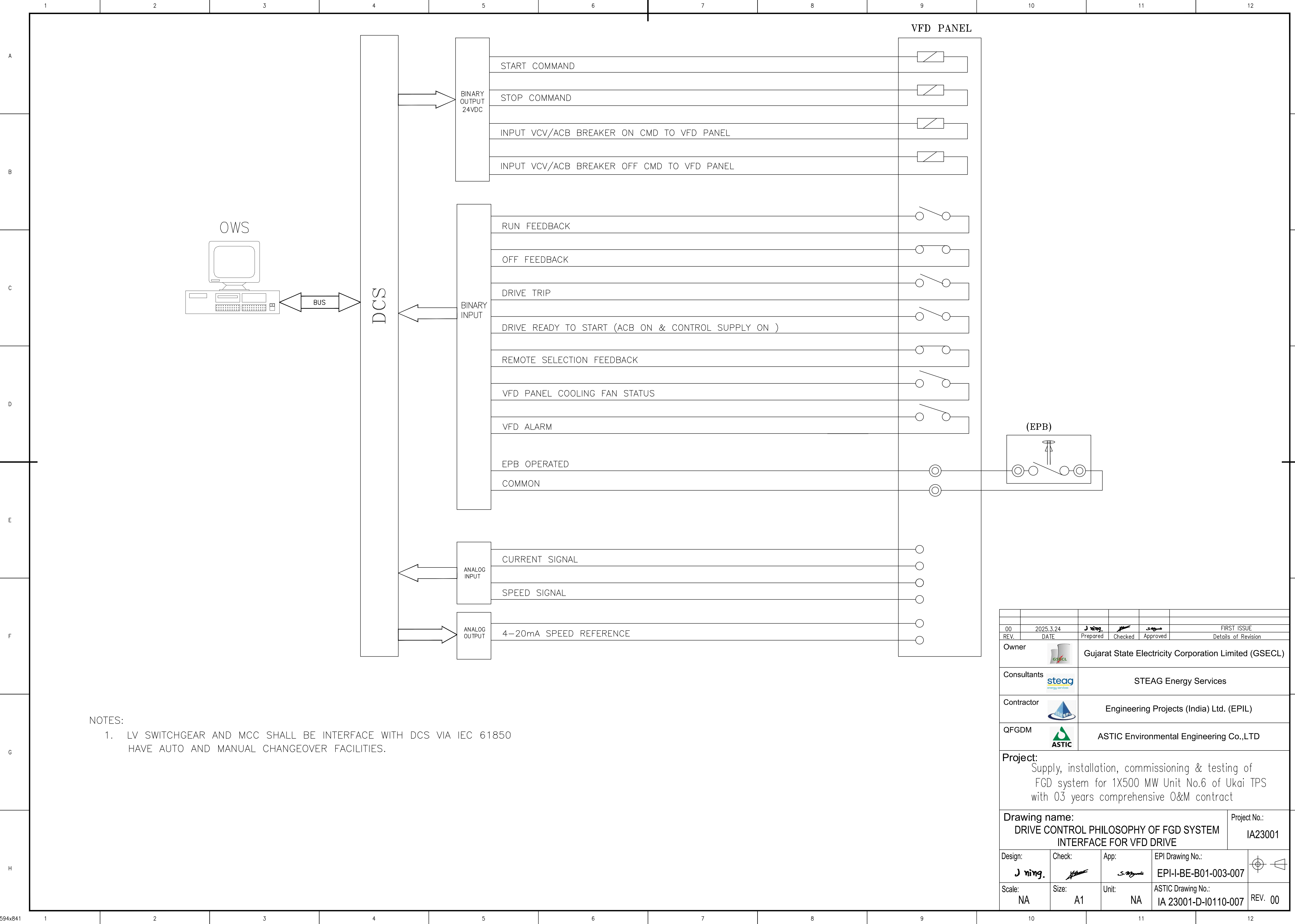
1. LV SWITCHGEAR AND MCC SHALL BE INTERFACE WITH DCS VIA IEC 61850 HAVE AUTO AND MANUAL CHANGEOVER FACILITIES.

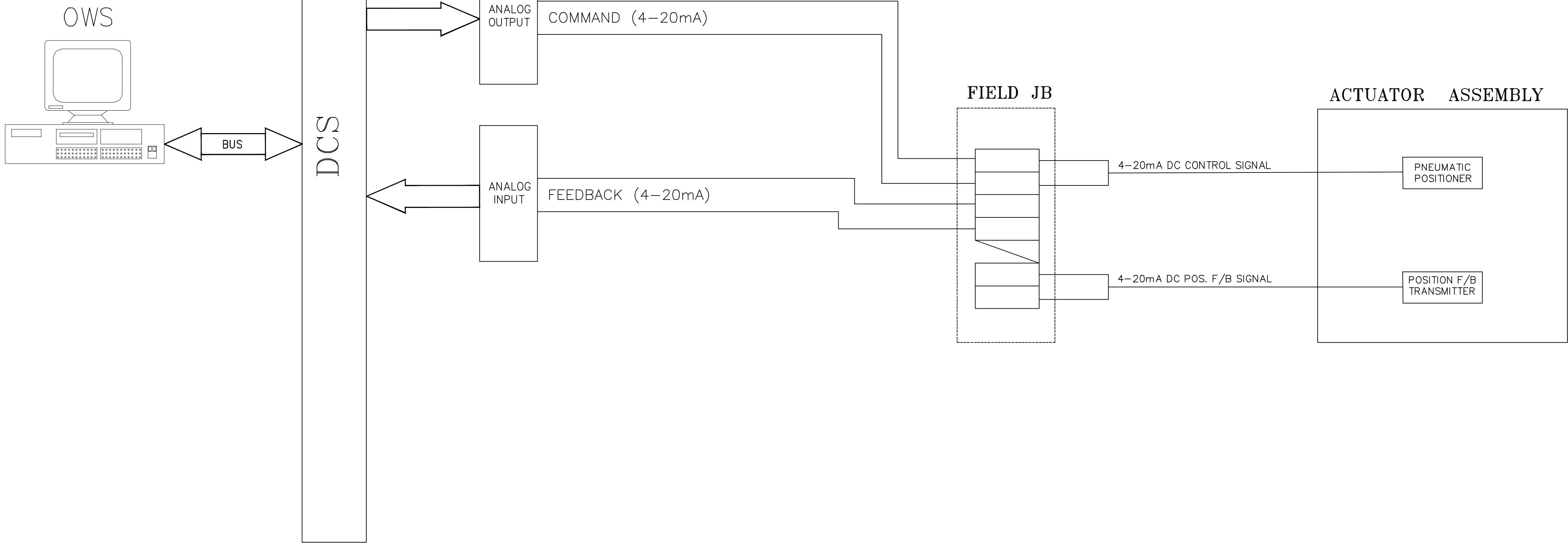
ZSS : ZERO SPEED SWITCH
BSS : BELT SWAY SWITCH
PCS : PULL CORD SWITCH
EPB : EMERGENCY PUSH BUTTON
** : AS APPLICABLE

00	2025.3.24	J.ning			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		 Gujarat State Electricity Corporation Limited (GSECL)			
Consultants					
		STEAG Energy Services			
Contractor		 Engineering Projects (India) Ltd. (EPIL)			
QFGDM					
		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR UNI - DIRECTIONAL LT DRIVE (CONTRACTOR CONTROLLER)					Project No.: IA23001
Design:	Check:	App:	EPI Drawing No.:		
J.ning			EPI-I-BE-B01-003-004		
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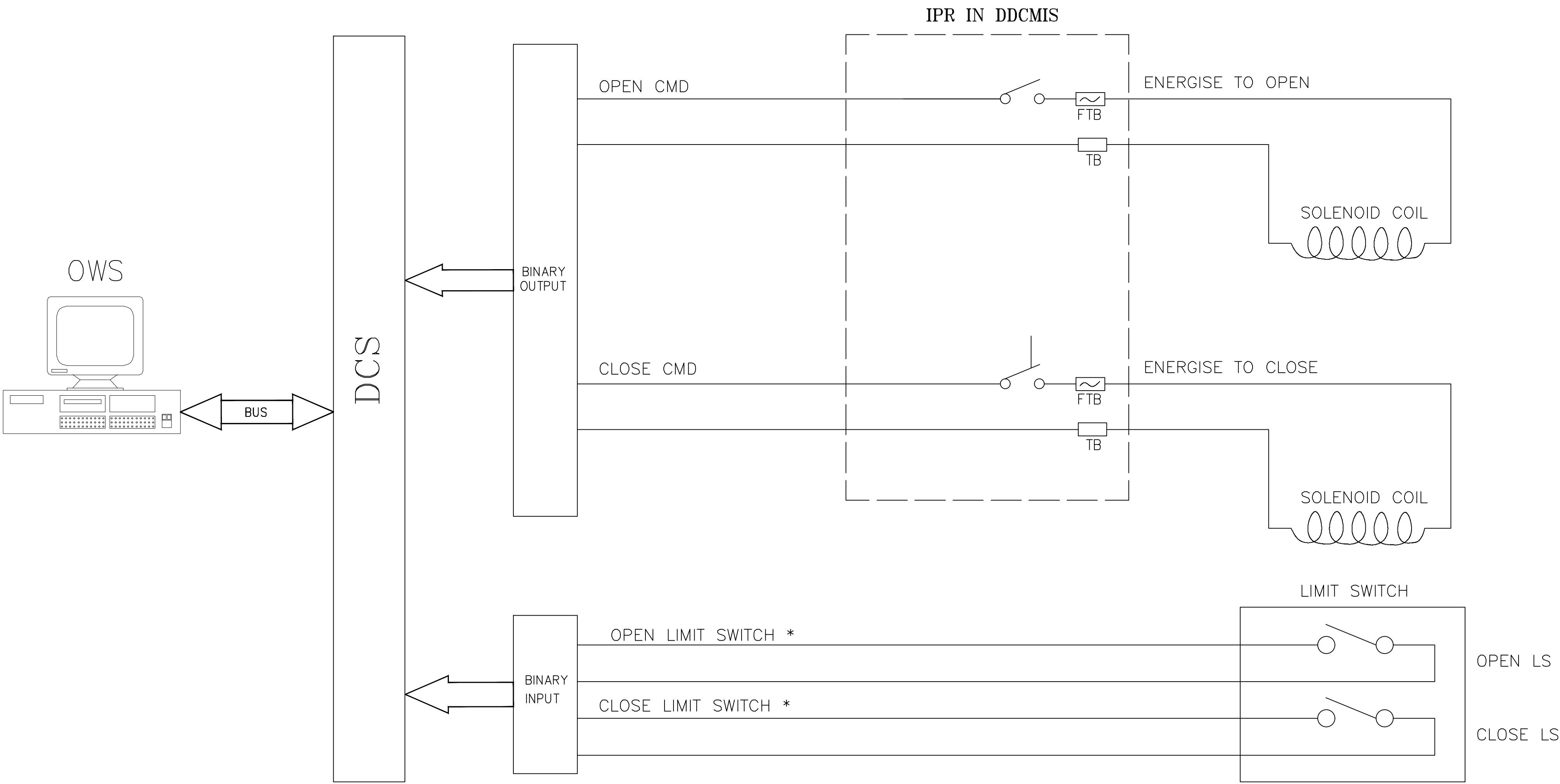


00	2025.3.24	J. ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR UNIDIRECTIONAL HT DRIVE					Project No.: IA23001
Design: 	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-006		
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









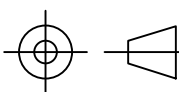




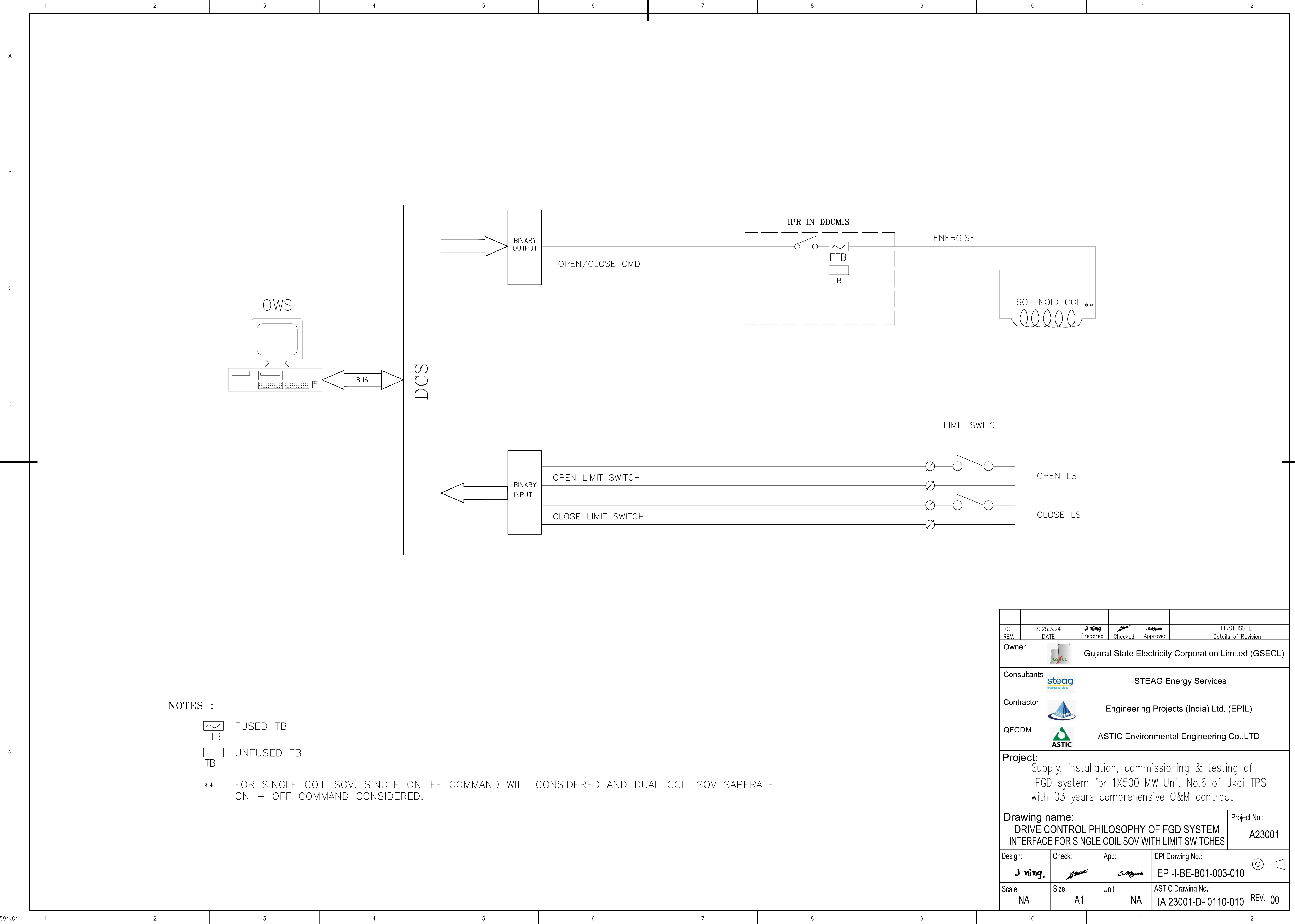
00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR MODULATING TYPE PNEUMATIC DAMPER					Project No.: IA23001
Design:	Check:	App:	EPI Drawing No.:		
J ning.			EPI-I-BE-B01-003-008		
Scale:	Size:	Unit:	ASTIC Drawing No.:		REV. 00
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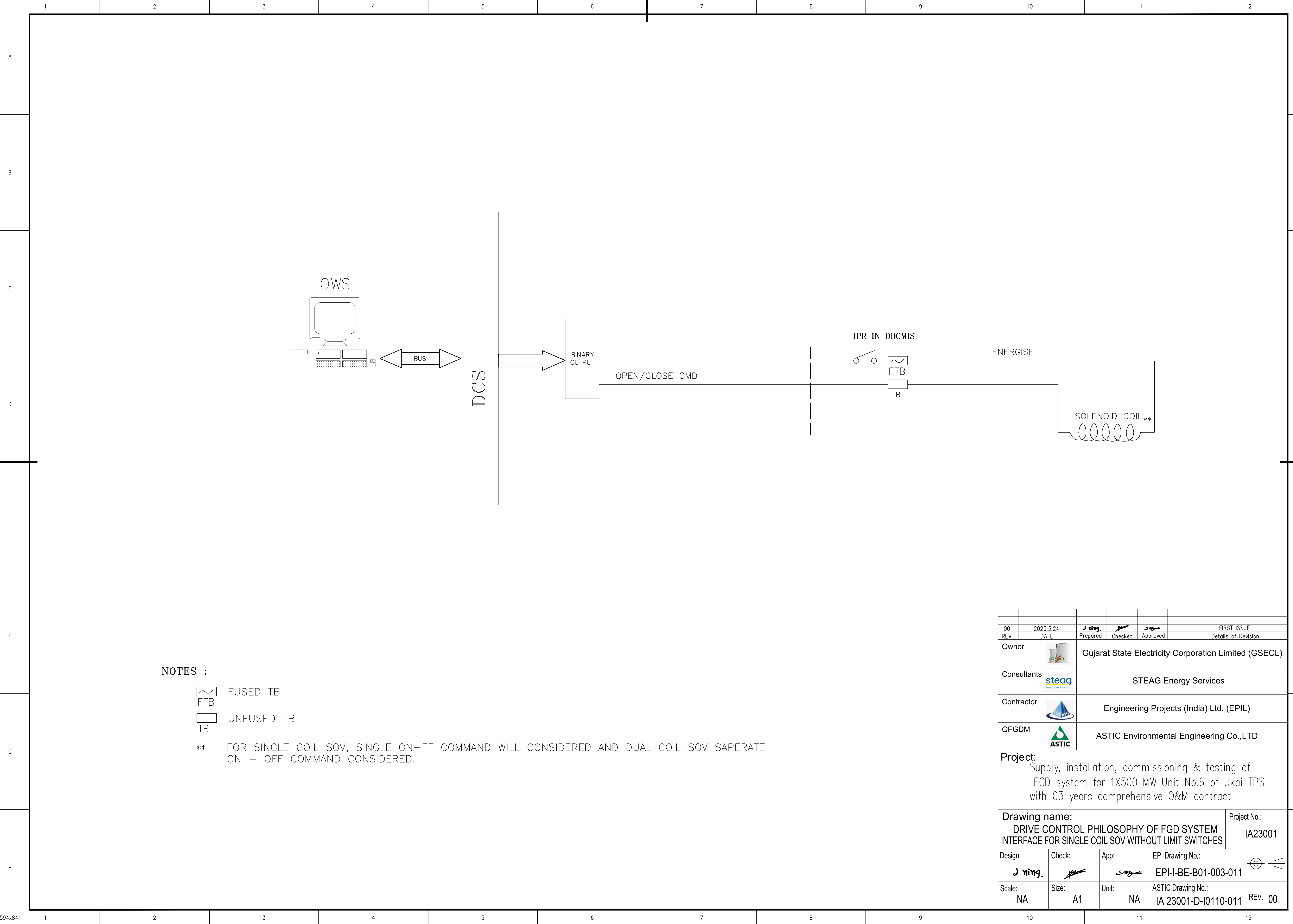
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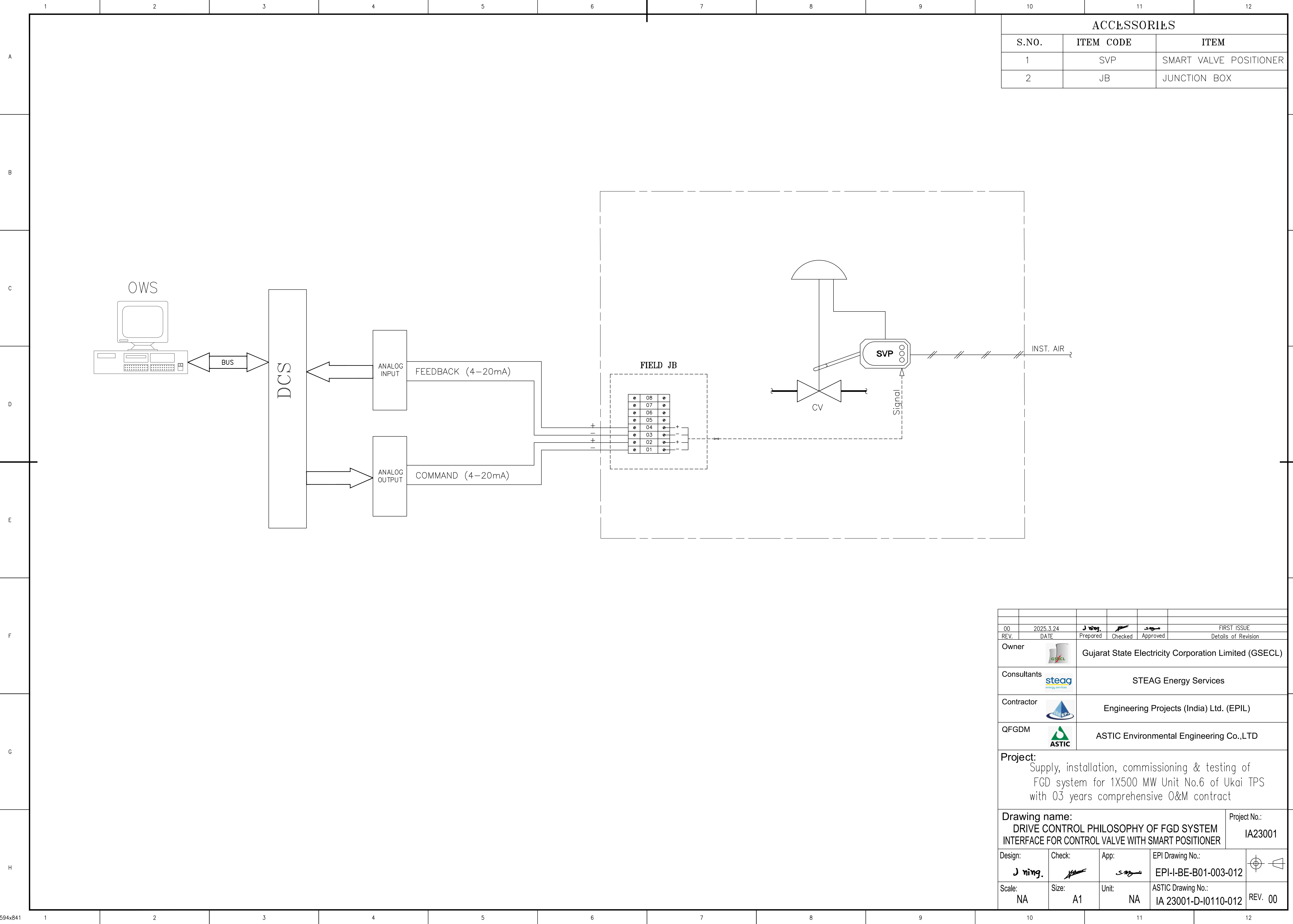
-  FUSED TB
-  UNFUSED TB
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- * AS APPLICABLE.

00	2025.3.24	J. ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR DUAL COIL SOV					Project No.: IA23001
Design:	Check:	App:	EPI Drawing No.:		
J. ning.			EPI-I-BE-B01-003-009		
Scale:	Size:	Unit:	ASTIC Drawing No.:		REV. 00
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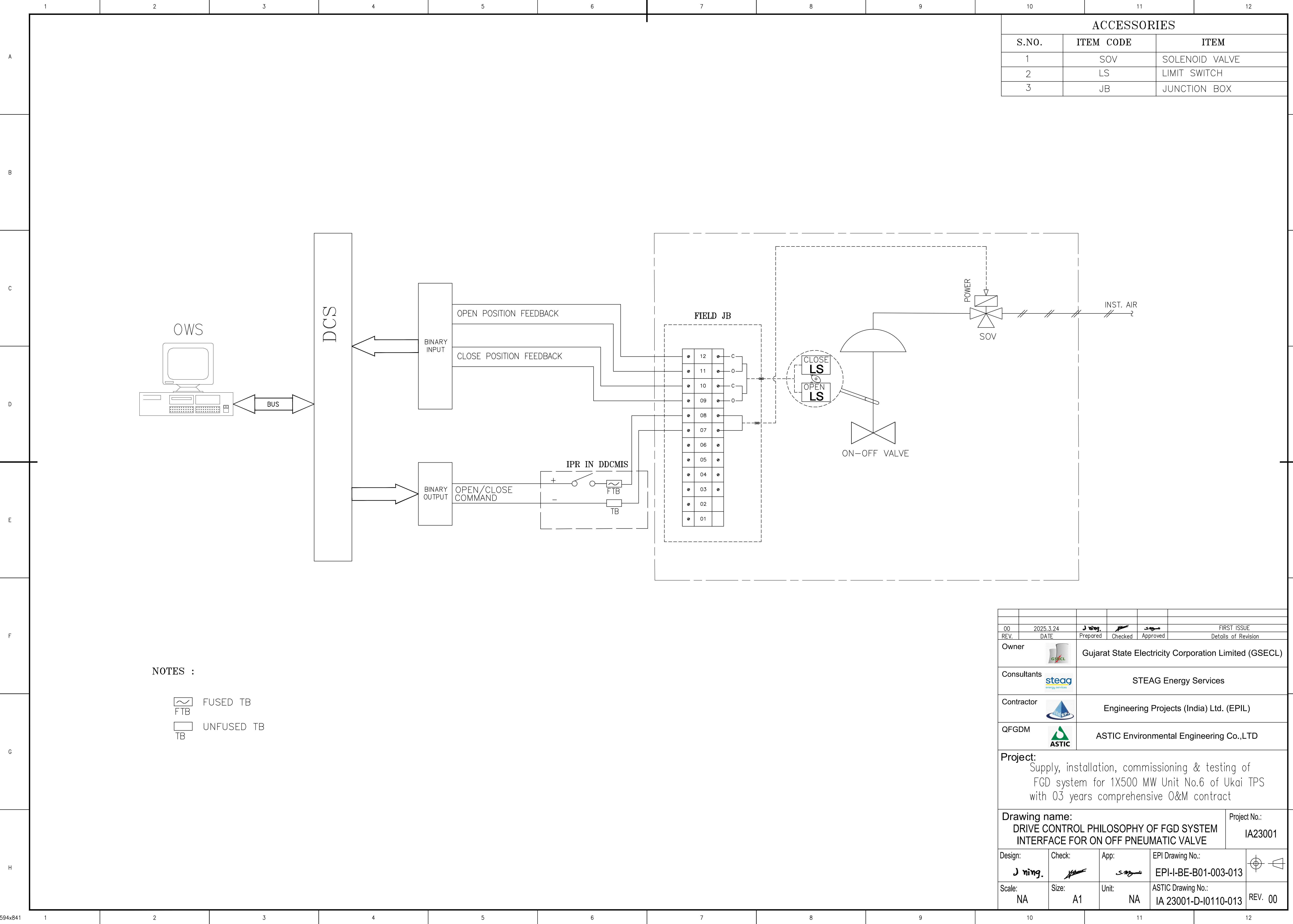


00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner	Gujarat State Electricity Corporation Limited (GSECL)				
Consultants	STEAG Energy Services				
Contractor	Engineering Projects (India) Ltd. (EPIL)				
QFGDM	ASTIC Environmental Engineering Co.,LTD				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR SINGLE COIL SOV WITH LIMIT SWITCHES					Project No.: IA23001
Design: J ning.	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-010		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-010		REV. 00





00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner	Gujarat State Electricity Corporation Limited (GSECL)				
Consultants	STEAG Energy Services				
Contractor	Engineering Projects (India) Ltd. (EPIL)				
QFGDM	ASTIC Environmental Engineering Co.,LTD				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR CONTROL VALVE WITH SMART POSITIONER					Project No.: IA23001
Design: 	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-012		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-012		REV. 00



00	2025.3.24	J ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner	GSECL				
Consultants	STEAG Energy Services				
Contractor	EPIL				
QFGDM	ASTIC				
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR ON OFF PNEUMATIC VALVE					Project No.: IA23001
Design: J ning.	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-013		
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A

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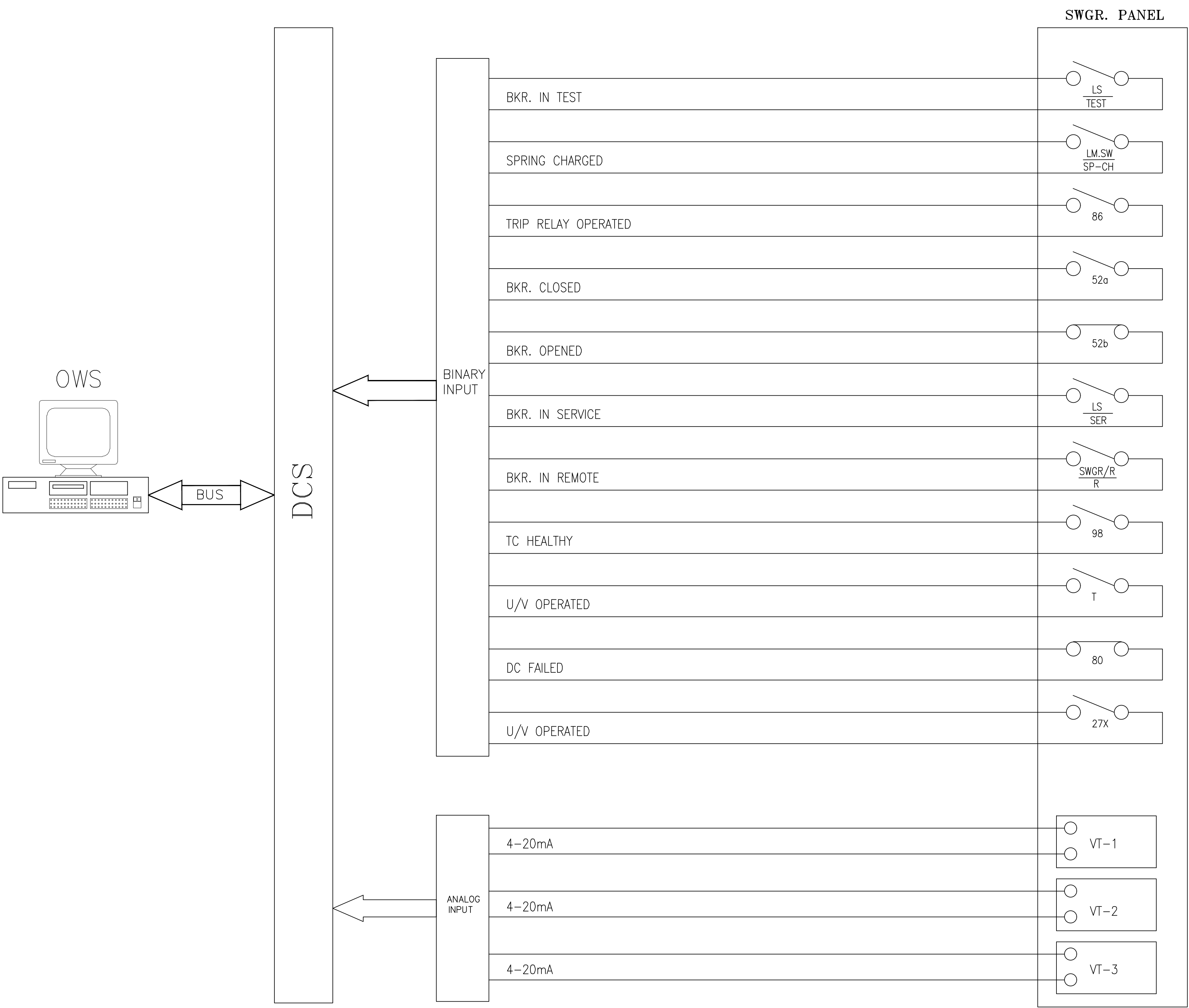
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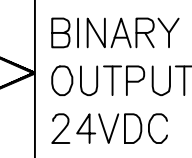
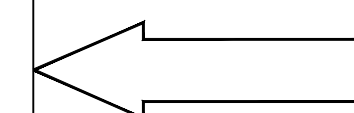
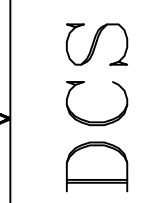
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




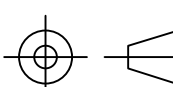


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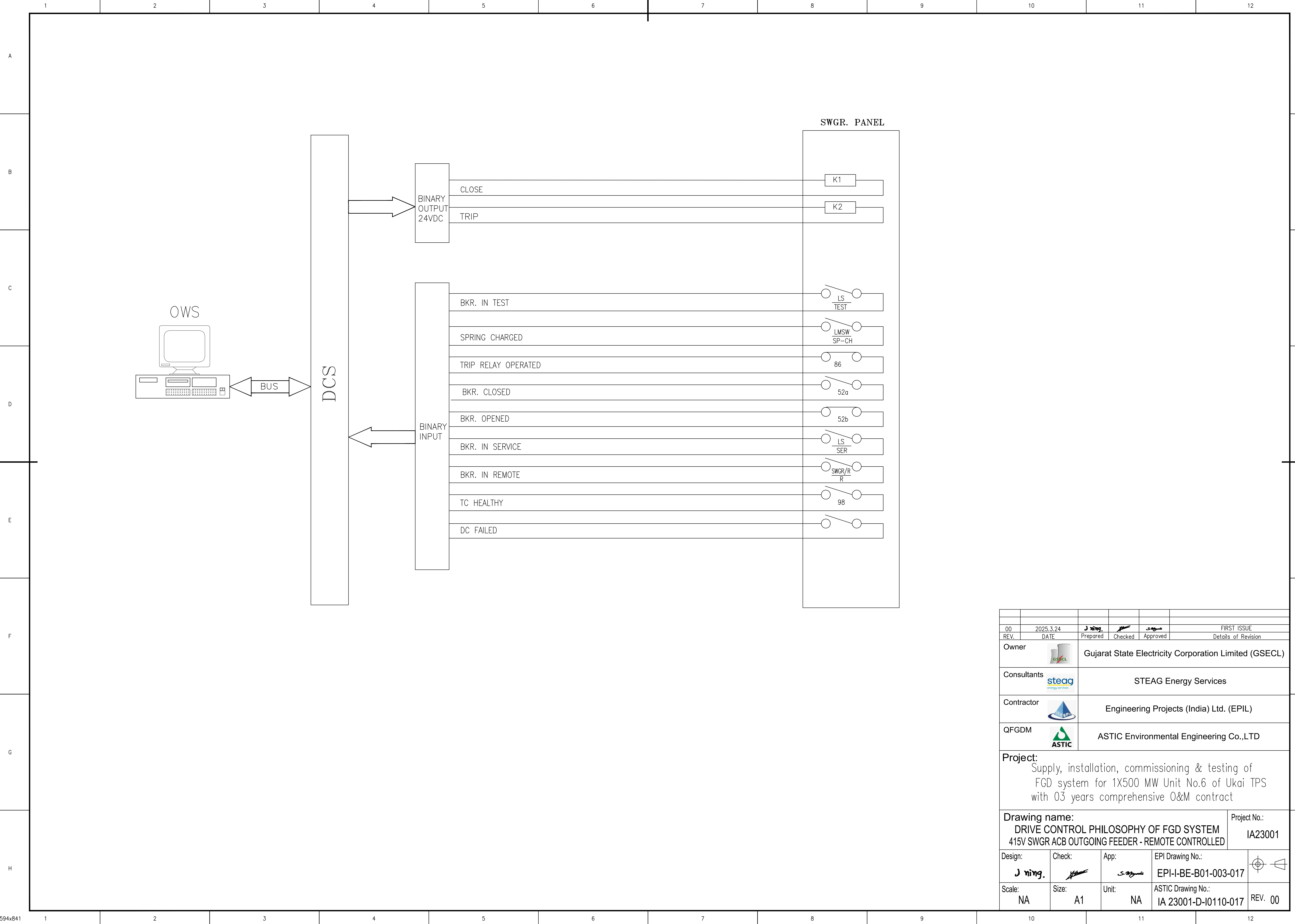


00	2025.3.24	J.ning.			FIRST ISSUE
REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM 415V SWGR ACB I/C FOR PMCC/MCC					Project No.: IA23001
Design:	Check:	App:	EPI Drawing No.:		
J.ning.			EPI-I-BE-B01-003-014		
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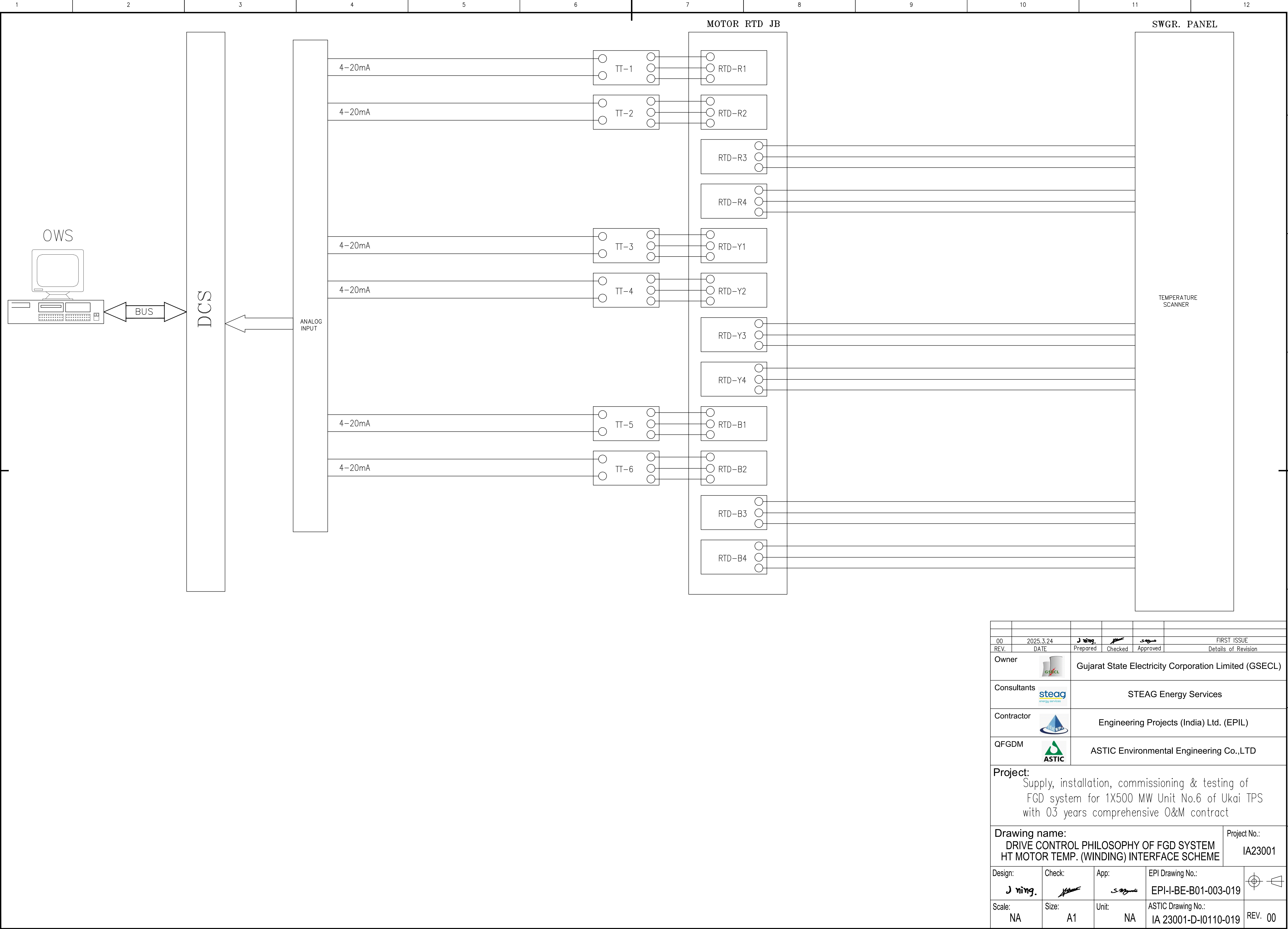


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I/C-1 CLOSE	K1
I/C-1 OPEN	K2
I/C-2 CLOSE	K1
I/C-2 OPEN	K2
B/C CLOSE	K1
B/C OPEN	K2
SPRING CHARGED	LS.SW SP-CH
TRIP RELAY OPERATED	86
BKR. CLOSED	52a
BKR. OPENED	52b
BKR. IN SERVICE	LS SER
BKR. IN REMOTE	SWGR/R R
CHECK SYNC. OK	25C
TC HEALTHY	98
U/V OPERATED	27
2 SOURCES PARALLELELD BEYOND LIMIT	T3
DC-1 FAILED	K5
DC-2 FAILED	K6
PNL DC FAILED	80
MAIN DC FAILED	K7
BKR. IN TEST	LS TEST

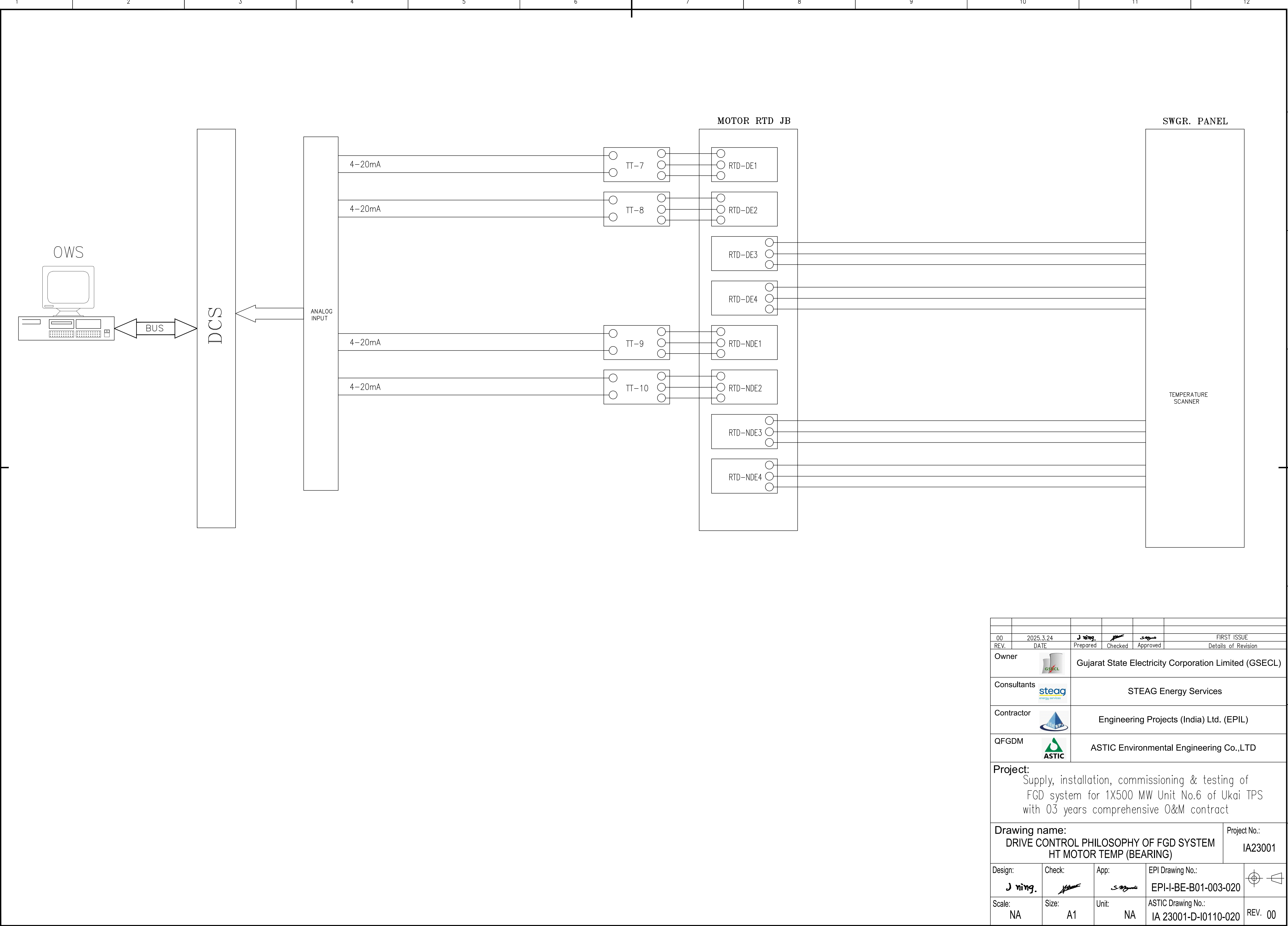
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REV.	DATE	Prepared	Checked	Approved	Details of Revision
Owner		Gujarat State Electricity Corporation Limited (GSECL)			
					
Consultants		STEAG Energy Services			
					
Contractor		Engineering Projects (India) Ltd. (EPIL)			
					
QFGDM		ASTIC Environmental Engineering Co.,LTD			
					
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM 415V SWGR ACB B/C FOR PMCC/MCC					Project No.: IA23001
Design:	Check:	App:	EPI Drawing No.:		
J.ning			EPI-I-BE-B01-003-015		
Scale:	Size:	Unit:	ASTIC Drawing No.:	REV. 00	
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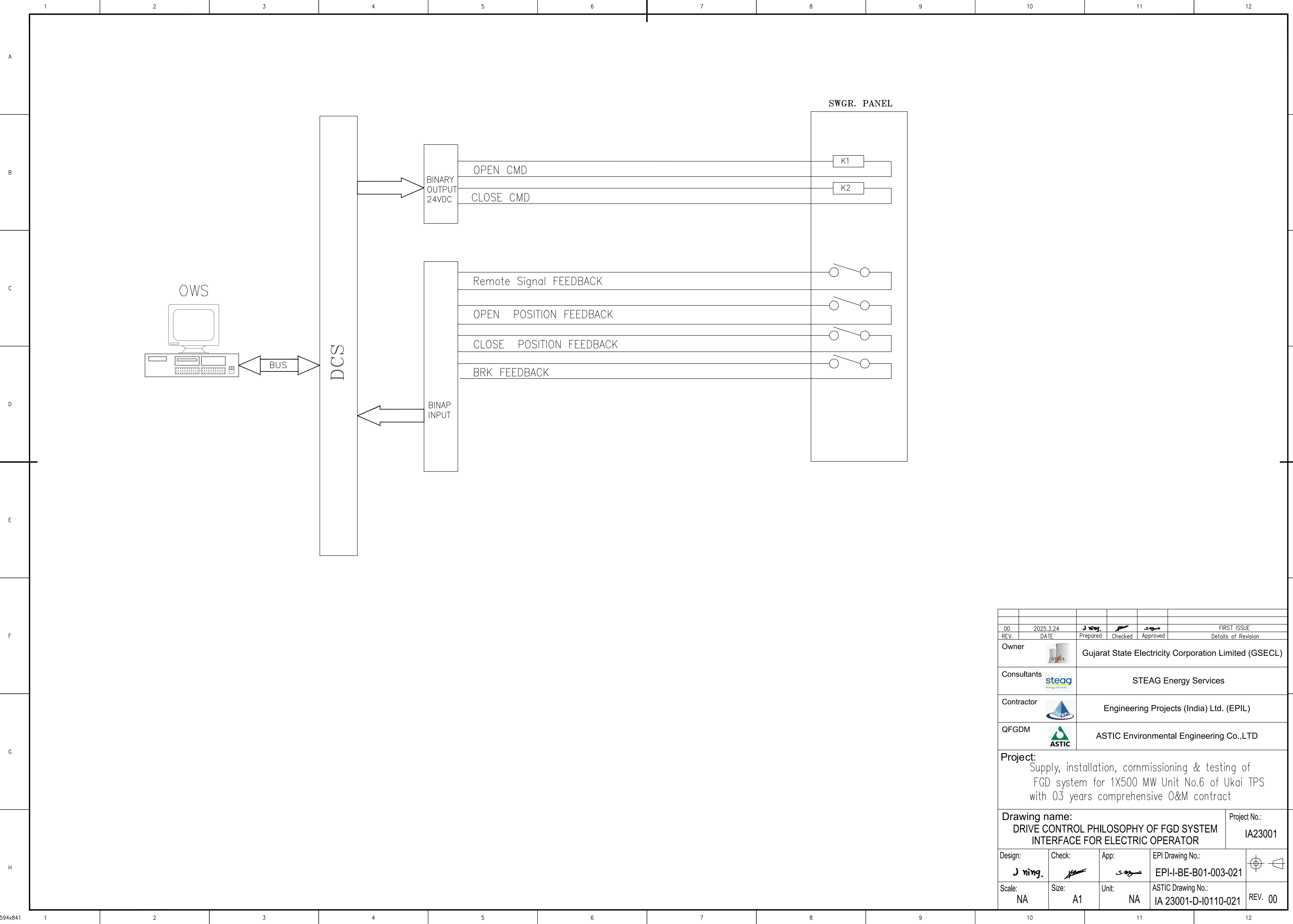
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Owner		Gujarat State Electricity Corporation Limited (GSECL)			
Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM 415V SWGR ACB OUTGOING FEEDER - REMOTE CONTROLLED					Project No.: IA23001
Design: 	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-017		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-017		REV. 00





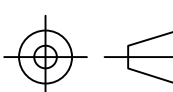


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Consultants		STEAG Energy Services			
Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM HT MOTOR TEMP. (WINDING) INTERFACE SCHEME					Project No.: IA23001
Design: J. ning.	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-019		
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Contractor		Engineering Projects (India) Ltd. (EPIL)			
QFGDM		ASTIC Environmental Engineering Co.,LTD			
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM HT MOTOR TEMP (BEARING)					Project No.: IA23001
Design: J. ning.	Check: 	App: 	EPI Drawing No.: EPI-I-BE-B01-003-020		
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Contractor		Engineering Projects (India) Ltd. (EPIL)			
					
QFGDM		ASTIC Environmental Engineering Co.,LTD			
					
Project: Supply, installation, commissioning & testing of FGD system for 1X500 MW Unit No.6 of Ukai TPS with 03 years comprehensive O&M contract					
Drawing name: DRIVE CONTROL PHILOSOPHY OF FGD SYSTEM INTERFACE FOR ELECTRIC OPERATOR					Project No.: IA23001
Design: J. ning.	Check: _____	App: _____	EPI Drawing No.: EPI-I-BE-B01-003-021		
Scale: NA	Size: A1	Unit: NA	ASTIC Drawing No.: IA 23001-D-I0110-021		REV. 00

CLAUSE 9

UPS SYSTEM

1.0.0 GENERAL:

This specification covers the design, manufacture, supply, erection, testing and commissioning complete UPS System required at various areas of FGD system package.

It is not the intent to specify completely herein all details of the equipment, nevertheless, the equipment shall be complete and operative in all respects and shall conform to the highest standard of engineering, design and workmanship.

Should the bidder wish to deviate from this specification in any way, he shall draw specific attention to such deviation by listing the deviations in the deviation schedule without which his offer will be considered in conformity with the specification in all respects.

2.0.0 SCOPE OF WORK:

The scope of work shall include one but not limited to the following:

- One 230 V AC single phase, 50 Hz redundant UPS system, complete with all accessories.
- UPS distribution panels/boards

Any requirement for reliable operation of FGD system shall be fed from the above UPS.

3.0.0 CODES & STANDARDS:

The UPS system and components shall conform to relevant IEC/IS Standards amended up to date.

4.0.0 TECHNICAL REQUIREMENT:

- 4.1.0 The UPS system shall have adequate capacity to supply clean power to the instrumentation control system & plant Communication system for a period of 60 min in case of mains power failure. Voltage variation shall be limited to $\pm 1\%$ and frequency variation to $\pm 2\%$.
- 4.2.0 UPS system shall comprise of 2 sets static type redundant converter-cum-chargers and Inverters, each capable of supplying 100% load with 20% design margin, connected in parallel, one Battery Banks with support time of 60 min. and an output AC Power distribution board.

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- 4.3.0 UPS shall also consist of one by-pass regulating transformer along with surge suppression equipment, static switches, servo controlled voltage stabilizer, manual bypass arrangement and other power devices to supply power at constant output voltage in case of failure of both inverter system.
- 4.4.0 24V/48V DC required for Control & instrumentation shall be derived from UPS supply through converters.
- 4.5.0 The UPS shall have facilities for remote indication of the essential alarms and remote metering.
- 4.6.0 The overall efficiency of UPS system shall not be less than 90%.
- 4.7.0 The AC distribution board shall have switch fuse/MCCB feeders. 10% spare feeders of each rating and each type with minimum one (1) feeder shall be provided. The output from UPS shall be taken to loads in redundant feeders with changeover arrangement at receiving panel.
- 4.8.0 All other requirements such as panels, distribution boards, painting and other auxiliaries shall be as per the specifications given in LT Switchgears. The degree of protection for cubicles shall be IP 31 and the UPS shall be located in air conditioned atmosphere.
- 4.9.0 Input voltage to UPS shall be from 3 different, 3 phase 3 wire sources. Two supplies shall be normal supplies fed from Bus section-A & B PCC and the third supply shall be from Emergency section with voltage variation $\pm 10\%$ & frequency variation $+3\%$ to -5% .
- 4.10.0 In the event of mains supply failure the floating battery bank shall be connected to the DC input of each inverter and maintain continuity of AC Power output without interruption, through inverters.
- 4.11.0 On failure of one set of Converter & Inverter, the other set will take over the 100% load automatically without any interruption. On failure of both the set, SCVS will take over the power supply distribution and will supply the power. The changeover from inverter to by-pass transformer shall not be more than 5 ms
- 4.12.0 UPS may be provided with forced air cooling system as required. Fan cooling, if envisaged, shall be achieved with 2 x 100% cooling banks. In case of failure of running bank / one fan, the standby bank shall start automatically.
- 4.13.0 Battery charger shall be of automatic type having provision for boost and float charging of battery bank. However, provision shall be made for manual

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charging of battery banks, if required.

- 4.14.0 Inverter of UPS system shall synthesise AC wave form through pulse width modulation with atleast 12 pulses/ half cycle to take care of the dynamic conditions (like switching on and off of the connected electrical loads).
- 4.15.0 The output frequency shall be controlled by a quartz crystal oscillator.
- 4.16.0 The UPS shall have an over load capacity of 125 % rated capacity for 10 minutes and 150 % rated capacity for 10 sec. The inverter shall have sufficient I²t capability to clear fault in the maximum rated branch circuit. The sizing of UPS shall be based on the power factor of the loads being fed subject to a maximum of 0.8.
- 4.17.0 The UPS shall be protected from over voltage, under voltage, overload and short circuits
- 4.18.0 The UPS shall be tropicalized and shall have microprocessor based self-diagnostic feature.
- 4.19.0 24V DC required for Control & instrumentation shall be derived from UPS supply through converters.
- 4.20.0 The UPS shall have following alarm/status indications as a minimum:
- System normal (Green)
 - AC input failure (phase wise)
 - Battery discharge
 - Low battery voltage
 - Inverter failure (phase wise)
 - Charger failure
 - Over temperature
 - Overload trip
 - AC input over voltage
 - AC input under voltage
 - Static switch failure
 - Stand-by on
 - Fan failure
 - Oscillator failure
- 4.21.0 The UPS shall have facilities for remote indication of the essential alarms and remote metering.

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- 4.22.0 The design shall provide for high availability of equipment by ensuring high mean - time – between failures (MTBF) and low mean-time-to-repair (MTTR).
- 4.23.0 The storage battery shall be Ni-Cad type and shall be kept in Non-Air-conditioned room .The battery storage unit shall be complete with all accessories and shall have adequate capacity so as to provide the rated DC current to the inverter unit for a period of sixty (60) minutes in case of mains failure. The recharging time of the unit shall not be more than ten (10) times discharge time. Ni-Cad batteries shall generally comply to the requirements specified battery section.
- 4.24.0 Contractor shall furnish DBR (Design basis report).GTP(General technical Particulars) and sizing calculation of batteries /convectors/chargers for owner/engineer review and approval.

5.0.0 TESTS

- 5.0.1 All routine tests covered under IEC-62040-3 shall be conducted on the UPS system in addition to the functional tests in presence of Owner or his representative.
- 5.0.2 UPS and it's accessories shall be of type tested and proven type. If relevant type test certificates are not available the same shall be conducted without any cost implications.
- 5.0.3 All tests specified in battery section are applicable for UPS batteries also.

6.0.0 PAINTING

Equipment shall be finished with two (2) under coats of high quality epoxy based primer followed by two coats of epoxy painting. Painting shall be carried out by approved process.

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GUJARAT STATE ELECTRICITY CORPORATION LTD.



Supply, installation, commissioning & testing of FGD system for 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS with comprehensive O&M contract.

SECTION – X

Scope of work for Control & Instrumentation system

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SECTION – X

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SUB-SECTION - I GENERAL TECHNICAL REQUIREMENT

1. GENERAL

1.1 INTENT OF SPECIFICATION:

1. This specification is intended to provide the technical guidelines for the Instrumentation & Control system for FGD system. The duty of services specified below and in other drawings and documents forming part of this specification are considered required for safe, reliable, trouble free and efficient operation with adequate maintenance facilities enumerated in this specification.
2. Microprocessor based PLC System shall be supplied for the FGD. The system will be linked to plant DCS for integrated monitoring, control & operation. To demonstrate integrated monitoring with existing MAX DNA make DCS, necessary supply/works /changes/modification required in the existing plant DCS shall be in bidder's scope.
3. In conformity with the guidelines provided in the specification, the scope of works shall completely cover all the instrumentation & control equipment, functions, activities and documentation specified under the accompanying.

Technical Specifications and shall not be limited to the following:

- a) Detailed design and engineering of the manufactured equipment; system integration and system engineering.
- b) Complete manufacture including shop testing before shipment.
- c) Specifying, procurement, quality inspection of bought-out items from sub-suppliers. Design co-ordination for and integration with bought-out items.
- d) Coordination, integration and interface between the station I & C system and Offered package.
- e) Providing engineering drawings, documents, licensed copy of software and developmental tools, data, instruction, operation and maintenance manual etc. for Owner's review/ approval / record.
- f) Arranging for Owner's inspection and testing of manufactured as well as bought-out items at the respective works.
- g) The Bidder shall give the Engineer/Inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the Bidder's account except for the expenses of the Inspector. The Engineer/Inspector, unless the witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days of the date on which the equipment is notified as being ready for test/inspection failing which the Bidder may proceed with test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of test reports in six (6) copies.

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- h) Packaging and transportation of instruments, equipment, accessories and erection hardware from the manufacturer's works to the site, including transit insurance.
 - i) Opening of site office at location provided by Owner.
 - j) Receipt, storage, preservation of instruments, equipment and erection hardware at the site.
 - k) Fabrication of site-constructed items.
 - l) Pre-assembly (if any), erection, testing and commissioning of all the equipment and instruments supplied, in totality.
 - m) Performing availability tests and Performance and Guarantee tests.
 - n) Prepare and submit approved & as-built drawings and documents in hard and soft copies.
 - o) Furnishing of spares, tools and tackle and test instruments.
 - p) Fulfilling post-commissioning liabilities.
 - q) Arranging for the training of Owner's personnel of different categories at manufacturer's works as well as plant site.
 - r) Other activities detailed in subsequent sections of the Specification.
 - s) Any other activity, not mentioned explicitly, but felt essential by Bidder for successful completion of work.
4. Requirements enumerated in this specification are qualitative in nature and are based on typical configuration of the plant for the purpose of bidding. It shall be the responsibility of Bidder to offer Instrumentation & Control system to meet the actual functional requirements of the plant offered.
5. It is not the intent to completely specify the details of design and construction features herein. Nevertheless, the instruments / equipment and their installation shall conform to high standards of engineering design and workmanship in all respects.
6. In the event of conflict between requirements of any two clauses of this specification / documents or requirements of different codes / standards specified, the more stringent requirement as per the interpretation of the Owner shall apply.

1.2 GENERAL PERFORMANCE REQUIREMENT:

- 1. Instruments and control equipment shall be guaranteed to meet the performance, functional and accuracy requirements enumerated in the specification.
- 2. Instruments and control equipment shall be guaranteed against manufacturing defect for at least one year from the date of handing over to Owner.
- 3. The guaranteed performance criteria shall be met in full during the guarantee period.

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4. Any predictable or planned deterioration and / or obsolescence of equipment shall be clearly brought out in the Bid.
5. Instruments and control equipment shall be capable of maintaining the specified performance and accuracy standard over the complete regime of operation of main equipment, taking into account the excursion of parameters during emergency or malfunction of main equipment.
6. Instrumentation & Control system shall not impose any limitation or constraint on the operation of the main equipment. It shall be possible to utilize any inbuilt over capacity in design of an equipment with complete controllability and observability.
7. The control system shall be designed to prevent abnormal swings due to loss of control power, instrument air, failure of any system component, open/short circuits or any other such failure or degradation in the system and shall drive the plant and equipment to fail safe condition.
8. All modulating devices shall be in stay put condition during any of the above failures.
9. Mean Time between Failure (MTBF) of the instruments shall be considerably higher than the equipment they shall cater to in order to avoid shutdown on account of instrumentation failure.
10. Bidder shall introduce redundant control equipment or instruments wherever it is felt that the introduction of the same may lead to reduction of downtime of plant and equipment, in addition to the cases clearly identified in the specification.
11. In cases where continuous monitoring of performance of equipment is envisaged, Bidder shall supply instruments of suitable accuracy class to meet the accuracy requirements of the calculation as per ASME standard.
12. All instruments and control equipment shall ensure high reliability, low downtime and ease of maintenance.
13. Protective systems and their safety features shall be guaranteed to ensure the main equipment safety in the event of tripping, mal operation and malfunction.
14. The performance guarantee shall be on complete system basis as well as on the basis of isolated, individual instrument or component.
15. Bidder shall replace all instruments failing to meet the performance stipulations of the specification at any stage of the project.
16. All instruments / equipment shall be capable of performing satisfactorily in continuous commercial operation conforming to all relevant codes and regulatory requirement under the specified environmental conditions.
17. In general, equipment located in air condition environment shall be capable of operating without any degradation of performance or damage for at least twelve (12) hours to keep the plant in running condition in case failure of air conditioning units. For any equipment or component that cannot confirm to this requirement, Bidder shall consider back-up packaged split type air conditioning unit/s.
18. TRIAL OPERATION:

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The trial operation shall be conducted by Contractor as per the stipulation of this specification which shall be witnessed and signed off by Owner.

19. PERFORMANCE AND GUARANTEE TEST:

Contractor shall perform the tests for performance and guarantee as per the stipulations of this specification.

1.3 GENERAL DESIGN REQUIREMENTS:

1. Equipment and system shall be designed and constructed to perform accurately and safely under the environmental and operating conditions described or implied in this specification without undue heating, vibration, wear, corrosion.
2. Equipment and systems shall be supplied from latest proven product range of reputed experienced manufacturer whose successful performance has been established by a considerable record of satisfactory operation in large capacity coal fired thermal power stations. Bidder shall obtain Owner's approval for the selected manufacturers for critical items.
3. The equipment, systems and accessories furnished shall be designed and constructed to meet the performance specification during the continuous service life of the plant.
4. Bidder shall indicate the year in which the offered models of the instruments and control system have been introduced and how long the commercial production of the same is expected to continue. In any case, Bidder shall ensure supply of spare parts for lifetime of the plant. In case if it is felt by Bidder that certain equipment/components is likely to become obsolete, Bidder shall clearly bring it to the notice of Owner and indicate step proposed to deal with such obsolescence like maintaining "bonded spares" with the manufacturer/s.
5. Any part/module of the I & C system which are not listed under recommended spares shall be deemed as having life expectancy not less than the expected life of the plant i.e. 30 years.
6. latest version of hardware and software available at the time of system designing. In case of future up-gradation of software, Bidder shall remain committed to upgrade the supplied system with the new version within the warranty period and ensure successful integration of the system. Beyond the warranty period and during the remaining life of the plant, any up gradation in hardware and software shall be brought to the notice of Owner indicating whether it shall be possible to upgrade the system by partially replacing, modifying and/or patching of hardware /software.
7. For the sake of completeness of the system and in order to ensure desired performance & safety measures, any hardware or software item felt required, shall be in the scope of Bidder irrespective of their explicit or implicit inclusion in the accompanying document.
8. Technical details furnished in the accompanying documents are subject to change in future within reasonable limits, which Bidder shall abide by.

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1.4 GENERAL TECHNICAL REQUIREMENTS:

- 1 Instrumentation and Control system design will aim at high availability, efficient performance, plant & personnel security and high level of automation with minimum deployment of operational manpower.
- 2 Uniformity of make and type of instruments and control components shall be followed throughout for rationalization of spares' inventory, except for certain proprietary items where this requirement cannot be met.
- 3 PLC system shall perform closed loop control, open loop & sequential control and data acquisition & archiving functions in hierarchical levels.
- 4 Suggestive Plant Control System Overview Diagram for the PLC is schematically shown in Drawing No. FGD-C&I-I.
- 5 Transmitters shall be smart type. Each smart equipment shall communicate in the form of analog signal 4-20 mA DC with superimposed digital signal, zero adjustment, calibration and diagnostic from remote location. All transmitters /analysers/positioners/controllers shall be SMART type with HART protocol.
- 6 Power supply for Transmitters, contact interrogation, interposing relay and solenoid shall generally be ungrounded 24V D.C. Power supplies for interrogation, relay and solenoid shall be provided from bulk power supply modules separate from control rack power supplies. In all cases redundancy in power modules shall be considered.
- 7 When more than one device utilizes the same signal, the signal source shall meet such signal requirement and with proper isolation and without overloading. Short circuiting or grounding of one device shall not have any perceptible influence on any other consumer point nor shall change the transmitter calibration.
- 8 Final control device for regulating control shall have pneumatic actuator. Actuators for isolating and inching duty dampers and valves shall be, in general, electrical motor operated.
- 9 Electronics located outside control room areas shall be tropicalized based on environment conditions.
- 10 Local instruments shall be provided in cases where these are required for maintenance, commissioning and re-commissioning of major equipment or for calibration and setting of other instruments and for equipment safety. In general, the plant operation shall not depend on local measurement or local manual operation.
- 11 In general, instruments installed outdoors and in areas where these may be exposed to splashing oil, water, steam etc. shall be mounted in closed type enclosures. For other areas (indoor), open type racks may be used.
- 12 Drain from instrument rack/enclosure shall be routed to nearby plant drainage system.
- 13 Temperature measurement shall have upscale / down scale drive to protect from process upset in case of sensor failure. Both the elements of duplex temperature sensors shall be terminated to junction boxes.

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- 14 In general, for temperature measurements up to 300°C, Platinum resistance temperature detectors shall be used unless the area is prone to vibration. For temperature measurement above 300°C up to 750°C, Chromel-Alumel (K) type thermocouple shall be used. For high temperature applications, noble metal thermocouple (TC) such as Pt Rh-Pt (R) type in Inconel sheathed thermo well shall be used.
- 15 Temperature elements shall be in sheath tube and in thermo wells of suitable material. Thermo well made of Tungsten carbide shall be used for highly abrasion application.
- 16 Temperature elements shall be directly connected to their respective input modules or Temp Transmitter is also acceptable.
- 17 In general, temperature switching function shall be configured by use of temperature elements and software configured limit value monitors instead of using conventional field mounted temperature switch.
- 18 The instruments and control equipment shall be logically grouped in electronic cabinets in functional order for convenient fault location, troubleshooting and maintenance.
- 19 Equipment and devices, which require maintenance, shall be suitably located to ensure easy accessibility.
- 20 On-line automatic periodic testing, self-checking & diagnostic facility shall be provided with fault indication for easy identification of the faulty module. The system shall continuously check health of the component elements including the stand-by ones and shall permit carrying out of the on-line checks while maintaining safe condition of the plant without end angering the safety of equipment and without influencing the process being controlled.
- 21 Failure of equipment used for alarm & trip purposes shall initiate alarm.
- 22 Automatic un administered switchover to standby equipment (such as fan/blower /pump) is foreseen in case of either running equipment is not adequate to maintain the desired process condition or due to tripping of running equipment.
- 23 In case of HT motors, winding temperature for each stator winding and bearing temperature of motors & driven equipment shall be monitored for abnormal rise.
- 24 Electrical drives rated at 30 KW or more shall be monitored for current.
- 25 Drive shall have its local control station comprising of start and emergency stop pushbutton and with a local & remote selection switch in SWGR/MCC. Local stop pushbutton shall always be active. During the trial run of drives from local, safety permit and protection shall be ensured.
- 26 Position transmitters shall be 2-wire LVDT type with 4-20mA. Smart Positioner for Pneumatic Actuator shall be accepted.
- 27 The bidder shall include minimum 10% of installed quantity or minimum 1 (one) item of each type as mandatory spares for C&I supply.

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28. Process fluids shall not be piped directly in to Central Control Room (CCR) and Electronic Equipment Room (EER) areas.
29. Ergonomically & aesthetically designed furniture viz. control desks & chairs shall be provided for workstations, programming stations, PCs and various peripherals at control room/computer room/equipment room. Furniture shall include documentation racks, tables for laydown etc. Control Desk profile shall be in line with drawing FGD-C&I-II.
30. Critical / important/ major equipment of FGD system like Fan/Pump/Blower etc. having suction and discharge instruments (Pressure, Temperature, DPT etc).

1.5 INSTRUMENT RANGES:

Instrument range shall be selected to have the normal reading, preferably between 50% and 70% of full scale for linear parameters and 70% to 80% for flow measurements. Deviation indicators shall have the null position at mid scale. The normal operating parameter shall be identified with a clear green mark.

2. SECURITY AND FAILURE PHILOSOPHY

2.1 GENERAL:

It is essential that interlock, protection, supervision and automatic control systems shall have high integrity. Instrumentation & Control system shall meet the following requirements:

- a) No single failure shall cause failure of the control.
- b) No single fault shall cause the protection system to operate spuriously or cause the protection system to become inoperative.
- c) Grouping of the control functions into system blocks shall be such that failure of any one block will only partly degrade the overall system.
- d) Control system shall be structured with redundancy so that no single failure within the control system can cause the failure of plant on duty and at the same time cause the standby plant to be unavailable.
- e) Due to control system failure if a final control element or plant item does not respond then the control element shall go into a fail-safe status.
- f) Field wiring for contact interrogation or device control shall be protected such that a fault on the cable does not cause loss of more than a minimum tolerable functionality of the system.

2.2 MEASUREMENT & CHANNEL REDUNDANCY:

To meet the failure and self-checking criteria for the control system, measurement redundancy shall be provided for all the critical parameters. Throughout the control system, the security and validity of signals are to be sure based on the following design principles.

- a) Where a plant measurement is to be duplicated or triplicated such signals shall be separately fed to the different input modules.

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- b) Signals, after due security and validity checking by means of voting, averaging, median, difference monitoring or similar technique shall be used for control functions.
- c) Where duplicated measurements are used, provision shall be there for selecting anyone as the duty signal. Continuous monitoring of difference between the signals shall be made.
- d) For protection purposes, multi-channel measurement shall be provided incorporating either 2 out of 3, 2 out of 2 with fail safe design or 1 out of 2 trip action.

2.3 REDUNDANCY IN INPUT / OUTPUT MODULES:

- a) Redundancy in input / output modules for close loop control systems, open loop control system, protection, interlocking and sequential control shall be provided as follows:
 - i. Wherever redundant sensors are employed in CLCS each sensor shall be wired to a separate input module so that even if one input module fails, the parameter will be available from the other input module.
 - ii. If only one sensor is provided for CLCS control then redundant input cards shall be provided and wired accordingly.
 - iii. Redundant output card shall be provided for the signals from CLCS going to final drive control elements.
- b) As regards redundancy for drive control functions the following philosophy may be adopted.
For open loop control system input/output I/O modules for realizing drive control functions redundancy in input / output and processing modules shall be envisaged for HT drives and critical LT drives (approx. 20 nos.)
- c) In addition to above, 10% wired input/output spare channel should be provided for each I/O modules.
- d) For future modification 10% spare module slots shall be provided to accommodate 10% spare modules.
- e) At least 20% terminal blocks shall be left as spare. This shall be in addition to the terminal blocks for 20% wired channel.

2.4 DATA HIGHWAY REDUNDANCY:

There shall be Redundancy in the system for high reliability of communication. The redundant buses shall work continuously. All communication modules, bus couplers, bus interfaces etc. shall also be hot redundant. Communication between the operator station and the functional groups of control microprocessors shall be by means of hot redundant data highways. Redundancy failure shall also be indicated in operating station.

2.5 REDUNDANCY FOR POWER SUPPLY UNIT:

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All power supply feeders from UPS (in parallel mode having 50% loadsharing) or 24 V DC systems (in parallel mode having 50% load sharing) shall be redundant with auto changeover in each ACDB/DCDB panel

2.6 DESIGN OF ENCLOSURES:

1. For high pressure service open rack shall be provided & remaining closed type.
2. Design of outdoor enclosures shall be weather proof, dust-tight, drip-proof and shall take into account the environmental conditions.
3. Enclosures shall be adequately sized so that the maximum permissible temperature rise above 50 Deg. C ambient is 10 Deg. C (maximum).
4. Enclosures design shall also take into account greatest possible personnel safety

2.7 SECURITY:

Door lock shall be provided in all Panels, Cabinets and Enclosures. System mode key switch or password to prevent tampering of system program. Redundant elements of the system shall not be exposed to the common hazards. For example, routing of the redundant network cable through separate cable raceway using separate cabinet / separate rack for redundant controller and redundant IO modules.

3. SCOPE OF SUPPLY

3.1 GENERAL

The scope of supply shall include but shall not be limited to the following within the scope boundary:

1. Field instruments and sensors for remote measurement viz. smart transmitters, thermocouple, RTD, process switches, converters, analyzers etc. as well as local gauges with all accessories.
2. Primary flow elements along with branch pipes, root valves, nipples, flanges, nuts, bolts, gaskets and accessories.
3. Pneumatic, motorized and hydraulically operated valves and dampers along with actuators, smart positioners, limit & torque switches, hand wheels, solenoid valves, position transmitters and accessories.
4. For all type of thermocouple, thermocouple extension cables, Instrumentation pair, triad & core cable, instrumentation power cable, optical fiber cable, special cable as required.
5. Control panel, panel instruments, accessories and furniture, as required.
6. Programmable Logic Control system (PLC) for closed loop control, open loop control, sequence control and data acquisition system for FGD system& its Auxiliaries complete with operator's workstations, historical storage, alarm & sequence of event recording, advanced control system, engineering & diagnostic terminal, required highway & interconnecting cables and devices,

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interposing relays for signal exchange with electrical system, peripherals including printers etc. and links for interface with third party systems with all associated software. Control System Overview is illustrated in drawing no.: FGD-C&I-III.

7. Isolation, conversion and distribution of UPS, DC and non-UPS Power supply to all instruments, panels, consoles, etc.
8. Uninterruptible Power Supply (UPS) Systems for PLC, HMI, etc. Other power supply systems at voltage levels, as required.
9. Bidder may provide either 230V UPS to derive 24V DC or 24V DC charger system for PLC system. Please refer section IX-Clause-9, Cl.No.4.0.0; page No. 886 for UPS Technical Requirement & Section-X, Cl. No. 10.1(i) for 24V Charger system Technical Requirement. Bidder to consider UPS supply for the HMI, other instruments etc.
10. Local instruments e.g.- pressure gauges, temperature gauges, level switches, flow gauges, flow switches, level gauges etc. with all accessories.
11. Bearing temperature sensors for pumps, motors or other equipment driven by H.T. motors and drive turbines and as necessary.
12. Flue Gas Analysers.
13. All HT motors winding temperature & bearing temperature monitoring sensor shall be duplex RTDs (PT-100).
14. Temperature elements at upstream & downstream of Heat Exchanger and Coolers. DP gauge & switch to check fouling condition of Heat exchangers and strainers.
15. Process connection and piping materials including impulse pipes of different grades & stainless steel tubes, stub, bosses, root valves, isolation & drain valves, valve manifolds, gauge valves, condensate pot, fittings, stands, brackets etc. as applicable, for satisfactory installation of all field instruments and analysers.
16. Pneumatic tubing along with fittings and isolating cocks for air consumers.
17. Erection hardware including junction boxes, canopies, structural steel items viz steel angles, channels, flats.
18. Complete cable accessories viz, flexible conduits, sub-trays/perforated trays, pull boxes, inspection covers, bends, elbows, mounting brackets, clamps, nuts and bolts, glands, lugs, ferrules, connectors, markers, tray supports, rigid conduits, tie wraps etc.
19. Complete optical fiber cable /special cables with accessories like optical fibre distribution box, patch cord / pigtail, converter, terminators, taps, heavy duty conduits etc. to make the system complete in all respect.
20. Rating plates, Nameplates and Labels.
21. 02 (Two) nos. of each type of hand held configurators for Smart Transmitters.

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22. Supply of all start-up and commissioning spares in addition to the mandatory Spares.
23. Arranging all performance test instruments and equipment.
24. Performing tests on the equipment as per Quality Plan prior to shipment.
25. Bidder to provide Analysers as per statutory requirements of CPCB/GPCB operation & monitoring of the FGD plant.

3.2 SOFTWARE

Bidder shall be responsible for software licensing, design, development, debugging, system engineering, customizing, installation, site modification, tuning, adjustments, commissioning and furnishing manuals, documentation etc.

3.3 DRAWINGS AND DOCUMENTS

3.3.1. Bidder shall furnish system description, operational write-up, bill of materials, drawings, data, information, technical catalogues, test certificates and other details to establish the proven ness, capability and performance of the equipment and systems offered.

3.3.2. Document to be submitted with the Bid shall not be limited to the following:

- a) PLC architecture with write up explaining FGD control and its auxiliary controls.
- b) Technical features / write up of critical items including critical valves indicating make, model.
- c) Brief description of Type and Routine tests proposed to be carried out at shop and at site and write-up on the in-house quality assurance practice.
- d) List of reference of similar system in service with performance record.
- e) Details of training of Owner's personnel specifying duration of each course, number and category of personnel proposed to be trained in each course, location etc.
- f) Details of post-commissioning services.
- g) Deviation list, if any.
- h) All other schemes, data, drawing, document required to establish product quality and completeness of supply.
- i) Data Sheets of Instruments
- j) Power supply scheme

3.3.3 Submission of Drawings and Documents by Contractor On award of Contract, successful Bidder shall submit progressively, drawings and documents in multiple copies for approval of Owner at different stages of the Contract. Contractor shall obtain Owner's approval in writing and manufacture the equipment as per these approved drawings and documents. Contractor shall revise the drawings in line with Owner's comments and resubmit till approval is accorded. After award of the

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Contract, Owner in association with Contractor shall draw up a list of drawings, document/deliverables with corresponding submission schedule and shall assign review status of either "A" (for approval) or "I" (for information) to each deliverable.

The drawings & documents shall not be limited to the following.

1. General arrangement drawings of desk, panels, various equipment, components/ sub-assemblies.: A
2. PLC system architecture drawings with write up. : A
3. Layout drawings viz. control rooms, equipment room, auxiliary plants etc.: A
4. Instrument Index : I
5. Specification & Data sheet for Instruments & devices and all analyzer. : I
6. Drive control philosophy & interface diagram with write up : A
7. Analog & Binary Drive list : I
8. Specification and Data sheet of cables : I
9. Specification and Data sheet of junction box : I
10. Specification, Sizing calculation of control valve & data sheet : I
11. Sizing calculation of flow element & data sheet : I
12. Specification and Data sheet of Temperature element & gauges with sizing calculation of thermo well.: I
13. Closed loop control schemes & write up : I
14. Open loop control schemes & write up : I
15. Sensor grouping in racks : I
16. Instrument hook up drawings : I
17. PLC Input and Output list : I
18. Schedule of alarms : I
19. Operator Interactive Screen Graphics : I
20. Schedule of logs and display : I
21. Cable schedules : I
22. Wiring & Interconnection diagram. : I
23. Product catalogues : hI
24. General arrangement drawing of Instrument racks with datasheet: I
25. Layout drawing of unit control room showing arrangement of Grounding schemes : I
26. I & C Power distribution schemes : I
27. Quality Plans for field Instruments, Analyzers & Control System: A
28. Cable installation schedule and routing. : A
29. Specification and Technical data sheet of C & I cables. : A

3.3.4 Final Drawings

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- a. Contractor shall secure approval on the design drawings from Owner for the drawings identified as category “A”, in writing. Any manufacture done prior to approval of the drawings shall be rectified in accordance with the approved drawings by Contractor at his own cost and the equipment shall be supplied within the stipulated period.
- b. Contractor shall furnish final drawings and documents in multiple hard and soft copies. Contractor shall furnish instruction manuals containing various components, sub-assemblies, method of installation, check-up and tests to be carried out during erection and commissioning of the equipment. The manual shall also include instruction for step checking, trouble shooting and fault rectification for different components and sub-assemblies.
- c. Contractor shall incorporate all modifications in the drawings carried out at site during trial run, start-up performance and guarantee tests till handover of the units to Owner and submit these final as-built drawings both in hard and soft copy.
- d. Final documents shall be submitted in proper bounded form. All catalogues and literature (including sub-suppliers’ catalogues), datasheets, Instrument list, input output list, function control diagram, loop diagrams, configuration diagram etc. shall be bounded together in indexed volumes. All O&M manuals shall be in handy size and neatly bound for carrying it to the work place.

3.3.5 Quality Control Surveillance

The plant/ equipment to be supplied under this specification shall have assured quality and workmanship. The Bidder in his proposal shall submit his Quality Assurance Plan containing (MQP & FQP) quality assurance programme and quality assurance documents for Employer’s approval. The Contractor shall be bound to conduct all stage inspections on various equipment/material during manufacturing process in accordance with the approved copy of this document. Employer shall have the right to carry out Quality Audit and Quality Surveillance by witnessing any or all such tests to be carried out at Contractor’s / Sub-Contractor’s works as and when desired. The procedure applicable to Contractor’s works will also apply to the works of his sub contractors. For items coming under the purview of any Indian Statutory Regulation during the course of manufacture, all stage inspections and tests shall be witnessed by an inspecting authority recognized under the statutory regulation. A list of all sub-vendors is to be forwarded to the Employer for approval prior to the placement of sub-contract. All technical details shall be sent to Employer for approval prior to placement of orders on sub-vendors.

These audit/surveillance/approvals shall not however relieve the manufacturer of their responsibility of the Quality Assurance of their product and overall guarantee and responsibility shall wholly lie with the Bidder.

Tests/inspections shall be carried out during and after the completion of manufacture of different components and assembly as applicable in accordance

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with relevant codes and standards. Test Certificates for all such tests/inspections shall be made available to the Employer for approval.

Employer or his authorized representative shall have his full access to witness any or all tests / inspections to be carried out at manufacturer's shop. In case, the job is sub-contracted, it will be Contractor's responsibility to make all arrangements so that Employer or his authorized representative can attend such tests at Sub-Contractor's premises.

4. SCOPE OF SERVICES:

4.1 ENGINEERING AND OTHER SERVICES:

- a. Supply of spare parts for at least 20 years after commissioning of the plant shall be provided by Bidder. However, Mandatory spares & commissioning spares shall be considered as defined elsewhere in the specification.
- b. Participation of Bidder's personnel and experts as well as experts from their collaborator in discussion with Owner/ Consultant and other equipments Vendors during various stages of contract implementation as required by Owner to achieve desired I& C system configuration and performance.

4.2 SCOPE OF ERECTION:

In general all items supplied by Bidder shall be erected by Bidder. Sound engineering practice of international standard shall be adopted throughout.

Scope of works shall not be limited to the following:

- a) Installation of equipment, system, control room panels, desks, cabinets, junction boxes, instruments, gadgets and other accessories supplied as per this specification.
- b) Cable interconnection amongst different panels/cubicle/field instruments etc.
- c) Installation of field mounted instruments and devices including primary elements along with impulse pipe laying and wiring etc. Installation of thermo wells at the stubs provided at the tapping points.
- d) Installation of all transmitter racks & enclosure, cubicles, brackets, lying of impulse pipes and cable termination etc.
- e) Hook up of pneumatic tubes and interconnection between air supply point and all accessories of final control element as required.
- f) Lying of all cables including erection of sub-trays, G.I. conduits along with accessories, termination and ferruling at both ends of all cables laid.
- g) Termination & testing / checking of cable.
- h) Supply of the erection hardware, consumables, tools and tackle, test instruments and deployment of experienced personnel needed for completing the erection.
- i) Painting of site mounted structures and impulse lines after completion of erection.
- j) Providing a tentative programme of manufacture, erection, testing and commissioning.

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- k) Erection activities shall comply with stipulated project schedule.

4.3 SCOPE OF TESTING, CALIBRATION & COMMISSIONING:

Scope of works shall not be limited to the following:

- a) Testing /calibration /configuring /software development, loading, commissioning of instruments and systems supplied by Bidder as per the guidelines laid down in the specification.
- b) Temporary Setting up of site instrument laboratory equipped with Testing/Master instruments with Government/NABL accredited test certificates required to carry out testing, calibration & commissioning of the plant shall be considered. These testing/master instruments shall be brought back by the bidder after completion of commissioning. However, calibration certificate shall be submitted to owner before commissioning of each field instruments.
- c) Site modifications shall be documented and issued to Owner as design change notification and shall be signed by Owner. Subsequently, all such approved and agreed changes shall be incorporated in relevant design documents to elevate all documents to "As Built" status.

5. SCOPE OF ERECTION & COMMISSIONING:

5.1 ERECTION TESTING & PRE-COMMISSIONING PRACTICES- GENERAL

- 5.1.1 This part of the specification is intended to provide a general guideline for the procedures to be followed for the erection, testing and commissioning of various Instrumentation & Control systems, field instrumentation, final control elements and accessories.
- 5.1.2 Omission of any specific reference to any method, parts, accessories or material required for proper and efficient execution of the work shall not in any way relieve Contractor from his responsibilities of providing such facilities and performing the successful erection, testing and commissioning.

5.2 EQUIPMENT, MATERIALS & SERVICES TO BE PROVIDED BY CONTRACTOR:

- 5.2.1 Equipment, Materials & Services to be provided under this specification and shall include but shall not be limited to the following:
 - a) Shop testing and Factory Acceptance Test.
 - b) Pre-calibration of instruments at site and maintaining record of the same.
 - c) Pre-assembly at site, as required.
 - d) Erection.
 - e) Cleaning / flushing (as required).
 - f) Pre-commissioning check to ensure correctness of erection.
 - g) In-situ calibration, testing, loop checking etc. and maintaining record of the same.

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- h) Cleaning up of instruments, accessories and worksite during and after erection.
- i) Powering on and Commissioning.
- j) Perform site acceptance test and handing over.
- k) Participating in performance guarantee and other performance tests at site.

5.3 SPECIFIC ERECTION PRACTICES & GUIDELINES:

The specification provides the general guide lines to be followed for the warehousing, handling, testing, erection, pre-commissioning checks and commissioning of instruments and accessories.

- a) The guidelines provided shall not be deemed as an effort to describe the entire work involved or to identify the steps and sequence to be adhered to in the erection of specific work items.
- b) The basic intent is to establish a sound engineering practice to be adopted throughout.
- c) Equipment manufacturers' recommendation, where available, shall prevail.
- d) For special instruments viz. analyzers etc., the specification is of general nature only and manufacturer's recommendation shall be followed as guideline.
- e) The specification shall not be treated as comprehensive. Any activity, not specifically mentioned but felt essential or advisable from good engineering consideration shall be included.

5.4 Field Instruments

Guidelines provided herein shall be adhered to while erecting an instrument or accessory in the plant.

1. Care should be taken to avoid damage to the instruments during handling and transportation. Special care shall be taken while handling breakable, spillable, fragile and delicate items.
2. Before erection, instruments shall be subjected to calibration and other functional checks at Contractor's site laboratory. The instruments shall be uncased and unpacked with care and as per instructions furnished on the respective packages, using appropriate tools and implements.
3. Instruments, jigs, tools and tackle for the purpose of performing the tests shall be provided by Contractor.
4. Instruments shall be tagged with engraved aluminium / stainless steel tag plates and shall be secured to the instrument with metallic wire fasteners, during the test.
5. For instruments found acceptable and conforming to the declared performance parameters, a test report shall be prepared.

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6. Minor repairs and adjustments of the instruments shall be performed by Contractor. Once a defective instrument has been successfully repaired, it shall again be subjected to calibration and functional checks, as above.
7. A record of such repairs and adjustments shall be maintained by Contractor.
8. For instruments where the extent of damage is such that the same cannot be repaired at site, a failure report shall be generated by Contractor, enumerating the nature of fault/ damage. Cases where the damages are only superficial and does not affect the performance of the instrument/s, the decision as to whether such instrument/s are fit for erection shall lie solely with Owner.
9. In no case, erection work shall be taken-up in areas where heavy equipment movement is foreseen, major welding activity is under progress, heavy structural items are being erected or any major activity is being carried out or is anticipated, which may damage the erected instrument or its support.
10. If any erected instrument or its accessory is found to be vulnerable to damage or to be fouling/interfering with progress of other activities in the area, same shall be dismantled/removed immediately. During re-erection of such instruments, the steps indicated for erection shall be carried out afresh.
11. After erection, instruments shall be covered with transparent polyethylene sheets to protect from unauthorized handling.
12. Colour PVC adhesive tapes shall be put on the polyethylene cover to indicate various stages of activities. Red tape shall indicate erection under progress. Yellow tape shall indicate completeness of erection.

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SUB-SECTION – II

MEASURING INSTRUMENTS

(PRIMARY AND SECONDARY)

1. GENERAL:

- 1.1** Measuring instruments/equipment and subsystems offered by the Bidder shall be from reputed experienced manufacturers of specified type and range of equipment, whose guaranteed and trouble free operation has been proven. Refer Sub-section Basic Design Criteria. Further, all instruments shall be of proven reliability, accuracy, and repeatability requiring a minimum of maintenance. They shall comply with the acceptable international standards and shall be subject to Employer's approval. All instrumentation equipment and accessories under this specification shall be furnished as per technical specifications, ranges, makes/numbers as approved by the Employer during detailed engineering.
- 1.2** Every panel-mounted instrument requiring power supply shall be provided with a pair of easily replaceable glass cartridge fuses of suitable rating. Every instrument shall be provided with a grounding terminal and shall be suitably connected to the panel grounding bus.
- 1.3** All local gauges as well as transmitters, sensors, and switches for parameters like pressure, temperature, level, flow etc. as required for the safe and efficient operation and maintenance as well as for operator and management information (including all computation) of equipment under the scope of specification shall be provided on as required basis within the quoted lumpsum price. However, contractor shall supply any additional local gauges/switches/transmitters/sensors for reasons mentioned above without any additional cost to the Employer. For example: Individual remote as well as local measurement for suction & discharge pressure of each pump .
- 1.4** The necessary root valves, impulse piping, drain cocks, gauge-zeroing cocks, valve manifolds and all the other accessories required for mounting/erection of these local instruments shall be furnished, even if not specifically asked for, on as required basis. The contacts of equipment mounted instruments, sensors, switches etc. for external connection including spare contacts shall be wired out in flexible/rigid conduits, independently to suitably located common junction boxes. The proposal shall include the necessary cables, flexible conduits, junction boxes and accessories for the above purpose. Double root valves shall be provided for all pressure tapping where the pressure exceeds 40 Kg./sq.cm.
- 1.5** For all instruments envisaged for sea water applications, they shall be provided with wetted parts made of Monel / Hastelloy C or any other compatible material (if provenances experience of the proposed material for such applications is established by Contractor).

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- 1.6** All instruments shall be provided with durable epoxy coating for housings and all exposed surfaces of the instruments.

2. SPECIFICATION FOR ELECTRONIC TRANSMITTER FOR PRESSURE, D.P., FLOW AND LEVEL:

Sl.No.	Features	Essential / Minimum Requirements
1.	Type of Transmitter	Microprocessor based 2 wire type, HART protocol compatible
2.	Accuracy	$\pm 0.1\%$ of calibrated span(minimum)
	Repeatability	$\pm 0.05\%$ of Span or better
	Response time	100 m sec or better
3.	Output signal range	4-20 mA DC (Analogue) along with superimposed digital signal (based on HART protocol)
4.	Turndown ratio	10:1 for vacuum / very low pressure applications
		60:1 for other applications.
5.	Stability	$\pm 0.1\%$ of calibrated span for six months for Ranges up to and including 70 Kg/cm ² .
		$\pm 0.25\%$ of calibrated span for six months for Ranges more than 70 Kg/cm ² (g).
6.	Zero and span drift	+/- 0.015% per deg.C at max span.
		+/-0.11% per deg.C at min span.
7.	Load impedance	600 Ohms (min.) at 24 Volts D.C
8.	Housing	Weather proof as per IP-55 with durable corrosion resistant coating.
9.	Over Pr.	150% of max. Operating pr.
10.	Connection (Electrical)	Plug and socket type
11.	Process connection	1/2 inch NPT (F)
12.	Span and Zero	Continuous, tamper proof, Remote as well as adjustability manual from instrument with zero suppression and elevation facility.
13.	Accessories	-Diaphragm seal, pulsation dampeners, siphon etc. As required by service and operating condition.
		-2 valve manifold for absolute pressure transmitters (3-valve manifold for gauge/vacuum pressure transmitters) and 5 valve manifold for DP/level/flow transmitters.
		-For hazardous area, explosions proof enclosure as described in NEC article 500.
14.	Diagnostics	Self-Indicating feature
15.	Power supply	24VDC $\pm 10\%$.

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Sl.No.	Features	Essential / Minimum Requirements
16.	Adjustment / calibration / maintenance	Centralised PC based system (In Employer's Scope). In addition total two (2) no. of hand- held type universal calibrators compatible with HART protocol shall be provided.
17.	Accessories :	a. Universal mounting bracket suitable for 2" pipe mounting. b. High tensile carbon steel U- bolts. c. Siphon for steam and hot water services. d. ½" NPT 2-valve stainless steel manifold, constructed from SS316 bar stock. e. Companion flange with nuts, bolts and gaskets. f. ½" NPT cable gland
Note: 1) In case it becomes necessary to use a DP transmitter for pressure measurement then a 3 –valve manifold should be used in place of 2- valve manifold. 2) LVDT type is not acceptable. 3) Where the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.		

3. ULTRASONIC TYPE LEVEL TRANSMITTERS:

Sl.No.	Features	Essential / Minimum Requirements
1.	Type of Transmitter	Non-contact Microprocessor based 2 wire type, HART protocol compatible Ultrasonic transmitter
2.	Output signal	Galvanically isolated 4-20mA DC (Analogue) along with superimposed digital signal (based on HART protocol)
3.	Sensor Accuracy	+/- 0.1% of calibrated span
4.	Sensor Repeatability	3 mm or better
5.	Power supply	24 V DC +/- 10%
6.	Temperature compensation	To be provided within transducer
7.	Configuration	Sensor unit and Electronic units are to be separate. It shall be possible to mount the Electronic unit at a remote accessible location from the transducer. All cables and weather proof fittings to interconnect transducer to electronic unit shall be provided by Bidder
8.	Housing	Weather proof as per IP-65 with durable corrosion resistant coating.

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Tender Bid Documents for supply, installation, commissioning & testing of FGD system at 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS with O&M.

Sl.No.	Features	Essential / Minimum Requirements
9.	Calibration	Through HART Communicator.
10.	Zero and Span adjustment	Continuous, tamper proof, remote as well as manual adjustability from instrument. It shall be possible to calibrate the instrument without any level in the tank/sump etc
11.	Sensor Material	Corrosion resistant material to suit individual application requirement.
12.	False signal tolerance	Transmitter shall be capable of ignoring false echoes from internal tank/sumps obstructions such as pipes, heating coils or agitator blades. Also transmitter shall have adjustable damping circuitry
13.	Range	Range of transmitter shall be capable of covering the complete level span of tank taking care of blocking distance, frequency attenuation due to surface, obstructions etc
14.	Display	Minimum 4 character LCD display with integral keypad, access protected by user code
15.	Diagnostics	Loss of echo alarm etc
16.	Load Impedance	500 ohms minimum
17.	Electrical Connection	Plug and socket
18.	Accessories	<p>All weather canopy for protection from direct sunlight and direct rain.</p> <p>All mounting hardware and accessories required for erection and commissioning mounting fittings material shall be SS 316.</p> <p>For hazardous areas, explosion proof enclosure as described in NEC article 500.</p>
Note: <ol style="list-style-type: none"> Contractor can also provide Radar type transmitter in place of ultrasonic transmitters subject to approval by Employer during detailed Engineering. Four wire type transmitters can also be provided for applications where 2-wire transmitter has some technical limitations, subject to employer's approval during detailed engineering stage. However, in such cases isolated 4-20 mA DC (analogue) output shall be provided. Power supply required for such transmitters shall be 240V AC UPS/ 24V DC. 		

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4. GUIDED WAVE RADAR TYPE LEVEL TRANSMITTER:

Sl.No	Feature	Requirement
1.	Type	Microprocessor based 2 wire types, HART protocol compatible Guided wave radar transmitter.
2.	Principle	TDR (Time domain reflectometry)
3.	Probe Type & Material	(i) Coaxial probe of SS316/316L. If required, probe shall be suitable for over fill prevention.
4.	Output signal	4-20 mA DC along with superimposed digital signal (based on HART protocol), suitable for over fill prevention.
5.	Accuracy	+/- 0.5% of calibrated span or minimum 5mm.
6.	Power supply	24 VDC+/-10%.
7.	Housing	Weather proof as per IP-65, metallic housing with durable corrosion resistance coating.
8.	Adjustment / calibration	Using hand held HART calibrator / centralized PC based system (as applicable).
9.	Zero & span adjustment	Continuous, temper proof, remote as well as manual adjustability from instrument. It should be possible to calibrate the instrument without any level in the tank/sump etc.
10.	Display	Integral digital display.
11.	Load Impedance	500 ohms (minimum).
12.	Electromagnetic compatibility	Shall meet EN61326-1(1997) and AmdtA1, class A equipment / EN 50081-2 & EN5008 1-2 & EN50082-2
13.	Mounting	(i) External cage shall be provided where ever side mounting is required. External cage and other mounting accessories to be provided by the contractor. (ii) Where ever top mounting is required, all mounting accessories, stilling well (as required) etc., shall be provided by the contractor. (iii) All weather canopy shall be provided for protection from direct sunlight and direct rain for open locations.
Note: Four wire type transmitters can also be provided for applications where 2-wire transmitter has some technical limitations, subject to employer's approval during detailed engineering stage. However, in such cases isolated 4-20 mA DC (analogue) output shall be provided. Power supply required for such transmitters shall be 240V AC UPS/ 24V DC.		

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5. SPECIFICATION FOR PR. GAUGE, D. P. GAUGE, TEMP. GAUGE AND LEVEL GAUGE:

Sl. No	FEATURES	ESSENTIAL/MINIMUM REQUIREMENTS		
		Pr. Gauge/ DP Gauge / Draught	Temperature Gauge	Level Gauge
1	Sensing Element and material	Bourdon for high pressure, Diaphragm/Bellows for low pr. Of 316 SS	Mercury in steel for below 450°C and inert gas actuated for above 450°C of SS bulb and capillary.	Tempered toughened Borosilicate gauge glass steel armoured reflex or transparent type.
1	Body material	Body material shall be SS	Body material shall be SS	Body material shall be SS
2	Dial size	150mm	150 mm	Tubular covering entire range
3	End connection	1/2 inch NPT (F)	3/4" NPT (F)	Process connection as per ASME PTC and drain/vent 15 NB
4	Accuracy	±1% of span	± 1% of span	± 2%
5	Scale	Linear, 270° arc graduated in metric units	Linear, 270° arc graduated in °C	Linear vertical
6	Range selection	Cover 125% of max. of scale	Cover 125% of max. of scale	Cover 125% of max. of scale
7	Over range test	Test pr. for the assembly shall be 1.5 to the max. Design pr. at 38°C.		
8	Housing	Weather and dust proof as per IP-55	Weather and dust proof as per IP-55	CS/304 SS leak proof
9	Zero/span adjustment	Provided	Provided	--
10	Identification	Engraved with service legend or laminated phenolic name plate		
11	Accessories	Blow out disc, siphon, snubber, pulsation dampener, chemical seal (if required by process) gauge isolation valve	SS Thermo well	Gasket for all KEL-F shields for transparent type vent and drain valves of Steel/SS as per CS/Alloy process Requirement.

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Sl. No	FEATURES	ESSENTIAL/MINIMUM REQUIREMENTS		
		Pr. Gauge/ DP Gauge / Draught	Temperature Gauge	Level Gauge
12	Material of Bourdon/ movement	316 SS / 304 SS	316 SS / 304 SS	

Notes:-

- 1) Length of gauge glass shall not be more than 1400 mm. If the vessel is higher, multiple gauge glasses with 50 mm overlapping shall be provided.
- 2) Where the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.

6. PROCESS ACTUATED SWITCHES:

FEATURES	ESSENTIAL / MINIMUM REQUIREMENTS		
	Pressure/ Draft Switches/ DP Switches	Temperature switches	Level switches
Sensing Element	Piston actuated for high pressure and diaphragm or bellows for low pr./ vacuum	Vapour pressure sensing, liquid filled bellow type with SS bulb and capillary (10 m minimum) above gland	Float type switches/RF type for applications as decided by Employer during detailed engineering.
			Radio-frequency/capacitance type for other application.
Material	316 SS	Bulb 316 SS/ capillary 304 SS	316 SS
End connection	½ inch NPT (F)	½ inch NPT (F)	Manufacturer standard
Over range proof pressure	150% of max. design pr.	-	150% of max. design pressure
Repeat-ability	+ 0.5% of full range		
No. of contacts	2 No.+2NC. SPDT snap action dry contact		
Rating of contacts	240V, 5A AC / 220V, 0.5A DC (or more if required by or PLC)		

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Tender Bid Documents for supply, installation, commissioning & testing of FGD system at 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS with O&M.

Elect. Connection	Plug in socket		
Set point/dead band adjustment	Provided over full range		
Enclosure	Weather and dust proof as per IP-55		
Accessories	Syphon, snubber, chemical seal, pulsation dampeners as required by process	Thermo well of 316 SS and packing glands	All mounting accessories
Mounting	Suitable for enclosure/ rack mounting or direct mounting	Suitable for rack mounting or direct mounting	-
Note: Where the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.			

- 6.1** Limit switches shall be silver plated with high conductivity and non-corrosive type. Contact rating shall be sufficient to meet the requirement of Fire alarm Control System subject to a minimum of 60V, 6VA rating. Protection class shall be IP-55.

7. SOLENOID VALVES:

- 1) Operating Principle: Electromagnetic (noiseless)
- 2) Coil voltage rating: 240 V AC / 220 V DC/24 V DC/110 V (as required)
- 3) Ways : Generally 3-ways other depending on requirement
- 4) Port size : 1/4" NPT all ports
- 5) Body : SS bar stock
- 6) Trim : SS-316
- 7) Duty : Suitable for continuous energization
- 8) Sealing : Airtight and leak proof
- 9) Ambient Temperature : 0 - 50 O C
- 10) Fluid Temperature : 0-150 O C (approx.)
- 11) Coil Enclosure : Stainless Steel
- 12) Insulation : Class-H
- 13) Coil Casing : IP-65 (Explosion proof for NEC Class-1,Division-1 area)

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- 14) Mounting : On pipe or on panel
- 15) Cable Connection : 3/4" ET
- 16) Accessories : Mounting brackets, nuts and bolts
- 17) Preferred feature :
 - a) Solenoid valve directly integral to actuator body shall have NAMOOR interface for uniformity
 - b) Local indication for power

8. TEMPERATURE ELEMENTS:

8.01 THERMOCOUPLE:

Sr. No.	Description	Features Essential / Minimum Requirements
1	Type of Thermocouple	Type-J (Iron Constantan) / Type-K Rhodium). [As per application] (ungrounded type)
2	No. of element	Duplex, Ungrounded
3	Housing/Head	IP-65/Die cast Aluminium. Plug in connectors are to be provided for external signal cable connection
4	Sheathing of	Swaged type magnesium oxide insulation Thermocouple
5	Calibration and accuracy	As per IEC-751/ANSI-C-96.1(special class) for T/C.
6	Characteristic	Linear with respect to temp, within $\pm 1/2$ percent of top range value
7	Accessories	a. Adjustable nipple-union-nipple [1/2" b) Sch 80 X 1/2" NPT (M)] with Thermowell connection c) Compression fittings / unions d) Flanges etc. (for flanged connections only) e) Forged bar stock thermo well as per ASME PTC code. process connection M 33X2 (M) in general or 1 1/2" Flanged for Flue gas/Furnace/Air etc. application. f) e)Material of construction of Thermo well: g) SS 316: In general Inconel: For flue gas application
8	Standard	ANSI C 96.1 for Thermocouple and ASME PTC-19.3 for Thermo-well

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Sr. No.	Description	Features Essential / Minimum Requirements
9	Nameplate	Tag number, service engraved in stainless steel tag plate

8.02 RESISTANCE TEMPERATURE DETECTOR (RTD):

Sr. No.	Description	Features Essential / Minimum Requirements
1	Type of RTD	Four wire, Pt-100 (100 Ohms resistance at zero degree Centigrade).
2	No. of element	Duplex
3	Housing/Head	IP-65/Die cast Aluminium. Plug in connectors are to be provided for external signal cable connection.
4	Sheathing of RTD	Metal sheathed, ceramic packed
5	Calibration and accuracy	As per DIN-43760 Class-A for RTD
6	Characteristic	Linear with respect to temp, within $\pm 1/2$ percent of top range value
7	Accessories	Thermo well (as specified below) and shall be spring loaded for positive contacts with the well
8	Standard	DIN-43760 for RTD and ASME PTC-19.3 for Thermo-well.

8.3 THERMO WELL (FOR ALL PROCESS TEMP. ELEMENTS):

1. Shall be one piece solid bored type of 316 SS of step-less tapered design. (As per ASME PTC 19.3 1974)
2. For Mill classifier outlet long life solid sintered tungsten carbide material of high abrasion resistance shall be provided.
3. For Air & Flue gas 316 SS protecting tube with welded cap. (However contractor shall provide better material for Flue gas service if require based on the specify boiler design parameters).
4. For furnace zone, impervious ceramic protecting tube of suitable material along with Incoloy supporting tubes and adjustable flanges.

9. TEMPERATURE TRANSMITTER

Following types of 2-wire temperature transmitter (directly powered from 4-20mA input cards of PLC) shall be provided. The temperature transmitter shall be fully compatible with thermocouples and RTDs being provided by the contractor. Temperature compensation of the thermocouples shall be performed in the temperature transmitter itself.

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a. Single Input Head mounted Temperature Transmitter

These shall be suitable for mounting in the head of temperature element itself. The protection class of head of thermo well along with its plug-in connector shall be min. IP65.

b. Single Input DIN-rail mounted Temperature Transmitter

These shall be especially designed for DIN-rail mounting in JB's. The specifications of the JB's shall be same as indicated in Subsection-II: Clause No: 18.

(INST CABLE) with additional DIN-rails and IP 65 Protection class. This temperature transmitter shall be the ones which are specially designed for DIN-rail mounting with IP 20 protection class. These shall have terminals for input/output provided on front side when mounted on DIN-rail. Head mounted temperature transmitter with clamps to make it suitable for DIN-rail mounting shall not be acceptable under this category.

c. Dual-input Temperature Transmitter With Indicator:

The dual-input TTs shall be suitable for mounting in enclosures/racks and shall be provided with clamps. Indicator shall be provided with these transmitters. These transmitters shall have bump less change over facility to second sensor in case first sensor fails. This change-over is to be alarmed. Protection class shall be IP65 minimum.

d. Common requirements for each of the above type of temperature transmitters

1. Output : 2-wire (power supply from input card of Control System) with 4- 20mA output with Super-imposed HART protocol signal
2. Input : Same transmitter shall be capable to handle Pt-100 RTD, Thermocouples K&R types (input type to be selectable at site through HART terminal)
3. Isolation : min. 500 V AC
4. EMC compatibility : as per EN 61326
5. Operating ambient : 0 to 85 deg C (without indicator)
6. temperature : 0 to 70 deg C (with indicator)
7. Power supply : compatible with input module of Control System

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8. Accessories : Mounting arrangements including clamps etc.
9. Composite Accuracy : (a) For head mounted and DIN-rail mounted types
(Refer note 2) RTD $\leq 0.4\%$ of 0-250 deg C span T/C-K type
 $\leq 0.4\%$ of 0-600 deg C span T/C-R type
 $\leq 0.4\%$ of 0-1000 deg C span
CJC accuracy (for thermocouples) shall be ≤ 1 deg C
(b) For dual-input type:
RTD $\leq 0.25\%$ of 0-250 deg C span T/C-K type
 $\leq 0.2\%$ of 0-600 deg C span
CJC accuracy (for thermocouples) shall be ≤ 1 deg C

10. SPECIFICATION FOR FLOW ELEMENTS:

10.1 ORIFICE PLATE

Features	Essential/Minimum Requirements
Type	Concentric as per ASME PTC-19.5 (Part-II), ISA RP-3.2, 1960 or BS-1042
Material	316 SS
Thickness	3 mm for main pipe diameter up to 250 mm, 6 mm for main pipe diameter above 250 mm and 10 mm for main pipe diameter of 500mm and above.
Material of branch pipe Root valve type Root valve material Root valve size	Same as main pipe Globe 316 SS 1 inch
Impulse pipe of same material up to root valve	Required
Tapings	Flanged weld neck. 3 pairs. of tapping. Beta Ratio 0.34 to 0.7
Beta Ratio calculation to be	Yes
Assembly drg. and flow Vs DP	Yes
Accessories	Root valves, flanges, Vent/drain hole (As required)

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10.2 Flow Nozzle:

Features	Essential / Minimum Requirements
Type	Long radius, welded type as per ASME PTC-19.5 (Part-III) or BS-1042
Material	316 SS
Thickness	Suitable for intended application
Material of branch pipe Root valve type Root valve material Root valve size	Same as main pipe Globe 316 SS 1 inch
Impulse pipe of same material up to root valve	Required
Tapings	D and D/2(3Nos.oftappings)
Beta Ratio	Around 0.7
Beta Ratio calculation to be submitted	Yes
Assembly drg. and flow Vs DP Curves	Yes
Accessories	Root valves, flanges, Vent/drain hole (As required)

Contractor shall submit certified flow calculation and differential pressure vs. flow curves for each element for Employer's approval. Sizing calculation, precise flow calculation for all the flow elements, fabrication and assembly drawings and installation drawings shall be submitted for Employer's approval. One Flow element of each type shall be calibrated in the test laboratory for validation of computed flow calculations.

11. ANALYSER INSTRUMENTS:

Common Requirements

1.	Output Signals	
	Analog	4-20 mA DC galvanically isolated. If analyser provides superimposed HART signal on 4-20 mA DC output, It shall also be connected to PC based station
	Binary	2 NO + 2 NC for high alarm
2.	Zero & span Adjustment	To be provided with range selection facility.
3.	Ambient temp.	60°C

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4.	Indication	Digital Alphanumeric Display. Display of reading in engineering units shall be provided.
5.	Enclosure Type / Material	Weather & Dust proof (IP 55) Die cast Aluminium / SS.
6.	Type of Electronics	Microprocessor based with self - diagnostic.
7.	Digital Signal transmission	HART / RS 485 Port Modbus Protocol / Ethernet TCP/IP protocol for communication with plant control system.
8.	Calibration	Auto & Manual (from Remote)
9.	Power Supply	To be arranged by Contractor subject to Employer's approval.
10.	Others	<ol style="list-style-type: none"> 1. All interconnection tubing and cabling between probe and analyser / analyser panel and cabling from analyser/ analyser panel to local junction box are to be provided. 2. All the calibration gases required for one year continuous operation shall be provided. The calibration gas container material shall not contaminate the calibration gas.
11.	Compliance standards to	USEPA, TUV, MCERT Sor equivalent standards
12.	Type of Technology	SO ₂ : In-situ(Path)type
13.	Measurement Range, Tapping point	As per FGD system design and process parameter

11.3 SPECIFIC REQUIREMENTS FOR IN-SITU (PATH) TYPE SO₂ ANALYZERS:

Specification Requirements	SO ₂ Analyser cum monitor
Principle of Measurement	Differential Optical Absorption Spectroscopy
Accuracy	<= 2% of measured value for SO ₂
Linearity	+/-1% of measurement span
Probe Operating Temperature Range	0 to 300 deg C
Accessories for purging system	Purging system to be provided with heavy duty blowers and shutter mechanism for automatic isolation of lens during purge air failure.
Temperature compensation	Automatic temperature compensation to be provided

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11.4 PH ANALYZER

a	Type	Cell - flow through
b	Accuracy	< \pm 1% of reading
c	Range	0 - 14 pH freely programmable (For others)
d	No. of steams	Single
e	Temp. compensation	Automatic

12. AIR-CONDITIONING SYSTEM TEMPERATURE SENSOR:

Sensor : Duplex, Pt 100 RTD, Class B, linear characteristics.

Accuracy : As per IEC 751/ANSI MC 96./ + - 0.5 % of range

Mounting : Duct/ wall mounting with all mounting accessories.

Housing/ Head : IP 55/ Die-cast Aluminium

Output from the RTD is to be connected to Control System (in Contractor's scope)

NOTES :

1. The specifications for RTDs of winding/ bearings of motor/ pump, can be as per their manufacturer standards. The manufacturer shall submit the adequate supporting documents for establishing their standard practice. However the type of RTD shall be Pt100.
2. The specifications of temp elements for air conditioning & ventilation system / process can also be as per system manufacturer's standards. The manufacturer shall submit the adequate supporting documents for establishing their standard practice.

13. HUMIDITY SENSOR:

Sensor : Capacitance type

Accuracy : +/-3% R.H

Range : 0-100% R.H

Output : 4-20 mA

Time constant : 2 mins.

Output from the humidity sensor is to be connected to Control System (in Bidder's scope) .Bidder can also provide combined instrument for measurement of humidity and temperature subject to Employer's approval during detailed

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engineering. In all such cases, 4-20 mA outputs, each for temperature and humidity measurements are to be provided.

14. TEMPERATURE/ HUMIDITY INDICATOR:

- Sensor : RTD for(Pt 100) for temperature
: Capacitance Type for Humidity (specs for humidity and temperature shall be as mentioned above)
- Display : Combined enclosure with one/two three digit seven segments LED display with decimal point after two digits.
LED height shall be 4 inches, clearly legible from a distance of at least 10 meters.
- Range : 0-60 Deg C for temperature.
: 0-95.0 % for Relative Humidity.
- Accuracy : Better than +/-0.5 % for Temperature
: Better than +/-2.5 % for Relative Humidity
- Mounting : Table Top/ wall mounting.
- Power : 240 V AC, 50 Hz. Supply
- Output : 4-20 mA signal each for temperature and Humidity
- Qty. : 5 nos. Each of temperature & Humidity indicators
(Combined indicators for Humidity and temperature is also acceptable).

One Set of output signal is to be connected to Control System(in Bidder's scope) apart from displaying the temperature/ humidity values on indicator

15. CONTROL VALVE SPECIFICATIONS:

15.1 GENERAL

Control valves shall be located near floor or platform for ease of access and with adequate clearances for maintenance and lay-down and shall be placed as station with upstream motorized isolating valve, down-stream isolating valve, inching duty motorized bypass valve and manual drain valves. Each redundant control valve shall have its upstream motorized and down-stream manual isolating valves. Where quick shut off requirement is foreseen, upstream isolation valve shall be pneumatic type.

Control valves for regulating service shall normally be globe body, preferably cage guided; metal-to-metal seated, pneumatically operated and shall be provided with characterized plugs having ANSI leakage class-IV.

Where the operating time is critical for the operation of the plant, hydraulic actuators with electro-hydraulic interface shall be offered.

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Bonnet joints for all control valves shall be of flanged and bolted type.

Flanged valve shall be rated at no less than class 300 lbs.

15.2 VALVE BODY / END CONNECTIONS

Valve end to end dimension and connection shall be according to ANSI standard, straight through pattern. However, Bidder may offer angle body valve for high pressure drop applications. For high pressure drop applications, construction of the valve shall be such that the gland is not exposed to inlet pressure.

Control valves of 40 mm. size and above with line pressure up to 50 Kg / Sq.cm may have flanged or welded end connections.

Control valves, used in high pressure services shall have butt welded end connections for size 65mm and above and socket weld end connection for size 50 mm or below.

Control valve body shall be selected as per the ISA guideline. Generally control valve body shall be cast and machined for pressure rating up to 1500 lbs. Above 1500 lbs, valve body shall be of forged steel. For Demineralized Water application, valve body shall be Stainless Steel.

The direction of flow shall be clearly engraved on the body .

Valve Body Material (material shall match the process condition)

SR. NO	SERVICE	MATERIAL
1	Non corrosive, non-flashing and non cavitating service for fluid temperature up to 275°C	Cast carbon steel ASTM A216 Gr. WCB
2	Non corrosive, non-flashing and non cavitating service for fluid temperature above 275°C	Cast alloy steel ASTM A217 Gr.WC9
3	Severe flashing / cavitating services	Cast alloy steel ASTM A217 Gr.WC9
4	Low flashing / cavitating services	Cast alloy steel ASTM A217 Gr.WC6
5	DM water application (condenser hotwell normal, emergency make up etc.)	Cast type 316 stainless steel ASTM A351 Gr. CF8M

15.3 VALVE SIZE

The control valve sizing (Cv / Kv) shall be based on following guidelines :

- The valves shall pass normal flow (MCR condition) with 60 to 70 percent opening for linear characterised valves and between 70 to 80 percent opening for equal percentage characterised valves.
- The valves shall have adequate rangeability to pass the minimum and maximum flows at 10% and 85% of the valve opening respectively. Valve

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stem travel range from minimum to maximum flow condition shall not be less than 50% of the total valve stem travel.

- c. Valve Cv shall be selected in such a way that the valve shall be capable of handling at least 120% of required maximum flow.
- d. The valve selection shall be based on the highest size dictated by the above considerations unless noise, flashing or other factors dictate the final selection.
- e. Trim outlet velocity for the control valves shall be no more than 7 m/sec for water service and Mach number less than 1/3 for steam and air service application.
- f. The sizing procedure followed shall be as per latest edition of ANSI/ISA or equivalent standard.

15.4 VALVE TOP WORK

- a. Top work shall be sized so that the valve shall operate properly when upstream pressure is 10 percent above maximum inlet pressure and downstream pressure is atmospheric.
- b. Extended bonnet/Finned bonnet and high temperature packing shall be used for high temperature application.
- c. The gland material shall be chosen to suit the operating temperature. PTFE may be chosen for lower temperature application (232°C maximum) and for high temperature application graphited asbestos glands are to be provided.
- d. For vacuum services, the glands shall be of dry seal type.

15.5 VALVE TRIM

- a. Valve trim for applications up to leakage class-V shall be stainless steel 316 SS for pressure drop up to 7 Kg/ Sq. cm. For pressure drops above 7 Kg/Sq. cm hard trim (selliting or equivalent) shall be used. Other alloys or treatment such as nitride shall be used if severe erosion is expected.
- b. Balanced trim valves shall be offered for high shut-off pressure or high pressure drop condition to reduce the size of the actuators.
- c. For flashing services and two stage mixtures, the trim material shall be 17-4 PH SS or equivalent.
- d. If cavitating condition is foreseen, Bidder shall offer multistage or labyrinth trims valves. Trim of severe service valves shall be of multistage and multipath design with number of discrete pressure drop stages to eliminate the chances of erosion, cavitation, noise and vibration throughout the control range of the valve.
- e. Quick replacement type trim shall be considered for easy maintenance.

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15.6 VALVE TRIM

SR. NO.	SERVICE	MATERIAL
1.	Non corrosive, non-flashing and non cavitating service for fluid temperature up to 275°C	SS 316 stellited
2.	Non corrosive, non-flashing and non cavitating service for fluid temperature above 275°C	SS 316 stellited
3.	Severe flashing / cavitating services	440 C
4.	Low flashing / cavitating services	17-4 PH SS
5.	DM water application (condenser hot well normal, emergency make up etc.)	17-4 PH SS

15.7 NOISE LEVEL

The equivalent sound level measured at 1.5M above nearest floor level in elevation and 1 M horizontally from the control valve expressed in decibels to a reference of 0.0002 microbar shall not exceed 85 dBA. If the calculated noise is more than the above limit, even with low noise trim design, diffusers shall be included. Diffusers shall be made of stainless steel and shall be integrally connected to the control valve with spool piece. The spool piece shall be in conformity with the main line piping specification.

15.8 VALVE ACTUATORS

Spring-diaphragm type actuators shall generally be used. Piston type actuators shall be offered in case of high shut-off pressure & quick response requirement.

1. The actuator shall be designed for 150% thrust required for the valve (at shut-off pressure) at an air line supply pressure of 5.5 Kg/Sq. cm.
2. Diaphragms shall be designed for 200% maximum operating pressure.
3. Nylon reinforced neoprene is preferred as diaphragm material.
4. Valve actuators shall be capable of operating at 800 C ambient, continuously.
5. Entire actuator assembly shall be painted with corrosion inhibiting paint.
6. Air connection size shall be 1/4" NPT (F) unless otherwise dictated by process response time. Integral tubing shall be stainless steel.
7. Bidder shall indicate the stroking time of the valve assemblies with positioned and ensure that the stroke time shall meet the process and equipment dynamics and shall be better than 20 seconds.
8. All actuators shall be of failsafe design signifying that the spring direction will tend to move the valve (open or close) in a direction safe for the process. "Failure to Open" or "Failure to Close" shall be marked on the actuator.

15.9 VALVE POSITIONERS

1. Regulating duty valves shall be offered with Electro Pneumatic Positioners to ensure accuracy and repeatability of response.

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2. Positioners shall have integral non contact (LVDT) type position transmitter, input and output gauges, local keypad & display.
3. Positioners shall be capable of functioning under hot, humid and vibrating conditions.
4. Positioner casings shall be dust tight, corrosion resistant and weather proof.
5. In general, positioner shall operate at signal range 4 - 20 mA DC for the full travel of the valve.

15.10 VALVE ACCESSORIES

Accessories shall include side mounted hand wheels, limit switches, junction boxes, airlock relays etc.. Solenoid valve wherever required shall be furnished.

16. INSTRUMENTATION & CONTROL CABLE:

1. Cables shall be flame retardant low smoke (FRLS) type. In hazardous areas cables of suitable R/L ratio shall be provided for intrinsic safety.
2. Durable marking shall be provided on the surface of the cable at intervals not exceeding 5 mtrs. Marking shall include Manufacturer's name, Year of manufacture, Voltage grade, Type of cables (Conductor size & no. of pairs /triads / type of compensating /extension cable), Insulation material, FRLS etc.
3. Sequential length marking shall also be provided at every meter interval on outer sheath of cable.
4. Standard seasoned wooden drum containing minimum 500 /1000 M \pm 5% length. Drum shall be anti rodent, anti termite and smooth finish. Both end of cable shall be capped by means of non-hygroscopic sealing material.
5. Cables near high temperature zone shall be capable of withstanding high temperature and terminated in junction box / panel in normal temperature zone. Teflon insulated and sheathed thermocouple extension cables and copper conductor cables shall be used in high temperature zone. Conductor and sheath shall be extruded FEP (Teflon) as per VDE 0207 Part 6 and ASTM D 2116. These cables shall be pair, multi pair, triad, multi triad and twisted & shielded.

16.1 THERMOCOUPLE EXTENSION & COMPENSATING CABLE

1	Conductor	Solid conductor
2	Conductor size	0.75 sq.mm
3	Type	KX (Extension) (Chromel Alumel), RX (Compensating) (Copper-Copper alloy), JX (Extension) (Iron Constantan)
4	Conductor Insulation	HR PVC Type-C (IS-5831,1984) 0.6 mm thick
5	Operating Voltage	300V /500V RMS (Core to earth / core to core)

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Tender Bid Documents for supply, installation, commissioning & testing of FGD system at 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS with O&M.

6	Twisting	Pair twisted with lay of 60 mm (max)
7	Twisting Direction	All pairs in the same direction. Lapped to form bunch with mylar tape
8	Screen (Pair & Overall)	Aluminium mylar tape with a thickness of 28 μ m (min.) for individual pair screen and 60 μ m (min.) for overall screen with 100% coverage and 25% overlapped edges. Over the individual pair screening tape two laps of 0.05 mm thick (min.) polyester tape shall be applied with minimum overlap of 25%. Metallic side of the screen shall be in contact with drain wire
9	Drain wire	Annealed tinned copper wire, stranded. Size 0.5 Sq. mm. (No. of strands / size: 7 / 0.3mm)
10	Inner Sheath	Extruded FRLS PVC (anti rodent, anti-termite & moisture resistant properties) HR PVC Type ST2 of IS-5831,1984 Thickness as per IS-1554Part-I 1976.
11	Rip Cord	Non-metallic under sheath
12	Armouring	GI wire / strip as per IS 3975
13	Outer Sheath	Extruded FRLS PVC (anti rodent, anti-termite & moisture resistant properties) HR PVC Type ST2 of IS-5831,1984 Thickness as per IS-1554Part-I 1976.
14	Filler	Non hygroscopic with FRLS property
15	Temperature Range	Up to 85 °C
16	Insulation at 200 C	100 MOhms/Km [Min]
17	Capacitance at 800 Hz	120 nf/km
18	Cross talk	60 dB
19	Attenuation	1.2 dB/Km
20	Codes & Standards	a) IEC 332-1 b) ANSI MC 96.1 c) IS-8784-1987
21	Tests	a) Oxygen Index: Min.29 at room temp. (ASTM-D-2863) b) Acid Gas Gen.: Max.20% by weight as per IEC 754 Part-I c) Temp Index: Min 250 DEG C at 21Oxy. Ind. (ASTM- D-2863) d) Smoke Density Rating: Max.60% (ASTM-D-2843). e) Flammability Test : as per IEC 332 Part-I /IEEE-383 Swedish Chimney Test - SS-424-

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		1475 F3 f) High voltage test Core to core- 1.5 KV for 1 min. Core to screen- 1.0 KV for 1 min. g) Insulation Resistance 100 M Ohm /Km Min h) Rodent & Termite repulsion test (Presence of lead shall be confirmed)			
22	Conductor material & sheath color for thermocouple cable as per ANSI MC				
	CABLE TYPE	SHEATH COLOR	WIRE	SHEATH COLOR	CONDUCTOR MATERIAL
	KX	Yellow	Positive	Yellow	Nickel / Chromium
			Negative	Red	Nickel / Aluminium
	JX	Black	Positive	White	Iron
			Negative	Red	Constantan
	RX	Green	Positive	Black	Copper
			Negative	Red	Copper Nickel Alloy
23	Durable printed or embossed numbering at regular interval of 50mm shall be provided for identification of pairs.				

16.2 INSTRUMENTATION MULTI PAIRED SIGNAL CABLE

1.	Conductor type	Stranded (7) annealed tinned copper
2.	Conductor size	0.5 / 1.0 / 1.5 Sq.mm (as required)
3.	Conductor resistance	39 Ω/Km/18 Ω/Km/12 Ω/Km
4.	Conductor Insulation	HR PVC Type-C (IS-5831,1984) 0.6 mm thick
5.	Operating Voltage	300 / 500V RMS (Core to earth / core to core)
6.	Twisting	Twin twisted with lay of 60 mm
7.	Twisting Direction	All pairs in the same direction. Lapped to form bunch with mylar tape
8.	Screen (Pair & Overall)	Aluminium mylar tape with a thickness of 28 µm (min.) for Individual pair screen and 60 µm (min.) for overall screen with 100% coverage and 25% overlapped edges. Over the individual pair screening tape two laps of 0.05 mm thick (min.) polyester tape shall be applied with minimum overlap of 25%. Metallic side of the screen shall be in contact with drain wire. <ul style="list-style-type: none"> Analog signals- Individual pair & overall shield to be considered. Binary signals- overall shield to be considered.
9.	Drain wire	Annealed tinned copper wire, stranded. Size 0.5 Sq.mm (No. of strands / size:7 / 0.3mm)
10.	Inner Sheath	Extruded FRLS PVC (anti rodent, anti-termite & moisture resistant properties) HR PVC

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Tender Bid Documents for supply, installation, commissioning & testing of FGD system at 500 MW Unit No. 6 of Ukai TPS and 2x250 MW Unit No. 3 & 4 of Sikka TPS with O&M.

		Type ST2 of IS-5831,1984 Thickness as per IS-1554, Part-I 1976.																								
11.	Rip Cord	Non-metallic under sheath																								
12.	Armouring	GI wire / strip as per IS 3975																								
13.	Outer Sheath	Extruded FRLS PVC (anti rodent, anti-termite & moisture resistant properties) HR PVC Type ST2 of IS-5831,1984 Thickness as per IS-1554, Part-I 1976.																								
14.	Filler	Non hygroscopic with FRLS property.																								
15.	Temperature Range	85 ⁰ C																								
16.	Insulation at 20 Deg.C	100 MOhms/Km [Min]																								
17.	Capacitance at 800 Hz	120 nf/km																								
18.	Cross talk	60 dB																								
19.	Attenuation	1.2 dB/Km																								
20.	Codes & Standards	a) IPCEA-S-61-402 b) BS 5308 c) IEC 332-1 d) ASTM-B-33 e) IS-8130-1984 f) IS 1554 Part-1 g) IS 10810																								
21.	Sheath colour	Inner- Black and Outer- Gray																								
22.	Tests	a) Oxygen Index: Min.29 at room temp. (ASTM-D-2863) b) Acid Gas Gen.: Max.20% by weight as per IEC 754 Part-I c) Temp Index : Min 250 O C at 21Oxy. Ind. (ASTM-D-2863) d) Smoke Density Rating : Max.60% (ASTM-D-2843). e) Flammability Test : as per IEC 332 Part-I f) Swedish Chimney Test-SS-424-1475 F3 g) Insulation Resistance 100 M Ohm / Km Min h) High voltage test Core to core- 1.5 KV for 1 min. Core to screen- 1.0 KV for 1 min. i) Rodent & Termite repulsion test (Presence of lead shall be confirmed)																								
	Colour of core for Instrumentation Cable (As per IS-9938)	<table border="1"> <thead> <tr> <th>PAIR</th><th>CORE</th><th>COLOR</th></tr> </thead> <tbody> <tr> <td>1st</td><td>1st</td><td>Blue</td></tr> <tr> <td>1st</td><td>2nd</td><td>Red</td></tr> <tr> <td>2nd</td><td>1st</td><td>Gray</td></tr> <tr> <td>2nd</td><td>2nd</td><td>Yellow</td></tr> <tr> <td>3rd</td><td>1st</td><td>Green</td></tr> <tr> <td>3rd</td><td>2nd</td><td>Brown</td></tr> <tr> <td>4th</td><td>1st</td><td>White</td></tr> </tbody> </table>	PAIR	CORE	COLOR	1st	1st	Blue	1st	2nd	Red	2nd	1st	Gray	2nd	2nd	Yellow	3rd	1st	Green	3rd	2nd	Brown	4th	1st	White
PAIR	CORE	COLOR																								
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3rd	1st	Green																								
3rd	2nd	Brown																								
4th	1st	White																								

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			4th	2nd	Black	
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4th 2nd Above 4 Pairs, 4 Pairs making a unit shall have indelible printed colour coded bands like Pink for 1st unit, Orange for 2nd unit and Violet for 3rd unit and so on. In addition band marking, for example single band for 1st. unit, double band for 2nd. unit and so on, shall be provided on each conductor for identification of unit. Band marking on individual core shall be provided at regular intervals not exceeding 50 mm.

17. JUNCTION BOX

1. Type of Enclosure : Dust tight & weatherproof conforming to IP 65
2. Material : 3 mm sheet steel
3. Type of Cover : Solid unhinged with retention chain
4. Paint : RAL 7032
5. Mounting : Surface
6. Cable Entry : 3 mm (min) Gland plate
7. Gasket : Neoprene
8. Grounding : Brass earth lug with green screw head External-2 nos , Internal-1no.M6
9. Number of Drain Holes : Two at bottom capped
10. Identification : Label for JB and Tags for cable
11. Accessories : Rail mounted cage clamp type screw less terminals with markers, Cable gland, Ferrules, Canopy at top

18. CABLE GLAND

1. Type : Double compression
2. Entry Thread : NPT
3. Material : Brass
4. Finish : Cadmium Plated.
5. Protection : IP 54 or better
6. Accessories : Neoprene gasket, locknuts, reducers etc

19. CABLE TRAY

1. Material : Mild steel, slotted
2. Thickness : not less than 2.0 mm
3. Finish : Hot dip galvanized
4. Perforation : As per MFR standard
5. Cover : Suitable for tray

20. CABLE INSTALLATION & ROUTING

All cables assigned to a particular duct/conduit shall be grouped and pulled in simultaneously using cable grips and suitable lubricants. From field instrument to JB conduit shall be provided.

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All Instrument cable trays shall be perforated type mounted in vertical position. Cables shall be segregated as per IEEE Std.-422. In vertically stacked trays, the higher voltage cable shall be in higher position and instrumentation cable shall be in bottom tier of the tray stack. The distance between instrumentation cables and those of other system shall be as follows:

- From 415V tray system - 610 mm
- From control cable tray system - 305 mm

Cables shall terminate in the enclosure through cable glands. All cable glands shall be properly gasketed in the gland plates. Fireproof sealing to prevent dust entry and propagation of fire shall be provided for all gland plates used for cable entry.

The cables emanating from redundant equipment/devices shall be laid through different routes. All network cable shall be laid in metal conduit.

21. CABLE LAYING & ACCESSORIES

- Cables shall be laid strictly in line with cable schedule.
- Identification tags for cables: Indelible tags to be provided at all terminations, on both sides of wall or floor crossing, on each conduit/duct/pipe entry/exit, and at every 20 m in cable trench/tray.
- Cable tray numbering and marking: To be provided at every 10m and at each end of cableway & branch connection.
- Joints for less than 250 Meters run of cable shall not be permitted.
- Buried cable protection: With concrete slabs; Route markers at every 20 Meters along the route & at every bend.
- Road Crossings: Cables to pass through buried high density PE pipes encased in PCC. At least 300 mm clearance shall be provided between LT power & LT control/instrumentation cables
- Segregation: In order to ensure physical isolation to prevent fire jumping, interplant cables of station auxiliaries and unit critical drives shall be segregated in such a way that not more than half of the drives are lost in case of single incident of fire.
- Cable clamping

All cables laid on trays shall be neatly dressed up & suitably clamped/tied to the tray. For cables in trefoil formation, trefoil clamps shall be provided.

22. CONDUITS

All rigid conduits, couplings and elbows shall be hot dipped galvanized rigid mild steel in accordance with IS: 9357 Part-I (1980) and Part-II (1981). The conduit interior and exterior surfaces shall have continuous zinc coating with an overcoat of transparent enamel lacquer or zinc chromate. Flexible conduit shall be heat resistant lead coated steel, water, fire and rust proof. The temperature rating of flexible conduit shall be suitable for actual application.

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23. XLPE, FRLS CABLES – INSTRUMENTATION CABLES, CONTROL & POWER CABLE & CABLE SUB-TRAYS

All instrumentation cables, Control & Power cables as applicable for interconnection of all equipment/system/devices in Bidders scope as well as for connection of signals from/to systems like MCC/LT SWGR/HT SWGR (even if they are not in Bidder's Scope.) etc. along with necessary laying & termination accessories, hardware etc. shall be under Bidder's scope. All sub trays along with supporting, connecting hardware etc. required for lying of instrumentation, control, power and other cables etc. for instruments supplied by Bidder, upto main cable trays are under Bidder's scope.

24. IMPLUSE PIPING & ERECTION HARDWARE

24.1 IMPULSE PIPING

Material and rating of the hook up items shall suit the piping and fluid condition. Hook up materials shall be IBR certified for applicable cases. Bidder shall furnish hook up drawings and the drawings for open racks & closed racks for owner's approval.

All materials supplied under this Sub-section shall be suitable for intended service, process, operating conditions and type of instruments used.

24.2 IMPULSE PIPING, TUBING, FITTINGS, VALVES AND VALVE MANIFOLDS

- a) All impulse pipes shall be of seamless type conforming to ANSI B36.10 for schedule numbers, sizes and dimensions etc. The material of the impulse pipe shall be same as that of main process pipe.
- b) Stainless steel tube shall be provided inside enclosures & racks from tee connection to valve manifold and then to instrument. For high pressure/temperature applications (piping classes A, B, C & D of the table no. PCP) the material shall be ASTM A 213 TP 316H and for other applications material shall be ASTM A 213 TP 316L. The wall thickness of the tube shall be in accordance with the ANSI B31.1 standard.
- c) Size and thickness of piping/tubing shall be suitable for the design pressure and temperature conditions as per ANSI 16.11.
- d) All fittings shall be forged steel and shall conform to ANSI B16.11. The material of forged tube fittings for shaped application (e.g. Tee, elbow etc.) shall be ASTM A 182 Gr. 316 H for high pressure/ temperature applications and ASTM A 182 Gr. 316L for other applications. The material for bar stock tube fitting (for straight application) shall be 316 SS. Metal thickness in the fittings shall be adequate to provide actual bursting strength equal to or greater than those of the impulse pipe or SS tube, with which they are to be used. The source shut-off (primary process root valve) and blow down valve shall be of 1/2 inch size globe valve type for all applications except for air and flue gas service wherein no source shut-off valves are to be provided. The disc and seat ring materials of carbon steel and alloy steel valves shall be ASTM A-105 and ASTM A-182, Gr.

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F22, hard faced with satellite (minimum hardness - 350 BHN.) The surface finish of 16 RMS or greater is required in the area of stem packing. The valve design shall be such that the seats can be reconditioned and stem and disc may be replaced without removing the valve body from the line. The valve manifolds shall be of 316 stainless-steel with pressure rating suitable for intended application. 2-valve manifold and 3-valve manifold shall be used for pressure measurements using pressure transmitters/ pressure switches and diff. pressure transmitter/ switches respectively. 5-valve manifold shall be used for remaining applications like DP, flow and level measurements.

- e) For PR/D.P gauges in fluid application two-way globe valve on each impulse line to the instrument and in Air & Flue gas application two-way gate valve on each impulse line to the instrument shall be provided near the instrument. These shall be in addition to the three ways gauge cock provided along with the PR/D.P gauges. Impulse piping material shall be the same as the parent pipe material. Impulse piping of SS316 shall be provided for all sampling lines up to the analyser. For transmitters, SS 316 piping / tubing shall be used within the transmitter rack for connecting from the manifold up to the transmitter. At transmitter rack input, bulkhead fittings shall be provided to be suitable for connecting impulse pipe at outside end, and impulse tube at the inside end. Length of impulse piping from tapping point to rack shall be generally limited to 10 meters.
- f) For impulse pipes / tubes and fittings, IBR certificate shall be provided as applicable. Bidder shall provide thermal insulation for sampling pipes for the purpose of personnel protection so that the temp. outside the insulation is not more than 60oc. Insulation shall be lightly bonded mineral wool. Tubing shall be complete with union connections and end fittings at supply and receiving ends. All fittings with SS tubing shall be stainless steel double compression type fittings.

24.3 IMPULSE PIPE / TUBE FITTINGS & ACCESSORIES

Nipple shall be provided for root valve size more than ½ inch and the nipple size shall be same as the root valve size. Reducer/adaptor shall be provided to suit instrument connection, where nipple, root valve size is more than ½ inch.

24.4 Fittings

All fittings except the last fitting connecting to the instrument (or to bulkhead fitting for transmitter racks) shall be socket welded. The size of the fittings shall be same as the impulse line size. The fitting connecting to the instrument shall have a size and thread to suit the instrument connection.

24.5 DRAIN

Drain shall be provided for all water/ steam and non-inflammable/ non- corrosive fluids only.

24.6 DRAIN VALVE

Two numbers of globe drain valves shall be for process conditions of 425°C or 62 bar and higher. One number globe drain valve shall be provided for process conditions of less than 425°C and 62 bars. The valve size shall be same as impulse piping/tubing size. For air/flue gas measurement a drain pot with plug shall be

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provided in place of drain valves. Gunmetal valves are not allowed for any instrumentation applications. All instrumentation Isolation valve should have drain facility.

24.7 FUNNEL WITH DRAIN HEADER

This shall be provided in the racks for blowing/draining out the process fluid in the impulse tubing's. The size of the drain header shall be 1". When instruments are mounted local to the tapping point and are not mounted in the rack, or panel or enclosure, the drains shall be connected to the nearest floor level or plant drain.

24.8 AIR SUPPLY PIPING

- a) All pneumatic piping, fittings, valves, air filter cum regulator and other accessories required for instrument air for the various pneumatic devices/instruments shall be provided.
- b) This will include as a minimum air supply to pneumatically operated control valves, actuators, instruments, continuous and intermittent purging requirements etc.
- c) For individual supply line and control signal line to control valve, 1/4-inch size seamless SS tubes with double compression SS tube fittings shall be used. Alternatively, light drawn tempered copper tubing conforming to ASTM B75 shall be used. The thickness of cu-tubing shall not be less than 0.065 inch and shall be PVC coated. The fittings to be used with copper tubes shall be of brass, screwed type with ferrules for sealing.
- d) All other air supply lines of 1/2 inch to 2 inch shall be of mild steel hot dipped galvanized inside and outside as per IS-1239, heavy duty with threaded ends. The threads shall be as per ASA B.2.1. Fittings material shall be of forged carbon steel A234 Gr. WPB galvanized inside and outside screwed as per ASA B2.1. Dimensions of fittings shall be as per ASA B16.11 of rating 3000 lbs.
- e) For air supply to various devices mentioned above, the Bidder shall provide 2-inch size GI pipe header with isolation valve from the instrument air and service air terminal points. In the Turbine area the 2-inch header shall be provided upto top most elevation of turbine floor and from this 2-inch header, 1-inch sub-header shall be branched off at each floor with isolation valve. From this 1 inch sub-header, branch line of 1/2 inch, with isolation valve shall be provided upto various devices.
- f) All instrument air filters cum regulator set with mounting accessories shall be provided for each pneumatic device requiring air supply. The filter regulators shall be suitable for 10-kg/ Sq.mm max. inlet pressure. The filter shall be of size 5 microns and sintered bronze material. The air set shall have 2-inch size pressure gauge and built in filter housing blow down valve.
- g) All the isolation valves in the air supply line shall be gate valves of SS as per ASTM inside screw rising stem, screwed female ends as per ASA B2.1. Valve bonnet shall be union type & trim material shall be stainless steel, body rating 150 pounds ASA. The valve sizes shall be ½ inch to 2 inch.

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24.9 INSTRUMENT PIPING SYSTEM

For steam and liquid measurements, the impulse pipe should preferably slope downward from source connection to instrument and instrument shall be installed below the source point. If due to any reason instrument is installed above the source point, the impulse pipe should slope upwards continuously and a 'pigtail' should be provided at the instrument to assure water seal for temperature protection. For vacuum measurements instrument shall be installed above source point and impulse pipe should slope upwards.

Impulse piping for air and flue gas shall slope upwards and instrument shall be installed above source point. If this requirement cannot be met special venting or drain provision shall be provided with vent & drain lines along with isolation valves and other accessories including drainpipes. This drain is to be connected to plant drain through open funnel also.

All impulse piping shall be installed to permit free movement due to thermal expansion. Wherever required expansion loops shall be provided.

Special accessories such as condensing pots/ reservoirs shall be provided and installed wherever required. In any case condensing pots shall be provided for all level measurements in steam and water services, all flow measurement in steam services and flow measurements in water services above 120 Deg. C. Colour coding of all impulse pipes shall be done by the Bidder in line with the colour coding being followed for the parent pipes.

24.10 INSTRUMENT AIR & SERVICE AIR PIPING/ TUBING SYSTEM

Air piping shall be installed always with a slope of over 1/20 to prevent accumulation of water within the pipe.

Single and multi-tubes shall run with the minimum number of changes in direction. Suitable identification tags shall be provided for easy check-up and for connections.

24.11 PIPING/TUBING SUPPORT

Impulse piping and sample piping shall be supported at an interval not exceeding 1.5 meters. Each pipe shall be supported individually using mounted clamps with necessary fixtures. Tubing shall run in proper perforated trays with proper cover. Tubing shall be supported inside the trays by aluminium supports. Hangers and other fixtures required for support of piping and trays shall be provided, either by welding or by bolting on walls, ceilings and structures. Hanger clamps and other fastening hardware shall be of corrosion resistant metals and hot-dip galvanized.

25. FURNITURE

The Bidder shall provide necessary industrial grade furniture (desks, tables, chairs etc) for monitors, peripherals and operators/engineers in the control room etc.

1. Chairs

Industry standard wheel chairs with provision for adjustment of height shall be provided for the operator & unit in charge & other personnel in control room area. These shall be designed for sitting for long duration and shall not cause undue stress.

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2. Tables

- a. Industry standard computer tables shall be provided & shall be as approved by Employer.
- b. Conference Room standard tables shall be provided with acrylic coat for good finish.

The Bidder shall design, supply the furniture to meet the intent of the specification and indicate the basis of design, bill of quantities in the offer. Please refer drg: FGD C&I-II Console.

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SUB-SECTION – III

PLC BASED CONTROL SYSTEM

1. CONTROL AND INSTRUMENTATION FOR PLANT AUXILIARY PACKAGES:

Contractor shall provide complete Control and Instrumentation system with all accessories, auxiliaries and associated equipments and cables for the safe, efficient and reliable operation of the plant auxiliary systems.

- 1.1 Bidder shall also include in his proposal all instruments and devices & PIDs, which are needed for the completeness of the plant auxiliary system/equipment, supplied by the Contractor.
- 1.2 All instruments and control equipments like primary and secondary instruments etc. shall meet the FGD requirements. In addition, all electrical instrument devices like switches/ transmitters / controllers/ analyzers/ solenoid valves which are located in the field/ hazardous locations shall be provided with explosion proof enclosure suitable for hazardous areas described in National Electric Code(USA), Article 500, Class-I, Division-I. All fittings, cable glands etc. shall be strictly as per NEC recommendation article, 500 to 503.
- 1.3 Contractor shall provide independent control systems for safe, efficient and reliable operation of each of the plant auxiliary systems.
- 1.4 ON/OFF control, indication, annunciation of incomers and bus-coupler (even if they are not in the scope of the contractor) are also to be performed from Contractor's Control System for each of the plant auxiliary system as applicable.
- 1.5 It shall be possible to remove/ replace online various modules (like any I/O module, interface module, etc.) from its slot for maintenance purpose without switching off power supply to the corresponding rack. System designs shall ensure that while doing so, undefined signalling and releases do not occur and controller operation in any way is not affected (including controller trip to manual, etc) except that information related to remove module is not available to controller. Further, it shall also be possible to remove/ replace any of the redundant controller module without switching off the power to the corresponding rack and this will not result in system disturbance or loss of any controller functions for the other controller. The on-line removal/ insertion of controller, I/O modules shall in no way jeopardize safety of plant and personnel.
- 1.6 The control system shall provide safe operation under all plant disturbances and on component failure so that under no condition the safety of plant, personnel or equipment is jeopardized. Control system shall be designed to

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revert to normal swings due to loss of Control System power supply, failure of any Control System component, open circuit/ short circuit, instrument air supply failure etc. On any of these failures the controlled equipment /parameter shall either remain in last position before failure or shall come to fully open/ close or on/ off state as required for the safety of plant/ personnel/ equipment and as finalised during detailed engineering. System shall be designed such that there will be no upset when Power is restored.

- 1.7** The Control system shall include on-line self-surveillance ,monitoring and diagnostic facility giving the details of the fault on the Human Machine Interface System (HMIS). The faults to be reported shall include fault in main & standby power supplies, sensor fault, Input/ Output card failure, Memory Status, Controller fault, failure of Communication /Network links to other control systems, LAN etc. These faults shall be reported as colour change on system status display and as messages on HMI as well as through local indication on the faulty module and on respective rack/ cubicle. The diagnostic system shall ensure that the faults are detected before any significant change in any controller output has taken place.
- 1.8** The Control system shall operate in non-air conditioned area and shall meet the minimum requirements as specified below.
- 1.9** Also refer configuration diagram for PLC based off-site control system, drawing no: FGD C&I-I.

2.0 PROGRAMMABLE LOGIC BASED CONTROL SYSTEM

2.1 PLC PROCESSOR

The processor unit shall be capable of executing the following functions:

- a) Receiving binary and analog signals from the field and providing command output to MCC/SWGR/Drive etc. through Input/ Output modules and operator initiated commands from HMIS/control panel.
- b) Implementing all logic functions for control, protection and annunciation of the equipment and systems.
- c) Implementing modulating control function for certain application as specified elsewhere in the specification.
- d) Providing supervisory information for alarm, various types of displays, status information, trending, historical storage of data etc.
- e) Performing self-monitoring and diagnostic functions.

- 2.2** Each PLC unit shall be provided with two processors (Main processing unit and memories) one for normal operation and one as hot standby. In case of failure of working processor, there shall be an appropriate alarm and simultaneously the hot standby processor shall take over the complete plant operation automatically. The

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transfer from main processor to standby processor shall be totally bump less and shall not cause any plant disturbance what so ever. In the event of both processors failing, the system shall revert to fail safe mode. Its shall be possible to keep any of the processors as master and other as standby. The standby processor shall be up dated in line with the changes made in working processor. CPUs shall not be loaded to over 60% of their capacity even under worst data loading conditions.

Wherever multiple functional groups have been specified/ required, the above requirements are applicable for each functional group.

- 2.3** The memory shall be field expandable. The memory capacity shall be sufficient for the complete system operation and have a capability for at least 20% expansion in future. Programmed operating sequences and criteria shall be stored in non volatile semi conductor memories like EPROM. All dynamic memories shall be provided with buffer battery backup which shall be for at least 360 hours. The batteries shall be lithium or Ni-Cd type.

2.4 Priority of different commands shall be as follows

2.4.1 Manual intervention shall be possible at any stage of operation. Protection commands shall have priority over manual commands and manual commands shall prevail over auto commands.

2.4.2 A forcing facility shall be provided for changing the states of inputs and outputs, timers and flags to facilitate fault finding and other testing requirements. It shall be possible to display the signal flow during operation of the program.

2.5 Human Machine Interface System (HMIS)

2.5.1 Operator workstation (OWS) shall perform control, monitoring and operation of all auxiliaries/ drives interacting with PLC based control system. It shall be possible to use the same as programming station of the PLC and the Human Machine Interface System. It shall basically perform the following functions. 1 no of Engineering work station (EWS) & 2 No of OWS with A4 size printer shall be provided.

2.5.2 Operator shall be able to access all control/ information related data under all operating conditions including a single processor/ computer failure in the HMIS.

2.5.3 All frequently called important functions including major displays shall be assigned to dedicated function keys on a soft key board for the convenience of the operator for quick access to displays & other operator functions.

2.5.4 The operator functions for each OWS shall as a minimum include Control System operation (A/M selection, raise/lower, set point/ bias change, on/off, open/close operation, mode/device selection, bypassing criteria, sequence auto, start/stop selection, drive auto selection, local-remote/other multi-position selection etc.);

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alarm acknowledge; call all kind of displays, logs, summaries, calculation results, etc.; printing of logs & reports; retrieval of historical data; and any other functions required for smooth operation, control & management of information as finalized during detailed engineering.

2.5.5 The display selection process shall be optimized so that the desired display can be selected with the minimum no. Of operations. Navigation from one display to any other should be possible efficiently through paging soft keys as well as through targets defined on the displays. There should be no limitation on number of such targets.

2.5.6 The system shall have built-in safety features that will allow/disallow certain functions and entry fields within a function to be under password control to protect against inadvertent and unauthorized use of these functions. Assignment of allowable functions and entry fields shall be on the basis of user profile. The system security shall contain various user levels with specific rights as finalised by the Employer during detailed engineering. However, no. Of user levels, no. Of users in a level and rights for each level shall be changeable by the programmer (Administrator).

When any drive or sequence is being controlled from one OWS, the system shall inhibit control access of the same drive or sequence from other OWS or Local Control Panel.

2.5.7 Operator/Engineering workstation shall be complete with latest available CPU/hardware along with latest user friendly operating system, 24" colour LED monitor, Key Board, mouse, DVD Read/writer, A4 colour laser printer. In addition, a laptop unit of latest configuration, loaded with engineering software shall be furnished & can be worked as EWS cum OWS. The system support including software support shall be available throughout the plant life.

2.6 PROGRAMMING FUNCTIONALITIES

Programming of the PLC Processor/controller as well as programming of HMIS shall be user friendly with graphical user interface and shall not require knowledge of any specialized language. For example, the programming of PLC shall use either of the following:

- Flow-chart or block logic representing the instructions graphically.
- Ladder diagrams.

The programming of HMIS (like development and modification of data base, mimics, logs/reports, HSR functionalities etc.) shall also be possible through user-friendly menus etc

All programming functionalities shall be password protected to avoid unauthorised modification.

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2.7 SOFTWARE REQUIREMENT

2.7.1 All necessary software required for implementation of control logic, operator station displays / logs, storage & retrieval and other functional requirement shall be provided. The programs shall include high level languages as far as possible. The contractor shall provide sufficient documentation and program listing so that it is possible for the Employer to carry out modification at a later date.

2.7.2 The Contractor shall provide all licence software required by the system for meeting the intent and functional/ parametric requirements of the specification.

2.7.3 Industry standard operating system like WINDOWS (latest version) etc. to ensure openness and connectivity with other system in industry standard protocols (TCP-IP/ OPC etc.) shall be provided. The system shall have user friendly programming language & graphic user interface.

2.7.4 All system related software including Real Time Operating System, File management software, screen editor, database management software. On line diagnostics/ debug software, peripheral drivers software and latest versions of standard PC-based software and latest WINDOWS based packages etc. and any other standard language offered shall be furnished as a minimum.

2.7.5 All application software for PLC system functioning like input scanning, acquisition, conditioning processing, control and communication and software for operator interface of monitors, displays, trends, curves, bar charts etc. Historical storage and retrieval utility, and alarm functions shall be provided.

1.7.6 The Contractor shall provide software locks and passwords to Employer's engineers at site for all operating & application software so that Employer's engineer scan take back up of these software and are able to do modifications at site.

1.7.7 Microsoft Window Operating system Software for control system should be latest License version available in market and compatible with the control system. Applicable software with lifetime license version shall be provided. Applicable software CDs / DVDs shall be provided in 06 Sets

2.8 PARAMETRIC REQUIREMENTS

The control system shall be designed such that under worst case loading conditions the response time shall not be worse than the following:

On/Off Command : The response time for screen update after the execution of the control command from the time the command is issued (for example command to start a motor to the time the screen is updated) shall be two seconds (excluding the

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drive actuation time).

Adjustment Command	: 0.5to1second
On screen Updating	: 1second
All Control related displays	: 1second.
Bar Chart displays	: 2 to 3 seconds.
Plant Mimic displays	: 2 to 3 seconds.
Groupreview displays	: 2 to 3 seconds.
X-T Plot Displays	: 1 to 2 seconds.
Plant Summary Displays	: 1 to 2 seconds.

Even under worst case loading condition of HMIS and system Bus, each HMIS processor shall have 50% spare time when measured over any one minute period and the system bus shall have at least 50%spare duty cycle.

3. INPUT / OUTPUT MODULES:

- 3.1** The PLC system should be designed according to the location of the input/output cabinet as specified.
- 3.2** Input Output modules, as required in the Control System for all type of field input signals (4-20mA, non-changeover/change over type of contact inputs etc.) and outputs from the control system (non changeover/ changeover type of contact, 24/48 VDC output signals for energising interface relays,4-20mA output etc.) are to be provided by the Contractor.
- 3.3** Electrical isolation of 1.5KV with optical couplers between the plant input/output and controller shall be provided on the I/O cards. The isolation shall ensure that any inadvertent voltage or voltage spikes (as may be countered in a plant of this nature) shall not damage or mal-operate the internal processing equipment.
- 3.4** The Input/output system shall facilitate modular expansion in fixed stages. The individual input/output cards shall in corporate indications on the module front panels for displaying individual signal status.
- 3.5** Individually fused output circuits with the blower fuse indicator shall be provided. All input/output points shall be provided with status indicator. Input circuits shall be provided with fuses preferably for each input, alternatively suitable combination of inputs shall be done and provided with fuses such that for any fault, fuse failure shall affect the particular drive system only without affecting other systems.
- 3.6** All input/output cards shall have quick disconnect terminations allowing for card replacement without disconnection of external wiring and without switching of power supply.

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3.7 The Contractor shall provide the following monitoring features:

- a) Power supply monitoring.
- b) Contact bounce filtering.
- c) Optical isolation between input and output signals with the internal circuits
- d) In case of power supply failure or hardware fault, the critical outputs shall be automatically switched to the fail-safe mode. The fail-safe mode shall be intimated to the successful Contractor during detailed engineering.

3.8 Binary Output modules shall be rated to switch ON/OFF coupling relays of approx. 3VA at 24VDC. Analog output modules shall be able to drive an load impedance of 500 Ohms minimum.

3.9 Output module shall be capable of switching ON/OFF inductive loads like solenoid valves, auxiliary relays etc. without any extra hardware.

3.10 All input fields interrogation voltage shall be 24VDC or 48VDC. Bulk power supply units for interrogation relay and solenoid voltage shall be separate from system power supply units and shall be redundant.

3.11 In case of loss of I/O communication link with the main processing unit, the I/O shall be able to go to predetermined failsafe mode(to be decided during detailed engineering) with proper annunciation.

4. WIRING SCHEME FOR INPUTS TO CONTROL SYSTEM SHALL BE AS FOLLOWS

4.1. Input used for interlock /protection shall be dual redundant. Each of the redundant binary & analog inputs shall be wired to separate input modules. These redundant modules shall be placed in different racks, which will have separately fused power supply distribution. Implementation of multiple measurement schemes of these inputs will be performed in the redundant hardware. Loss of one input module shall not affect the signal to other modules. Other channels of these modules can be used by other inputs of the same functional group.

4.1.1 The single (i.e. non-redundant) binary & analog signal required for control purposes shall be wired as follows.

4.1.2 All single analog & binary inputs including the limit switches of valves/dampers MCC/SWGR check-backs of all drives & information related signals shall be wired to single (i.e. non-redundant) input modules.

4.1.3 The on-off status of HT drives etc, however, be wired to two different input modules of different rack in parallel.

4.1.4 Inputs and Outputs related to each of the redundant drives/ equipment (eg. each of the 3x50% drives, each of the storage vessel/ sump/ tanks to ring same fluid, each of the streams and its related drives etc.) shall be wired to separate input and output.

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4.2 The signal conditioning functions like multiple measurement schemes, square root extraction for flow signals, pressure and temperature compensation, limit value computation can be performed either in the controllers or in signal conditioning and processing hardware outside controllers.

4.3 The maximum number of inputs/outputs to be connected to each type of module shall be as follows:

- | | |
|---------------------------------------|------|
| 1) Analog input module | : 16 |
| 2) Analog output module | : 16 |
| 3) Binary input module | : 32 |
| 4) Binary output module | : 32 |
| 5) Analog input & output (combined) | : 16 |
| 6) Binary input and output (combined) | : 32 |

4.4 Any single sensor/transducer/transmitter failure alarm shall be provided on programmer station screens for all sensors/transducers/transmitters. Similarly sensor break alarm for thermocouples etc. shall also be displayed on the screens.

4.5 Contractor shall provide remote Input / Output modules Housed in free-standing cabinets/racks (with suitable redundant data link to the central PLC system) as specified. These Input / Output modules shall meet the technical requirements as mentioned in the above clauses. Further these Input / Output modules shall be designed to continuously work under the environment expected to be encountered in assigned areas without any air-conditioning support. Wherever the cable route distance of these I/O cabinets/racks exceeds a distance of 300 meters from the Central PLC, fiber optic data link has to be provided.

5. SYSTEM SPARE CAPACITY

5.1 Over and above the equipment and accessories required to meet the fully implemented system as per specification requirements, Control System shall have spare capacity and necessary hardware/ equipment/ accessories to meet following requirement for future expansion at site:

5.2 10% spare channels in each input/output modules fully wired up to cabinets TB. In addition to this, 10% or minimum of one off, extra assigned complete spare modules mounted on rails in racks for each type of I / O modules.

5.3 Wired-in "usable" space for 20% modules in each of the system cabinets for mounting electronic modules wired up to corresponding spare terminals in system cabinets. Empty slots between individual modules/group of modules, kept for ease in maintenance or for heat dissipation requirement as per standard practice of Contractor shall not be considered as wired-in "usable" space for I/O modules. Terminal assemblies (if any in the offered system), corresponding to the I/O modules shall be provided for above mentioned 20 % blank space. At least 10%percent spare unwired

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terminals shall be provided for all panels /cabinets /desks /junction box etc.. This shall be in addition to spare wired terminals.

5.4 Each processor / controller shall have 30% spare functional capacity to implement additional function blocks, over and above implemented logic/ loops. Further, each processor / controller shall have spare capacity to handle minimum 30% additional inputs/ outputs of each type including above specified spare requirements, over and above implemented capacity. Each of the corresponding communication controllers shall also have same spare capacity as that of processor/controller.

5.5 The Data communication system shall have the capacity to handle the additions mentioned above.

5.6 Twenty (20) percent spare relays of each type and rating mounted and wired in cabinets TB. All contacts of relays shall be terminated in terminal blocks of cabinets.

5.7 The spare capacity as specified above shall be uniformly distributed throughout all cubicles. The system design shall ensure that above mentioned additions shall not require any additional controller/processor/ peripheral drivers in the system delivered at site. Further, these additions shall not deteriorate the system response time / duty cycle, etc. from those stipulated under this specification.

6. DATA COMMUNICATION SYSTEM (DCS)

6.1 The Data Communication System shall include a redundant Main System Bus with hot back-up. Other applicable bus systems like cubicle bus, local bus, I/O bus etc shall be redundant except for backplane buses which can be non-redundant. The DCS shall have the following minimum features:

- a) Redundant communication controllers shall be provided to handle the communication between I/O Modules (including remote I/O) and PLCs and between PLCs and operator work station.
- b) The design shall be such as to minimise interruption of signals. It shall ensure that a single failure anywhere in the media shall cause no more than a single message to be disrupted and that message shall automatically be retransmitted. Any failure or physical removal of any station/module connected to the system bus shall not result in loss of any communication function to and from any other station/module.
- c) If the system bus requires a master bus controller philosophy, it shall employ redundant master bus controller with automatic switchover facility.
- d) Built-in diagnostics shall be provided for easy fault detection. Communication error detection and correction facility (ECC) shall be provided at all levels of

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communication. Failure of one bus and changeover to the standby system bus shall be automatic and completely bump less and the same shall be suitably alarmed / logged.

- e) The design and installation of the system bus shall take care of the environmental conditions as applicable.
- f) Data transmitting speed shall be sufficient to meet the responses of the system in terms of displays, control etc. plus 25% spare capacity shall be available for future expansion.
- g) Passive coaxial cables or fibre optic cables shall be employed.

The Contractor shall furnish details regarding the communication system like Communication protocol, bus utilisation calculations etc.

- 6.2** The reaction time of the programmable control system from input signals at the input cards to output of the associated signals or commands of the output card inclusive of programmed logic processing, comprising a mixture of logic gates, arithmetic operations and other internal operations shall be less than 100 milli seconds under the most arduous control system operating conditions.

6.3 CONTROLS/OPEN LOOP CONTROL SYSTEM (OLCS) FUNCTIONS

- 6.3.1** These clauses are applicable for all the Binary controls of PLC included in Contractor's Scope including all the control logics of FGD system.
- 6.3.2** The OLCS shall include sequence control, interlock & protection for various plant auxiliaries/valves/dampers/drives etc. The sequence control shall provide safe and automatic start up and shutdown of FGD system. The interlock and protection system shall ensure safe operation of FGD system at all times and shall automatically shut down FGD system when unsafe conditions arise.
- 6.3.3** The OLCS shall be arranged in the hierarchical control structure consisting of unit level, group level, subgroup level & drive level (as applicable).
- 6.3.4** It shall be possible to perform automatic FGD startup & shutdown by issuing minimum number of command from OWS. Thus, the unit level shall control all the Control System Blocks and issue appropriate startup & shutdown commands to various blocks of this Control System and receive corresponding commands/check backs/feedbacks.
- 6.3.5** The group level shall control a set of functional sub-groups of drives. Appropriate start-up and shut down commands shall be issued to the sub-group control and various check-backs shall be received from sub-groups or drives. Each sub-group shall execute the sequential start-up and shut down programs of a set of inter-related drives along with system interlocks and protections

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associated with that sub-group as well as basic interlocks and protections related to individual drive falling under that sub-group. The drive level shall accept commands from the sub-groups, push buttons (wherever provided), etc., and transmit them to the respective drive, after taking into account various interlocks and protections and the safety of that particular drive. For HT drive, first-up logic shall be incorporated to indicate the cause of protection/trip.

6.3.6 Sequence Control

- 1) A sequence shall be used to move a set of groups, sub-groups from an initial steady state (for instance 'OFF') to a final steady state (for instance 'ON'). The sequence initiating command for the unit & group level shall be issued from OWS.
- 2) A sequence shall be made of steps. The steps shall be executed in predetermined order according to logic criteria and monitoring time consisting of the interlock & protection requirements and check back of previous step which shall act as preconditions before the sequence control can execute the command for that step.
- 3) Each step shall have a "waiting time" implying that the subsequent step would not be executed unless the specified time elapses. A monitoring time shall also be defined as the maximum time required in executing the commands of any step and the time required for appearance of check back signals. In case, this is not completed within the specified time, a message shall be displayed and programme will not proceed further.
- 4) Manual intervention shall be possible at any stage of operation and the sequence control shall be able to continue at the correct point in the programme on return to automatic control. Protection commands shall have priority over manual commands, and manual commands shall prevail over auto commands.
- 5) Open or close priority shall be selectable for each drive.
- 6) The sequence startup mode shall be of the following types.
 - Automatic Mode
 - Semi-Automatic Mode
 - Operator Guide Mode / Test Mode

6.3.7 For the drives, the command shall be provided through redundant O/P module to MCC/SWGR/Actuator as applicable and inputs (status, SWGR & process) shall be acquired through input modules. The failure of one of the redundant output module shall in no way affect the function of the other output module. For open loop control system input/output I/O modules for realizing drive control functions redundancy in input / output and processing modules shall be envisaged for HT drives and critical LT drives (approx. 20 nos.)

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- 6.3.8** The output modules control module shall have the feature that ensures that in case of failure, all the outputs are driven to zero. The 24V DC command outputs to drives for ON/OPEN, OFF/CLOSE shall be separate and independent and inverted outputs shall not be employed. Keeping +24 V DC extended to the relays for these outputs continuously and extending ground/negative when command is to be issued is not acceptable except some of the auxiliary plants as to be decided during detailed engineering.
- 6.3.9** For inching type of drives, position transmitter power supply and monitoring of position transmitter signal shall be provided.
- 6.3.10** The termination for OPEN (ON)/CLOSE (OFF) command for the drive actuator shall be performed in the actuators specified elsewhere in the specification. However, OPEN (ON)/CLOSE (OFF) and disturbance status as a minimum shall be monitored in OLCS.
- 6.3.11** The sequence interlock & protection requirements shall be finalized during detailed engineering and the same shall be subject to Employer's approval.
- 6.3.12** The drive function i.e. basic interlock & protection logic of the drive shall be implemented in redundant controllers. The drive function shall ensure that protection signals for the safety of the drive shall be effective under all conditions and under all modes of operation. The different commands shall be performed according to the priority of protection 'Off', Protection 'On', manual and automatic. The standard functions like running time monitoring, status signalling, alarm/drive annunciation, etc. shall be performed in drive function. The drive function shall prevent hunting of the actuator in the presence of both open & close commands for actuators of the valves & dampers. The drive function shall be implemented in dedicated standard software functional block.
- 6.3.13** The reversible drives to be controlled under OLCS shall be actuators with integral starters. These actuators will have coupling/interposing relays for accepting commands from OLCS and shall provide check back signals to OLCS. As such, all drive related inputs/outputs for reversible drives shall be available from actuators in field. The 'Open' and 'Closed' limit switches of each actuator shall be monitored with selectable delay time to check & alarm the contradictory condition of both contacts indicating 'Open' or 'Closed' status of actuators. The actuators for valves & dampers shall be interfaced as follows:

The open/close commands and check back signals from limit switches and disturbance signals shall be hardwired to respective OLCS group through I/O modules from actuators in the field.

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6.4 MODULATING CONTROLS/CLOSED LOOP CONTROL SYSTEM (CLCS) FUNCTIONS

- 6.4.1** This Clause is applicable for all analog controls of PLC.
- 6.4.2** The controller capability shall, as a minimum, include (i) P, PI, PD and PID control functions and their variations (ii) cascade control (iii) feed forward control (iv) On-Off control, (v) Ratio and bias control, (vi) Logical operation .
- 6.4.3** The loop reaction time (from change of output of the transmitter/temperature element to the corresponding control command output) shall be within 500 milli-seconds. For binary control the response time shall be within 100 milli-seconds only.
- 6.4.4** The control loop shall have enough flexibility and various features to perform feed forwards, balancing of controller, increasing the response to achieve the desired process parameter within prescribed time frame.
- 6.4.5** The control system shall be bump lessly transferred to manual on the conditions of Control power supply failure, Failure of redundant controllers, Field input signal not available, Analog input exceeding pre-set value, etc. as a minimum and as finalized during detailed engineering. In the event of failure of active CPU, tasks shall be transferred to the standby CPU within fastest possible transfer time (< 5m sec.) without causing any relays to drop out during the transfer.
- 6.4.6** Any switch over from auto to manual, manual to auto and switchover from OWS operation to local station operation and vice versa shall be bump less and without resulting in any change in the plant regulations and the same shall be reported to the operator and recorded automatically.
- 6.4.7** The System being supplied shall be such that when permissible limits are exceeded, an automatic switchover from an operation governed by maximum efficiency, to an operation governed by safety and availability is affected.
- 6.4.8** For safety reasons, switchover logics associated with the modulating control loops shall be performed within the closed loop control equipment. Modulating control loops shall be provided with standard features to interface overriding commands from OLCS/Protection System like open, protection open etc.
- 6.4.9** All controllers shall be freely configurable with respect to requisite control algorithms.

7. SYSTEM REACTION TIME

- 7.1** The reaction time of the programmable control system from input signals at the input cards to output of the associated signals or commands of the output card inclusive of programmed logic processing, comprising a mixture of logic gates,

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arithmetic operations and other internal operations shall be less than 100 milliseconds under the most arduous control system operating conditions.

8. OPERATOR INTERFACE DISPLAYS / LOGS / REPORTS

8.1 Suitable Operator Interface Displays/Logs/Reports for control operation & monitoring shall be provided. The details shall be finalised during detailed Engg. stage.

8.2 Minimum quantities shall be as follows:

- 1 various displays on the OWS shall as a minimum include P&ID displays or mimic, bar chart displays, x-y & x-t plot (trend) displays, operator guidance message displays, group displays, plant start-up/shutdown message displays, system status display sets. Number of displays and the exact functionality shall be on as required basis and as finalised during detailed engineering subject to the minimum quantities as given in subsequent clauses. For x-t & x-y plots, the facility of providing a background grid on operator request shall be variable with adequate no. of divisions in both co-ordinates.

- 2 the minimum quantity of major types of displays per unit shall be as follows:

the assignment for the above will be done by the contractor as per the requirement of operation of contractor's system as well as for maintenance. The balance displays shall be left as spare for future modification/addition.

9. HISTORICAL STORAGE AND RETRIEVAL SYSTEM (HSRS)

9.1 The HSRS shall collect store and process system data from MMIPIS database. The data shall be saved online on hard disk and automatically transferred to erasable long term storage media once in every 24 hours periodically for long term storage. Provision shall be made to notify the operator when hard disk is certain percentage full. The disk capacity shall be sufficient to store at least 3 months data.

9.2 The data to be stored in the above system shall include alarm and event list, periodic plant data, selected logs/reports. The data/information to be stored & frequency of storage and retrieval shall be as finalised during detailed engineering. The system shall provide user-friendly operator functions to retrieve the data from historical Storage. It shall be possible to retrieve the selected data on OWS or printer in form of trend/report by specifying date, time & period. Further, suitable index files/directories shall also be provided to facilitate the same. The logs/reports for at least last 3 months shall be available on the disk.

9.3 In addition to above, the system shall also have facility to store & retrieve important plant data for a very long duration (plant life) on portable long term storage media). These data will include any data from the database as well as

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processed/computed data based on various calculations/transformation. The retrieved data from long term storage media should be possible to be presented in form of alarms, logs, reports, etc.

10. CONTROL & POWER SUPPLY SCHEME

10.1 GENERAL REQUIREMENTS:

The requirements of Electrical Power Supply system are specified herein on system basis. The Contractor shall be responsible for engineering and furnishing a complete and operational system fully meeting the intent and requirements of this specification and Employer approved drawings during detailed engineering. All equipment and accessories required for completeness of this system shall be furnished by the Contractor whether these are specifically mentioned herein or not. All the equipment and sub systems offered shall be from reputed experienced manufacturers. All system cabinets, enclosures, & distribution boards shall be manufactured, assembled, wired and fully tested as a complete assembly as per the requirements of this specification at the manufacturer's works. The Contractor shall furnish all required equipment cubicles and wiring required for conversion and/or stabilization of the power sources provided by the Employer to all other levels which may be necessary for meeting the individual requirement of equipment/system furnished by him including the panel/desk mounted equipment.

24 V DC power supply system shall be provided as below:

- i) 24V DC power supply system for PLC based control system shall comprise of two sets, each set shall consist of 1 x 100% microprocessor controlled, intelligent, modular rectifier banks, Controller – one for each rectifier bank, 1 x 100% Nickel - Cadmium batteries for one (1) hour duty, 1 X 100% DC distribution board. 1x100% Microprocessor controlled Battery Health Monitoring System (BHMS) – common for both the sets. Necessary redundant transformers shall be provided by the contractor to derive the power supply from 415V, 3 phase, 3 wire incomers for above. Battery Health Monitoring System (BHMS) – common for both the sets.

10.2 POWER SUPPLY SYSTEM FOR PLC BASED CONTROL PANELS

10.2.1 Microprocessor based, Intelligent, Modular Power Supply.

10.2.2 Microprocessor based, intelligent, modular power supply shall be sized to meet connected load requirements and keep the connected battery full charged in Float/Boost mode. A provision of 10% design margin shall be kept over and above the load requirement. Either of the bank of rectifier modules shall be able to recharge fully discharged battery within 8 hours. It shall also be possible to discharge batteries periodically manually. Each rectifier bank shall have N+1 rectifier modules for all applications. The exact sizing of the rectifiers in one bank shall be as approved by Employer during detailed engineering. While selecting the components and finalizing the cooling arrangements, Bidder to note that, these rectifier modules are required to operate at 30-40 % of the rated load for most of the time. While sizing, the temperature de rating factor as applicable, is to be considered for arriving at

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the rating of the modules as per Bidder's manufacturing standard if the modules are rated for lower than the 50 deg. C ambient. For the rectifier bank, matching controller along with applicable software shall be provided to meet system requirements under all modes of operation."

- 10.2.3** The rectifier module shall be microprocessor controlled, IGBT/Power MOSFET based, high frequency with active load sharing, designed for single and parallel operation with battery and shall have automatic voltage regulators for a close voltage stability even when AC supply voltage and DC load fluctuates, effective current limiting features, front access design, programmable temperature compensation feature for battery charging and filters on both input and output to minimize harmonics. The rectifier module output regulation shall be +/- 1% or better from no load to full load with an input power supply variation of +/- 10% in voltage and +/- 5% in frequency. In addition to indications / display on rectifier panel, alarms along with relevant analog measurements shall also be provided by employing RS 485 Port Modbus Protocol / Ethernet TCP/IP protocol for use in PLC system. Further isolated 4-20 mA signals shall be provided for important parameters like rectifier bank voltage, rectifier bank current, battery voltage, battery current, DCDB Voltage, DCDB current etc. The list of alarm output & 4-20 mA signals shall be as approved by Employer during detailed engineering. Necessary provision shall be done in PLC end also.
- 10.2.4** "Float / Boost" charge functions shall be provided with alarm / indications.
- 10.2.5** Each rectifier bank shall be rated for 100% load requirement and keep the connected battery full charged and one spare rectifier module.
- 10.2.6** The rectifier module circuitry shall be of fail-safe design and failure of any component should not result in any rectifier bank output voltage to increase beyond acceptable limits of the C&I system being fed from it.
- 10.2.7** The rectifier module shall be current limited for circuit protection and protection of battery from overcharge. The current limit shall be continuously programmable.
- 10.2.8** The rectifier module shall have a slow walk-in circuit which shall prevent application of full load DC current in less than 10 seconds after AC power is energized.
- 10.2.9** The rectifier module shall be fed from 415 V AC, 50 HZ, 3 phase, 3 wire system. Bidder shall provide all required power cables & other accessories etc. from 415 V AC power supply system to his electrical power supply system.
- 10.2.10** The full load efficiency of rectifier module at nominal input and output shall be 90%. The ripple content shall be limited to +/- 0.5% of output voltage.
- 10.2.11** Bidder shall furnish the equipment complete in all respect along with rectifier module rating & voltage drop calculations, supporting curves / data etc.
- 10.2.12** The Controller shall be intelligent, microprocessor controlled for monitoring & control of rectifier modules with features viz. auto / manual battery discharge

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test, battery reserve time prediction, energy management, float / boost mode control etc.

- 10.2.13** All software as required for smooth operation and monitoring of rectifier modules in conjunction with controller & BHMS shall be provided by the Contractor.

10.3 BATTERIES FOR PLC SYSTEM

- 10.3.1** The batteries shall be heavy duty Nickel-cadmium type and shall be sized for one hour of full load operation during non-availability of AC supply / chargers. The Ni-Cd batteries shall conform to IS: 10918. The batteries shall be sized as per relevant IEEE Standards. For sizing calculation, an aging factor of 0.8 and a temperature correction factor as per manufacturer's standard at 4 deg. C electrolyte temperature (Based on temperature characteristics curve to be submitted by the Contractor at a temperature of 4 deg. C). Capacity factor, Float Correction Factor, as per Battery Supplier Standard, shall be taken into consideration, if applicable and ambient temperature shall be considered as the electrolytic temperature. The sizing of the battery shall be as approved by Employer during detailed engineering. However, Contractor shall consider a suitable voltage drop of 2V from battery room to DCDB and DCDB to load, while sizing the battery.

10.3.2 DC DISTRIBUTION BOARD (DCDB)

Redundant DC feeders (one from each DCDB) shall supply each of the connected panels. From DCDB / panel to driver/load feeder shall be in scope of Bidder. The exact design, rating & number of feeders of the each redundant DCDB shall be as finalized during detailed engineering and as approved by Employer. However, 25% spare feeder (min. 1 no.) with fuses for each rating shall be provided in each DCDB.

10.3.3 Battery Health Monitoring System (BHMS)

BHMS, wherever applicable, shall include microprocessor based hardware and software to monitor the condition of each battery cell of 24 V DC systems on-line. With BHMS it shall be possible to measure & analyze the minimum and maximum voltage values of each battery-cell so that any damage to battery shall be prevented by pro-active maintenance. BHMS shall communicate with the charger/PLC and provide alarms as finalized by Employer during detailed engineering.

11. CONTROL CABINETS / PANELS / DESKS

- 11.1.** The cabinets shall be IP-22 protection class. The Contractor shall ensure that the packaging density of equipment in these cabinets is not excessive and abnormal temperature rise, above the cabinet temperature during normal operation or air conditioning failure, is prevented by careful design. This shall be demonstrated to the Employer during the factory testing of the system. The Contractor shall ensure that the temperature rise is limited to 10 deg. C above ambient and is well within the safe limits for system components even under the worst condition and specification requirements for remote I/O cabinets. Ventilation blowers shall be furnished as required by the equipment design

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and shall be sound proof to the maximum feasible extent. If blowers are required for satisfactory system operation, dual blowers with blower failure alarm shall be provided in each cabinet with proper enclosure and details shall be furnished with proposal. Suitable louvers with wire mesh shall be provided on the cabinet. Anti-vibration pad 15 mm, Lifting hook / Eye bolt, drawing pocket, LED light etc. shall be provided.

- 11.2** The cabinets shall be designed for front access to system modules and rear access to wiring and shall be designed for bottom entry of the cables.
- 11.3** The cabinets shall be totally enclosed, free standing type and shall be constructed with minimum 2mm thick steel plate frame and 2mm thick CRCA steel sheet preferred height of the cabinet is 2200mm. The cabinets shall be equipped with full height front and rear doors. The floor mounting arrangement for other cabinets shall be as required by the Employer and shall be furnished by the Contractor during detailed engineering. 3 mm thick Removable Gland plates (bottom) shall be provided.
- 11.4** Cabinet doors shall be hinged and shall have turned back edges and additional bracing where required ensuring rigidity. Hinges shall be of concealed type. Door latches shall be of three-point type to assure tight closing. Detachable lifting eyes or angles shall be furnished at the top of each separately shipped section and all necessary provisions shall be made to facilitate handling without damage. Front and rear doors shall be provided with locking arrangements with a master key for all cabinets. If width of a cabinet is more than 800 mm, double doors shall be provided. 3 mm thick Removable Gland plates (bottom) shall be provided.
- 11.5** Two spray coats of inhibitive epoxy primer-surface shall be applied to all exterior and interior surfaces. A minimum of 2 spray coats of final finish colour shall be applied to all surfaces. The final finished thickness of paint film on steel shall not be less than 65-75 micron for sheet thickness of 2 mm and 50 microns for sheet thickness of 1.6 mm. The finish colours for exterior and interior surfaces shall conform to following shades:
- (a.) Exterior:- As per RAL 7032, to be finalised during detailed engineering.
- (b.) Interior:- Glossy White.
- 11.6** Paint films which show sags, checks or other imperfections shall not be acceptable.
- 11.7** As an alternative, single coat of anodic dip coat primer along with single textured powder coating with epoxy polyester meeting the thickness requirement is also acceptable.
- 11.8** The mimic shall be configured on the OWS/CRTs and it shall be possible to control, monitor and operate the plant from the same.
- 11.9** The technical specification covering panel fabrication details, wiring and termination details etc. shall be as described under Sec-II Clause no: 17.02.00 INST CABLE of this specification.

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11.10 CONTROL DESK

11.10.1 Control desk shall be free standing table top type with doors at the back and shall be constructed of 3 mm thick CRCA steel plates. A 19 mm thick wooden top shall be provided on the desk to keep the TFT monitors at top and computers inside. Control desk shall consist of vertical, horizontal and base supports with their coverings for work surface, keyboard trays, mouse pads, monitor shelf and concealed cable and wire way management, perforated trays with covers in both horizontal and vertical directions. PA system handsets, telephone sets, very few PB stations and lamps shall be mounted on the control desk on mosaic grid structure and same shall be decided during detailed engineering. ASCII Keyboard shall be capable of being pulled out through a tray. GA and data sheet to be furnished during detail engineering for final approval of control desk.

11.10.2 The cabling / wiring between OWS & CPU'S, power supply cables etc. shall be aesthetically routed and concealed from view.

11.11 FURNITURE

Chairs – Industry standard revolving chairs with full back support with wheels and with provision for adjustment of height (hydraulically/gas lift) shall be provided for the operators, unit-in-charge & other personnel in control room area. These shall be designed for sitting for long duration such that these are comfortable for the back. Chair pedestal shall be made of 5mm thick MS plate covered with poly-propylene cladding. Arm-rests in one piece shall be of poly-urethane and twin wheel castor of glass filled nylon. The exact details shall be finalized & approved by Employer during detailed engineering.

12. ANNUNCIATION SYSTEM

12.1 Only OWS based alarm system shall be provided with audio alarm facility (beep/tone generator). Facia annunciation is envisaged in the control room. Hooters are to be provided.

12.2 The system shall display history of alarms in chronological order on any of the OWS. The HMIS shall have the capability to store a minimum of 500 alarms each with paging features allowing the operator to view any page. The system shall have all alarm functions and related function keys like alarm acknowledge, reset, paging, summaries etc. Other design features like set point/dead band adjustments, provision of alarm priority, manual inhibition & automatic inhibition based on predefined logic etc., shall be provided and shall be as finalised during detailed engineering. The alarm display/report format shall be as approved by the Employer.

12.3 Facility of audio annunciation shall be provided in OWS upon the occurrence OWS alarms irrespective of whether alarms are displayed or not. Facility to disable the audio annunciation shall be provided.

12.4 At least three levels of alarm priority shall be available which will be displayed in different colour. It shall be possible to display & print alarms of any of the three levels.

12.5 Alarm boxes shall be provided in each display to alert the operator about an alarm

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when he is viewing some other picture. No of alarm boxes shall be finalised during detailed engineering for each process area & each priority therein.

12.6 The annunciator sequence shall conform to ISA sequence ISA-2A.

13. SOFTWARE DOCUMENTATION AND SOFTWARE LISTINGS

13.1 All technical manuals, reference manuals, user's guide etc., in English required for modification/editing/addition/deletion of features in the software of the PLC System shall be furnished. The Contractor shall furnish a comprehensive list of all system/application software documentation after system finalization for Employer's review and approval.

13.2 All The software listings including Source code for application software, All special - to-project data files etc. shall be submitted by the Contractor.

14. SOFTWARE LICENCES

The Contractor shall provide software license for all software being used in Contractor's System. The software licenses shall be provided for the project (e.g. organisation or site license) and shall not be hardware/machine-specific. That is, if any hardware/machine is upgraded or changed, the same license shall hold good and it shall not be necessary for Employer to seek a new license/renew license due to up-gradation / change of hardware/machine in Contractor's System at site. All licenses shall be valid for the continuous service life of the plant.

As a customer support, the Contractor shall periodically inform the designated officer of the Employer about the software upgrades/new releases that would be taking place after the system is commissioned so that if required, same can be procured & implemented at site.

15. SPECIFICATIONS OF PC BASED OWS

The minimum requirement for PC based OWS shall be as below:

CPU	: Latest generation Core I5/I7 or equivalent Industrial grade CPU
RAM	: 6GB or better
Drives	: 48xCD Read / Write drive
Hard disk	: 1 TB or better
Monitor	: 24"colour Graphic LED (TFT) industrial grade Monitor, USB Keyboard and mouse.
Graphic Memory	: min 64 MB
Communication port	: 2 serial plus, one parallel, 4 USB port, Dual 100 Mbps Ethernet, Additional NIC with 2 no Ethernet port.
Other Features	: 101 Keys Keyboard and Optical Mouse
UPS	: 1 no. on-line Interactive UPS with 30 mins. Battery backup on machine load (for PC & its printer)
Software	: a) General MS Windows latest version, MS-Office,

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Microsoft Visual Studio, Adobe Acrobat, anti-virus McAfee or equivalent, etc.

- b)** Application software - to suit project specific Requirement

16. PRINTER

A4 size colour laser printer shall be provided as a part of the HMIS system as per Part-A. It shall print out all alarm/trip conditions and event changes in plant status along with date and time of occurrence.

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APPENDIX – S

List of Approved Sub-Vendors

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
MECHANICAL		
1	Water Pumps	WORTHINGTON, MATHER & PLATT, KIRLOSKAR, KSB, MAX FLOW, FLOWMORE, SAM, BEACON WEIR LTD; AKAY, SULZER PUMPS INDIA LTD; VOLTAS, JYOTI LTD; FLOWSERVE INDIA CONTROLS PVT LTD.
2	Disposal Pumps	INDURE, SAM, WEIR, KISHORE PUMPS
3	Sump Pumps / Submersible Pumps	FLOWMORE PVT.LTD; KIRLOSKAR BROS. LTD; KSB PUMPS LTD; KISHOR PUMPS PVT.LTD; SU MOTORS, JYOTI PVT.LTD; WPIL LIMITED, BEACON WEIR LIMITED, SAM TURBO, HYD IND.
4	Lube. Oil Pumps(Centrifugal)	KSB-PUNE, KIRLOSKAR EBARA-KIRLOSKARWADI, SULZER-MUMBAI
5	Lube Oil Pumps (Screw Type)	ALLWEILER-GERMANY, IMO PUMP-USA, TUSHACO DAMAN, LEISTRITZ (EMPIRE)-GERMANY
6	Jacking Oil Pump	TUSHACO, (DELTA CORP)-DAMAN / VAPI, HAGULLAND DENSION-HYDERABAD
7	Jacking Oil Pumps With Motor (Screw Type)	TUSHACO PUMPS LTD. MUMBAI, ALLWEILER AG GERMANY, SIEMENS / KWU-GERMANY
8	Aux. Oil Pump & Emergency Oil Pump With Motor (AOP & EOP)	KSB-PUNE, MATHER & PLATT-PUNE, KBL-PUNE, BUFFALO-USA, KIRLOSKAR, GE-USA
9	Main & Aux. Hydraulic Pumps	HARTMAN CONTROLS INC.- USA, GE-USA, DELTA CORP.-INDIA
10	Vacuum Pumps	BOC EDWARDS HICK HARGIRES-UK, NI-TECH INC. USA/ FLOWTECH SOUTH AFRICA, STERLING SIHI GMBH-GERMANY, D.H.BUDENBERG LTD. UK, TRAN SCAT USA, TRAN SCAT-USA, PPI, KAKATI / VACUNAIR / GARDNER / NASH ELMO INDUSTRIES GMBH, GERMANY / UNIQUE SYSTEMS INC., USA
11	Boiler feed water pumps	K S B, KIRLOSKAR EBARA, SULZER, INGERSOLL RAND, TORISHIMA, WEIR PUMPS/ BHEL (INCORPORATION WITH MHI), CLYDE UNION PUMPS INDIA.
12	Condensate Extraction Pumps	KIRLOSKAR EBARA, KSB, SULZER PUMPS, WEIR PUMPS / TORISHIMA/CHANGSHA/BHEL (INCORPORATION WITH MHI)
13	Concrete Volute	KIRLOSKAR

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
14	General Service Pump	SULZER PUMP, SAM TURBO LTD; KSB PUMPS, KIRLOSKAR, VOLTAS
15	GATE/GLOBE/ CHECK VALVES	
	Cast Steel Valves	FOURESS, L&T, LEADER, SAKHI,MACNEILL, MAGORE, CRESENT, GEETA , KBL, AV VALVE BOSS, AUDCO
	Forged Steel Valves	AUDCO, FOURESS, LEADER , KSB, BDK,HI -TECH, L&T
	Cast Iron Valves	FOURESS/ L&T/KIRLOSKAR/BDK/LEADER/AV ENGG./ VAAS /GALAXY/HAWA VALVES/LEVCON/BANKIM/ I.M. ENGINEERS /H.SARKAR/AUDCO/SHIVA DURGA/ UPADHYAY VALVES/ CRESCENT/ OSCAR / AV VALVES/ SELTTEC/ GEETA/ IMET/ BOSS/LEADER VALVE
	G. M. Valves	LEADER / BOMBAY METAL / SANT / A.V. VALVES / GG / BDK/ AUDCO/ VAAS/ ILK / MIL/ FOURESS / JASH SCHUTTE
	Slewing Ring Bearing	FAG/SKF/ROTHERDE
	Bronze	LEADER, IMET, AV ENGG., BOSS
	Dual Plate Check Valve	ADVANCE, AUDCO, UPADHYAY, C&R, L&T
	General (As Above)	SHANCO,BDK,H SARKAR,GALAXY, L&T
16	Needle Valve	LEADER, AV ENGG. , BLUE STAR , BLISS ANAND, CRESENT, AKSONS, BDK, FLUID LINE
17	Ball Valves	AKSONS, AKAY, CRESENT, BDK, FLUID LINE, AUDCO,KIRLOSKAR,LEADER VALVES,KSB PUMPS, L&T
18	Safety Valves	BLISS, ANAND, FIBRE, FALNGER, LEADER, SARAIN , JN MASHALL, L&T, TYCO SAN MAR LTD; FOURERS ENGG; BHEL-TRICHY
19	Vent Cocks/Valves	AV ENGG. , LEADER, GALAXY
20	Plug Valve	AUDCO, LEADER, IMET, DEZURIK
21	Butterfly Valve	FOURESS,GEETA,FLOVEL,L&T,CRESCENT,IL(PALGHAT, BARODA FLOWTECH, AUDCO, ADVANCE, KIRLOSKAR, TYCO, KEYSTONE, MIL, FISHER SAN MAR, INSTRUMENTATION LTD, Sub vender -- CRANE PROCESS, BDK
22	Knife Gate Valve	DEZURIK, FOURESS
23	Control Valve/Flow Elements	MILCONTROLS, FOURESS, FISHER, XOMAX, AVCON, BLUESTAR, MASONEILEN, MIC RO PRECISION, TECHNOMATIC, DIATRIECH STANDARD, (IL, PALGHAT FOR DIAGNOSTIC AND PROGRAMMING STATION AND SPECIAL LABINSTRUMENTS.),SANMAN,CCI,SULZER,DRESSER,ABB, INSTRUMENTATION LIMITED,FORBES MARSHALL ARCA
24	BFP RC Control Valve	MASONEILAN (DRESSER)-FRANCE, CONTROL COMPONENTS INC-USA
25	Suction Strainers (BFP, BP & CEP)	OTOKLIN- MUMBAI, MULTITEX-NEW DELHI, GUJARATH OTOFILT-AHMEDABAD
26	Actuators (For BF Valves)	ROTORK CONTROLS (INDIA) LTD. CHENNAI, AUMA (INDIA) LTD. BANGALORE, MARSH ENGINEERS PUNE, LIMITORQUE INDIA LTD. DELHI

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
27	Solenoid Valves	AVCON,ROTEX,ASCO,HERION,SIETZ,ADVANCE,BLUE STAR,NUCON,VELJAN HYDRAIR,SMC PNEUMATIC
28	Drain Valve	SEMPELL AG-GERMANY, REINEKE-GERMANY,INSTRUMENTATION LTD
29	Valves(Gate, Globe, NRV) Flanges (LP Heaters, Miscellaneous Tanks, Gland Steam Condenser	LEADER VALVES, BHEL, AUDCO VALVES, KSB,SAMPELL,DREWANCE MICON AND FOURESS
30	Valves & Specialties	AUDCO; SEMPELL; JNM; KSB; CRESENT; BDK; FOURESS; GEA; MESOLINE(FRANCE), L&T
31	Lifting Beam	INDO ASIATIC ENGINEER PVT.LTD.DELHI,STANDARD CASTING PVT.LTD DELHI,GROWTH SHOP TISCO-JAMSHEDPUR,UNITECH MACHINES SAHARANPUR
32	MS Pipes / ERW(Black And Galvanized)	ITC, SURYA ROSHNI, ZENITH, INDUS ,MAHARASHTRA TUBES, JINDAL, SAIL, AJANTA, HSL,GST,BST, JAIN TUBES, TATA, MAN INDUSTRIES,RATNAMANI
33	CI Pipes	IISCO, ELECTRO STEEL
34	Seamless Carbon Steel Pipes	MAHARASHTRA SEAM LESS, ISMT, KALYANI, INDUS, TATA, SAIL,RATNAMANI
35	Carbon Steel Pipes And Fittings	MS FITTINGS,TRUTE FORGE,NITIN,ABASI,PARAMOUNT FORGE,ITC,SAIL,SURYA ROSHNI,RATNAMANI
36	Forge Steel Pipes And Fittings.	NITIN,TRUTEFORGE,TUBE PRODUCTS
37	Stainless Steel Pipes	JINDAL, RATNAMANI, REMI
38	Turbine Integral Piping	BEND JOINTS-BHOPAL, UNITECH-SAHARANPUR, BHEL PIPING CENTRE-CHENNAI, DARSHINI ENTERPRISE-YAMU NANAGAR
39	CPVC Pipes, Valves And Fittings	GEORGE FISHER , ASTRAL
40	Pipe Flanges, Companion Flanges	TRUTE FORGE, PERFECT, SIVANANDA, PUNJAB STEEL WORKS, ABASI, HI ENGINEERS , MS FITTINGS
41	Bolt And Nuts	TATA,JK,PRECISION, GMW, UNBRAKO
42	Gaskets	CHAMPION, GASKET INDIA,MECH PACKING, INMARCO, PERMANITE, HINDUSTAN FERRODO
43	Spring Hangers And Hangers Components	SARATHI, MYRICKS, PIPING AND ENERGY PRODUCT, PIPE HANGERS &SUPPORT PVT LTD
44	Bearings	SKF , FAG, NTN , NBC , NORMA , KINGSBURY,TIMKEN, TATA, COOPER, INA
45	Journal Bearing BFP & BP	COLHERENE-UK, WAUKESHA BEARINGS (GLACIER) UK, MITCHELL- UK, MITCHELL INDIA- BANGALORE
46	Thrust Cum Journal Bearing For CEP	WAUKESHA BEARINGS (GLACIER)- UK, MITCHELL-UK, MITCHELL INDIA-BANGALORE

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
47	Thrust Bearing (BFP & BP)	WAUKESHA BEARINGS (GLACIER)-UK, MITCHELL-UK, MITCHELL INDIA- BANGALORE, KINGSBURY-USA
48	Mechanical Seal (BFP)	BURGMANN-GERMANY, BURGMANN-INDIA (PO ON BURGMANN INDIA & SEALS MANUFACTURED BY BURGMANN-GERMANY), Durametallic.
49	Thrust Cum Journal Bearing For CWP	MITCHELL INDIA-BANGALORE,OMEGA
50	Mechanical Seal (BP & CEP)	BURGMANN INDIA , EAGLE POONAWALA LTD.(FORMELY SEALOL HINDUSTAN)-PUNE, FLOWERVE SANMAR (FORMERLY DURAMETTALIC) CHENNAI
51	Gear Box	RADICON, ELECON, FMG, NAW, KIRLOSKAR, SHANTHI GEARS, GREAVES, FLENDER, SEW, CYCLO TRANS; NEW ALLENBERY, WALCHAND NAGAR-PUNE, RENK AG GERMANY, LUFKIN-USA, FRANCE, FLENDER GRAFFENSTADEN -FRANCE, BHS-GERMANY, TRIVENI ENGG, MYSORE
52	Planetary Gear Box	M/S FLENDER, GERMAN COLOBORATION MANUFACTURED IN INDIA
53	Belt Vulcanizing Machine	NILOS INDIA , S V DATTAR, CHANDRA & CHANDRA
54	Wire Ropes	USHA MARTIN, BOMBAY WIRE,UNITED WIRE
55	"Y" Strainer	GREAVE COTTON, LEADER, BLISS ANAND, JAYPEE, MACN EILL MAGORE
56	Air Blower	MANEKLAL, KAY ENGG., INDCON,C-DOCTOR
57	Site Flow Indicator	GREAVES COTTON , LEADER , MACMEIL , AV ENGG., LEVCON, AUTOMAT , ROTA INSTRUMENTS, EUREKA, FORBES MARSHALL, TRAC
58	Air Heater	ESCORTS, LAMDA INDUSTRIES, Patel Air temp (India) Ltd
59	Expansion Joints(Rubber)	D WREN, FLEXICON LIMITED, Keld Ellentoft India Pvt Ltd. Madras
60	Expansion Joints(Steel)	SUR, MB EXPANSIONS, FLY IDYNE,EXPANSION JOINT SYSTEMS INC. USA
61	Painting Materials	BERGER ,SHALIMAR , ASIAN PAINTS, NEROLAC, JHONSON AND NICHOLSON,AKZO NOBEL
62	Under Ground Coating Material	SHALIMAR TAR PRODUCTS, PYPKOTE,KIRLOSKAR
63	Corrocoat Painting And Application	KIRLOSKAR
64	Thermal Insulating Materials With Accessories	LLOYDS, ROCK WOOL, EXCLITE
65	Compressors/Compressed air system	KG KHOSLA, KIRLOSKAR, ELGI, CONSOLIDATED PNEUMATIC, INGERSOL, ATLAS COPCO, CHICAGO PNEUMATIC, DOCTOR AND COMPANY PVT. LTD, COIMBATORE, PATEL AIRTEMP (INDIA) LTD, RAKANPUR, VEESONS ENERGY SYSTEM PVT. LTD, TIRUCHY

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
66	Air Drying Plant	PACE, SABROE, ULTRATROC, INDCON, DHIR PNEUMATIC, MELLCON, ELGI / INGESSOL RAND / KG KHOSLA/ CONSOLIDATED PNEUMATIC/ CHICAGO/DELAIR, TRIDENT,
67	Pressure Vessels, Tanks, Air Receivers.	SV ENGG. , PRAGATI ENGG., TEXMACO, ANUP , KANARA, VISHWAKARMA , SATGURU , VIRAT TRANS , HEAT TRANSFER, VIJAY FAB, BINNY ENG. LTD; TECHNOFAB, GMW, RAUNAQ
68	Misc. Tanks	GENERAL MECHANICAL WORKS, SAKTHI HI-TECH CONSTRUCTIONS PVT.LTD; TECHNOFAB ENGG.LTD; UNITECH MACHINES LTD; THERMOPADS PVT LIMITED, PAL ENGG. CORPORATION; UNITECH MACHINES LTD.; TECHNO ELECTRIC & ENGG. CO. LTD.; VIJAY TANKS & VESSELS LTD., BARODA
69	Air Pressure Regulator	SHAVO NORGREN , PLACKA, JRU INSTRUMENTS (EARLIER PLACKA), CHENNAI
70	Oil Lubricator	SHAVO NORGREN , PLACKA
71	Duplex Oil Filter (Lub Oil)	BOLL & KIRCH FILTERBAU GMBH- GERMANY, HYDAC FILTER TECHNIC- GERMANY, K&H EPPENSTEINER GERMANY, EPE EPPENSTIENER- GERMANY, INTERNORMAN FILTER-MUMBAI
72	Duplex Filter (Jacking Oil)	EPE EPPENSTIENER- GERMANY, HYDAC- GERMANY, K&H EPPENSTEINER- GERMANY
73	Oil Purification Unit (Oil Centrifuge)	ALFA LEVAL INDIA LTD. PUNE, WEST FALLIA SEPERATOR INDIA PVT.LTD; SERVIZI- ITALY, PENNWALT INDIA LTD. INDIA, WESTFALLIA SEPERATOR, INDIA / SERVICE ITALY
74	Damper (Viscous)	DAMPER (VISCIOUS), Pennwalt India Ltd. India
75	LP By Pass System Including LP By Pass Valve, Hydraulic Spray Valve & H PSU	BOSCH REXROTH- GERMANY, WELL AND TUXHORN GERMANY, CCI- SWITZERLAND, BOMABA GERMANY, BOPP & REUTHER- GERMANY, HORA, BOSCH REXROTH- GERMANY, WELL AND TUXHORN - GERMANY, CCI- SWITZERLAND, BOMABA GERMANY, BOPP & REUTHER- GERMANY
76	H2 Gas Analyzer Cabinet	ABB LTD BANGALORE, SIEMENS-INDIA, YOKOGAWA- BANGALORE, HONEYWELL AUTOMATION PUNE, CHEMTROLL- MUMBAI
77	Welded Austenitic Tubes (For Condenser)	CST VALINOX HYDERABAD, SCHOELLER WERK GMBH & CO. GERMANY, RATNAMANI- AHMEDABAD, VALTIMET-FRANCE
78	Pre Filter /After Filter In Compressed Air System	FINE FILTERS, Rotex, Shavo Norgen, Mumbai
79	Filters	HILLARD-USA, MICROFLO FILTERS, MULTITEX-INDIA
80	Heating Elements	ESCORTS , RACOLD
81	Heat Exchanger	KPC, HEAT TRANS, EAGLE, BEAM

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
82	Heat Exchangers (Plate Type)	ALFA LAVAL (INDIA) LTD; TRANTER INDIA PRIVATE LIMITED-PUNE, GEA ECOFLEX INDIA PVT LTD; IDMC ANAND, GEI
83	Auto Drain Valve In Air Circuit	ULTRAFILTER,GREAVES
84	Mechanical Exhauster	NASH, SIEMENS,NI-TECH INC.USA
85	Ceramic Liners	NTB HITECH
86	Handling Equipment: Elec. Operated	UNIVERSAL HOIST-O- FABRIK, CONSOLIDATED HOISTS PVT. LTD; ARMSEL MHE PVT. LTD; DYNAMECH CRANES PVT. LTD; LIFTING EQUIPMENTS & ACCESSORIES, POWER BUILT PVT. LTD. V.V. NAGAR
87	Handling Equipment-Mechanical	LIFTING EQUIPMENTS &ACCESSORIES,UNIVERSAL HOIST-O-FABRIK,ARMSEL MHE PVT.LTD
88	Chain Pulley Block	HERCULES HOISTS LTD; LIFTING EQUIPMENTS & ACCESSORIES, CONSOLIDATED HOIST PVT LTD;BEMCO PVT LTD, TUOBRO FURGUSON(INDIA)PVT.LTD; GRIP ENGRS; TRANSPADE, GREAVES, , UNIVERSAL HOIST, ARMSEL, POWER BUILD, AVON CRANE,WMI
89	Electric Hoists	AVON CRANES PVT.LTD; HERCULES HOISTS LTD; EDDYCRANES PVT.LTD; LIFTING EQUIPMENTS &ACCESSORIES, REVA INDUSTRIES LTD; CONSOLIDATED HOIST PVT LTD; TUOBRO FURGUSON(INDIA)PVT.LTD; GRIP ENGRS; TRANSPADE, GREAVES, INDEF, UNIVERSAL HOIST, ARMSEL, POWER BUILD, TRACTEL TIRFOR
90	Double Girder EOT Cranes Up to 50t (CWPB & Other Areas)	FURNACE&FOUNDRY EQUIPMENT CO; WMI CRANES LTD; THE TATA IRON &STEEL CO.LTD; UNIQUE INDUSTRIAL HANDLERS PVT.LTD; MUKAND LIMITED, ANUPAM INDUSTRIES LTD; AVON CRANES PVT.LTD; REVA INDUSTRIES LTD, HEAVY ENGG. CORPORATION LTD., ALPHA SERVICES ARMSEL MHE PVT. LTD., BANGALORE CENTURY CRANE ENGINEERS PVT. LTD. CRANEX LIMITED, NEW DELHI; DEMAG CRANES &COMPONENTS (I) PVT. LTD.
91	Single Girder HOT/EOT Cranes	CONSOLIDATED HOIST PVT LTD; LIFTING EQUIPMENTS & ACCESSORIES, REVA INDUSTRIES LTD., ALPHA SERVICES, GARLICK, BATLIBOI, KHANDELWAL, REWA, VIDYUT,GREAVES, CHITRAM, CRANEX, ACME, WMI,UNIQUE, ANUPAM INDUSTRIES LTD,THE TATA IRON & STEEL CO.LTD, FURNACE & FOUNDRY EQUIPMENT CO,MUKAND LIMITED
92	Double Girder EOT Crane Above 50t To 150t (TG/GT Hall & Other Areas	ANUPAM INDUSTRIES LTD; FURNACE & FOUNDRY EQUIPMENT CO; MUKAND LIMITED, THE TATA IRON & STEEL CO.LTD; UNIQUE INDUSTRIAL HANDLERS PVT.LTD; WMI CRANES LTD,REVA INDUSTRIES LTD.,HEAVY ENGG. CORPORATION LTD.

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
93	Fire Protection System	KIDDE INDIA LIMITED, MUMBAI, NEW FIRE ENGINEERS PVT.LTD; UNITECH MACHINES LTD; WORMALD FIRE SYSTEMS, GENERAL MECHANICAL WORKS, MEHTA & ASSOCIATES FIRE PROTECTION SYSTEM PVT. LTD. AHMEDABAD, TECHNOFAB, AGNICE / FIRE PRO / NEW FIRE /TYCO / STEELAGE/ VIJAY/MATHER & PLTT/ MINIMAX/ KUVIRJI DEVSI /PAVLO MARINE, UTC FIRE & SECURITY INDIA LTD.
94	A/C System	ASEA BROWN BOVERI LTD; BLUE STAR LTD; VOLTAS LTD., CARRIER AIRCON/CARRIER/ FRICK INDIA,STERLING AND WILSON PRIVATE LIMITED,
95	Ventilation System	ASEA BROWN BOVERI LTD; AIR LINK ENGINEERS PVT.LTD; ALSTOM LTD; BLUE STAR LTD; C.DOCTOR &CO.PVT.LTD; HYDERABAD POLLUTION CONTROLS LTD; VOLTAS LTD; APC SYSTEM,SK SYSTEMS PRIVATE LIMITED,KONDLI,ROOTS COOLING SYSTEMS PVT.LTD ,M/s Draft Air Pvt Ltd.
96	Ventilation Fan	INDUSTRIAL FAN, C DOCTOR, DUVENT, KIRLOSKAR AAF, PATEL AIR TEMP
97	Portable Fire Extinguishers	VIJAY, LIGHTEX, SAFEX
98	Infra Red Detectors	NEOLA
99	Breathing Apparatus	IMPORTED , FENZI, SAKURA
100	Membrane	DOW, KOTCH
101	Oil System/Lube Oil System	INSTRUMENTATION LTD; MIL CONTROLS LIMITED, R.K. CONTROL INSTRUMENTS PVT.LTD; SAMSON CONTROLS PRIVATE LIMITED,SOUTHERN LUBRICANTS- BANGALORE, PRAKASH LUB EQPTS- CALCUTTA, LEONARD ENGG. PVT KTD. BANGALORE, POWERMAX-CHENNAI, LINCOLN HELIOS-BANGALORE, T.A HYDRAULICSHYDERABAD, HYDROPOWER CORPO; UNITY
102	SB Pr. Reducing Valve &Control Valve : HP	INSTRUMENTATION LTD; MIL CONTROLS LIMITED, FISHER SANMAR LIMITED, DRESSER VALVE INDIA PRIVATE LTD
103	Pump: Fuel Oil Pump	TUSHACO PUMPS PVT.LTD; U.T.PUMPS & SYSTEMS LTD; ALEKTON ENGG.INDUSTRIES P.LTD; JOH HEINRICH BORNEMANN GMBH & CO KG, HEATLY &GRAHAM, MATZ PUMPS
104	BCWP	KSB AKTIENGESELLSCHAFT, TORISHIMA PUMP MFG CO.LTD; HAYWARD TYLER LTD; SAM PUMPS, FLOW MORE
105	Elevator-Passenger & Goods	KONE ELEVATOR INDIA PVT.LTD; OTIS ELEVATOR CO (I) LTD; ORBIS ELEVATOR AHMEDABAD, TECHNO ELEVATOR AHMEDABAD; JOHNSON LIFTS PRIVATE LIMITED.
106	Actuator: Pneumatic(OP/CL)	KELTRON CONTROLS, INSTRUMENTATION LTD.,FORBES MARSHALL,FOURESS

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
107	C.P.U.	VA TECH WABAG GmbH-VIENNA, DRIPLEX WATER ENGG. LTD; ORGANO CORPORATION, ION EXCHANGE (INDIA) LTD., THERMAX LTD., M/s Unitech
108	Wagon Tippler	ELECON/L&T/TRF/KRUPP, INDIA/METSO MINERALS/TKII
109	Apron Feeder	KRUPP - INDIA / ELECON / TRF / L&T/MBE
110	Crusher (Ring Granulator)	KRUPP, INDIA, / ELECON / TRF / L&T / MBE/ SAYAJI/ MPSI-USA/ TRF
111	Belt Conv. (Idlers, Pulleys)	L&T/ ELECON / TRF / MBE / KALI MATERIAL HANDLING SYSTEM / RADIANT/KRUPP INDIA/
112	Belting Nylon	NORTHLAND / PHOENIX - YULE / HILTON / ORIENTAL / MRF / NIRLON LTD. / HINDUSTAN RUBBER/NRC
113	Vibrating Grizzly Feeder / Roller Screen	KRUPP - INDIA / ELECON / TRF / L&T / MBE
114	Stacker Reclaimer	ELECON/TRF/KRUPP/L&T/MBE/FLSMIDTH/METSO MINERALS
115	Travelling Tripper	ELECON / TRF / KRUPP / L&T / MBE
116	Belt Weigher	POWER BUILD/JENSON & NICHOLSON / TRANSWEIGH/ AVERY / ENACARDIORITE/IPA
117	Magnetic Separators Foreign Metal Picker & Detector	POWER BUILD/ELECTROMAG/MAGNETIC CORPORATION OF INDIA/WMI
118	Dust Suppression System	APC / KAVERI/F.HARLEY & CO/PREMIER ENVIROMENTAL / BHEL/EAGLE AGRO TECH IND/DUVENT/ BATLIBOI/ DUSTVEN
119	Fluid Coupling / Scoop Type Coupling	PEMBRIL / FLU IDOMAT /VOITH INDIA / ELECON
120	Belt Cleaner	TECHNO - FAB /HOSCH EQUIPMENT INDIA (HEIPL) / KAVERI / THEJO ENGRS. / SCORPIO/ SPILLBAN/ELECON
121	Thrustor Brakes	BUBENZER/ EMCO PRECIMA/ SIEGERLAND BREMSEN/ SIEMA STROMAG/ KATEEL ENGG./ TECH NO CRATS/ ELECTROMAG
122	Vibration Isolation System	GERB,INSTRUMENTATION ENGINEERS PRIVATE LIMITED
123	Hyd. Power Pack For Stacker Reclaimer	REXORTH/ L&T KOMATSU/VICKERS SYSTEM
124	Hyd. Cylinders	WIPRO/VEZJAN/EIMCO
125	Hyd. Cylinders	VOITH TURBO-GERMANY, VOITH TURBO PVT LTD. HYDERABAD
126	Connecting Coupling For MD BFP Set & CEP	FLEXIBOX LTD. UK, TURBOFLEX-UK, EUROFLEX-UK, EUROFLEX TRANSMISSION LTD.HYDERABAD
127	Connecting Coupling For CWP	EUROFLEX TRANSMISSION LTD. HYDERABAD, TRIVENI FLEXI BOX –BANGALORE, UNIQUE TRANSMISSION-KOLKATA
128	Connecting Coupling (Membrane Type)	EUROFLEX TRANSMISSION-HYDERABAD, RENK A GERMANY, JOHN CRANE-UK, KOPFLEX-USA, BIBBY TURBOFLEX (FORMERLY EUROFLEX)-UK, AMERIDRIVES (ZURN)-USA
129	Connecting Coupling (Gear Type)	FLENDER GRAFFENSTADEN-FRANCE, RENK AG GERMANY, LUFKIN- USA/FRANCE, BHS-GERMANY

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
130	Disconnecting Coupling	ZURN INC-USA
131	ERW Pipes	JINDAL/SURYA ROSHNI/SAIL/ISSCO
132	Bearing For Idlers & Pulleys	SKF/FAG/TATA/ABL/NEI(NBC)/M/S cooper
133	Pipes For Idlers	ZENITH/ SURYA ROSHNI/JINDAL/GOOD LUCK STEEL,TATA
134	Mill Handling System	CONSOLIDATED HOIST-PUNE/ ARMSEL MHE PVT. LTD. BANGALORE/ UNIVERSAL HOIST-O-FABRIK MUMBAI/ DYNAMECH CRANES PVT. LTD. MUMBAI - as per Sr no 86,92
135	Grinding Roll	AIA ENGINEERING, AHMEDABAD,MAGOTTEAUX INDUSTRIES
136	Bull Ring Segments	AIA ENGINEERING, AHMEDABAD,BHEL HYDERABAD
137	Inner Cone	BHEL EPD- BANGALORE, BHEL IP-JAGDISHPUR
138	Air Cylinder	VELJAN HYDRAIR-HYDERABAD, NUCON INDUSTRIES HYDERABAD, PRECISION ENGG (PREAC) BANGALORE, SALZGITTER HYRAU LICS-HYD ERABAD, ASCO-CHENNAI
139	Mill Reject System	MACMET INDIA LIMITED- KOLKATA, MACAWBER BEEKAY PVT.LTD; UNITED CONVEYOR CORPORATION-USA, DC INDTL .PLANT SERVICES PVT.LTD; UNITED CONVEYOR CORPORATION (INDIA)PVT.LTD.-KOLKATA, ELECON LTD. V.V.NAGAR, MACAWBER BEEKAY PVT.LTD. / UNITED CONVEYOR CORPORATION, USA / DC INDTL. PLANT SERVICES PVT.LTD / UNITED CONVEYOR CORPORATION (INDIA)PVT.LTD., KOLKATA MILL REJECT (CONVEYOR TYPE): TECPRO SYSTEMS LIMITED MACMET INDIA LIMITED, KOLKATA TECH NIP SEIFFERT GmbH
140	Coal Handling Plant	L&T ECC DIVISION- CHENNAI, ELECON- V.V.NAGAR, TRF LIMITED- JAMSHEDPUR, KRUPP INDUSTRIESPUNE, MCNALLY BHARAT ENGINEERING COMPANY LTD, M/S TECHPRO
141	Aux. PRDS	COPEES VULCAN LTD.- U.K; CONTROL COMPONENT INC.- USA, HOLTER REGELARMATUREN GMBH &CO.KG, INSTRUMENTATION LTD; YARWAY CORPORATION- U.S.A, MIL CONTROLS -INDIA
142	Cooling Towers	BDT LIMITED, NATIONAL BUILDINGS CONSTRUCTION CORPORATION LTD; GAMMON INDIA LTD; LARSEN TOUBRO LTD; PAHARPUR COOLING TOWERS LTD; GEA,HAMMON, LANCO
143	COLTCS	EIMCO WATER TECHNOLOGIES – LLC - USA, TECHNOS-FRANCE, TAPROGGE GMBH, GEA ENERGY SYSTEM , MACMET, OTOKLIN , BRACKETT GREEN USA INC.
144	Travelling Water Screens	GENERAL MECHANICAL WORKS, MACMET INDIA LTD, VOLTAS
145	Self Cleaning/Debris Filter	EIMCO WATER TECHNOLOGIES –LLC- USA, FILTRATION ENGINEERS (I) PVT.LTD; TAPROGGE GMBH, MULTITEX FILTRATION ENGINEERS LTD, GEA BGR ENERGY SYSTEM INDIA LTD

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
146	D.M. Plant	MECON LIMITED-RANCHI, DOSHION LIMITED AHMEDABAD, DRIPLEX WATER ENGG. LTD; THERMAX LTD; ION EXCHANGE (INDIA) LTD; PARAMOUNT LIMITED, VA TECH WABAG LIMITED,CLEAR WATER LTD.
147	Effluent Treatment Plant	DRIPLEX WATER ENGG. LTD; SHRIRAM EPC LIMITED CHENNAI, TRIVENI ENGINEERING & INDUSTRIES LTD. NOIDA, GANNON DUNKERLEY & CO.LTD.NEW DELHI, CLEAR WATER LTD; GEO MILLER & CO. LTD; THERMAX LTD; HINDUSTAN DORR-OLIVER LTD; ION EXCHANGE (INDIA) LTD; PARAMOUNT LIMITED, VATECH WABAG LIMITED, DOSHION VEOLIA WATER SOLUTIONS PVT.LTD. / TECHNOFAB ENGG.LTD./ MECON LIMITED RANCHI / UEM.
148	Pretreatment Plant	MECON LIMITED-RANCHI, GANNON DUNKERLEY & CO.LTD. NEW DELHI, CLEAR WATER LTD; DRIPLEX WATER ENGG. LTD; GEO MILLER & CO. LTD; HINDUSTAN DORR-OLIVER LTD; ION EXCHANGE (INDIA) LTD; THERMAX LTD; VA TECH WABAG LIMITED
149	Chem. Dosing Plant	ENPRO INDUSTRIES PVT.LTD.PUNE, PSI ENGINEERING SYSTEMS (P) LTD.CHENNAI, TECHNO CONSULTANTS, MILTON ROY INDIA (P) LTD; SWELORE ENGG.PVT.LTD; V.K.PUMP INDUSTRIES PVT.LTD; POSITIVE METERING PUMPS (I) PVT. LTD.
150	CW Ozonation	WEDELO-GERMANY,OZONIA-SWITZERLAND, ORAIPL-NAGPUR/DEGREMONT
151	CO2 Fire Protection	NEW FIRE ENG; NITIN IND; AGNI
152	Chlorination Plant	BABUBHAI NAROTAM DASS & CO; CHLORO CONTROL EQUIPMENT CO; IEC FABCHEM LIMITED, METITO POLLUTION CONTROL I.PVT.LTD; PENNWALT INDIA LTD; TOSHCON JESCO (INDIA) PVT.LTD., M/s Banaco, M/s Titanium Tantalum Products
153	CW Treatment Plant	TD; DRIPCLEAR WATER LLEX WATER ENGG. LTD; ION EXCHANGE (INDIA) LTD; THERMAX LTD
154	Inlet Ducting	PVK ENG; INDIRA IND; LIOYDS INSULATION
155	Sub-Vendors for Cement	NARMADA CEMENT COMPANY, GUJARAT AMBUJA CEMENT CO. LTD., SAURASHTRA CEMENT &CHEMICALS, SIDDHI CEMENT, J.K.CEMENT, L&T CEMENT (ULTRATECH), SHRI DIGVIJAYA CEMENT CO. LTD. , BINANI CEMENT, VIKRAM CEMENT , SANGHI CEMENT, LAXMI CEMENT

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
156	Sub-Vendors for Steel	STEEL AUTHORITY OF INDIA , TATA IRON & STEEL CO. LTD; JINDAL, LLOYDS, ESSAR STEEL LTD; ISPAT, SHAH ALLOYS LTD. AHMEDABAD, MAHAVIR ROLLING MILLS LTD. AHMEDABAD, BHUWALKA STEEL IND. MUMBAI, SUN VIJAY ROLLING AND ENGINEERING LTD. NAGPUR, SHRI BAJRANG ALLOYS LTD. RAIPUR, UNIQUE STRUCTURES AND TOWERS LTD. RAIPUR, ISSCO
157	Desuperheater	ILP, FISHER SANMAR
158	FUEL OIL HANDLING SYSTEM	RAUNAQ INTERNATIONAL LTD. / TECHNOFAB ENGG. LTD. / UNITECH MACHINES LTD. / TECHNO ELECTRIC &ENGG. CO. LTD. / THERMOPADS PVT LIMITED / GENERAL MECHANICAL WORKS PVT. LTD. / INDIAN OILTANKING LIMITED, MUMBAI
159	REFRACTORY	ACE REFRACTORIES / DALMIYA REFRACTORIES, Associated Cement Company Limited, Katni
160	LUB OIL TRANSFER PUMPS	UT PUMPS & SYSTEMS LTD.,MATZ PUMPS PVT.LTD.,TUSHACO PUMPS PVT.LTD
161	SIDE STREAM FILTRATION SYSTEM	ION EXCHANGE (INDIA) LTD., THERMAX LTD., DRIPLEX WATER ENGG. LTD,CLEAR WATER LTD.
162	FIRE TENDER & EQUIPMENTS	STEELAGE INDUSTRIES LTD. / VIJAY FIRE VEHICLES AND PUMPS LTD./WADIA BODY BUILDERS
163	THERMAL INSULATION OF STEAM TURBINE	LLOYD INSULATIONS, INDIA; MIN WOOL, INDIA; KAEFER PUNJ LLOYD, THERMOCARE ROCKWOOL PVT. LTD.
164	WELDED AUSTENTIC TUBES (FOR CONDENSER)	SCHOELLER WERKE GMBH & CO,GERMANY,MULTITEX FILTRATION ENGINEERS LTD.,CST, Valinox, Hyderabad, Manish udhyog, Hardwar
165	CHIMNEY	L & T ECC / GAMMON/ SIMPLEX INFRASTRUCTURE LIMITED/ /GANNON DUNKERLEY & CO. LTD./ LANCO
166	Civil construction	M/s J K Construction, M/s BJCL,M/s Shriram engineering Construction, M/s TIPL, M/s Gammon India Ltd, M/s Simplex Infrastructures Ltd., GERB VIBRATION CONTROL SYSTEMS PVT LIMITED
167	FABRICATION & ERECTION OF STRUCTURAL STEEL	Petron civil Engineering limited, L & T ECC, Ramky ifracture, M/s Sunil Hi Tech
168	GRATINGS, PLATFORMS & HANDRAILS	Indiana Gratings Pvt. Ltd., India, Galfan Engineers Pvt. Ltd., India, Kande Anand Udyog, India, Greatweld Steel Grating Pvt. Ltd., India ,GMW VADODARA.
169	Boiler & Auxiliaries Erection	M/s Sunil Hi Tech, M/s Karpara Engg, M/s Power Mech Pvt. Ltd, Tata Projects, M/s TPS Builders Limited, L&T-ECC, Dowel erectors, M/s Petron Engineering Construction Ltd. India.
170	TG & Auxiliaries Erection	M/s Indwell Engg, M/s Power Mech, L&T- ECC,M/s Universal erection, M/s Alpha Power Engg. Service Pvt. Ltd

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
171	ASH HANDLING PLAN	MACAWBER BEEKAY / UCCI / DCIPS / Indure PVT Ltd./ UCC (USA)/ MCNALLY BHARAT /TECH PRO
172	FUEL OIL HANDLING SYSTEM	RAUNAQ INTERNATIONAL LTD. / TECHNOFAB ENGG.LTD. / UNITECH MACHINES LTD. / TECHNO ELECTRIC &ENGG. CO. LTD. / THERMOPADS PVT LIMITED / GENERAL MECHANICAL WORKS PVT. LTD. / INDIAN OIL TANKING LIMITED,MUMBAI / VIJAY TANKS & VESSELS LTD.,BARODA
ELECTRICAL		
1	Protective Relays	ABB, JYOTI, SIEMENS, ESSUN & RAY, ROLLE, GEC, ALSTOM, L&T, CSEG, MAKE OF MAIN PROTECTIVE RELAY SHALL BE RESTRICTED TO AREVA, ABB, SIEMENS AS PER NIT.
2	AUXILIARY RELAY	BCH,GEC, ALSTOM, L&T, SIEMENS, ABB
3	OVERLOAD RELAY, THERMAL OVER LOAD RELAY	L&T, SIEMENS, TELEMCHANIQUE & CONTROLS, ABB, BCH,CGL, SCHNEIDER, SPACEAGE-HYUNDAI
4	PROTECTIVE RELAY, MOTOR PROTECTION RELAY	ABB, ALSTOM, GEC, EASUN, Siemens, Areva
5	TIMER AUXILIARY CONTROL RELAY	ABB, BCH, GEC, L&T, ALSTOM, SIEMENS, TELEMCHANIQUE & CONTROLS.
6	INTER POSING RELAY FOR COMMANDS O/P TO MCC	JYOTI, H&B, GEC, ALSTOM, OEN, OMRON, HONEYWELL ENGLISH ELECTRICAL,SIEMENS, ABB
7	MCCB	GE, HAVELLS, MDS, L&T, SIEMENS, STANDARD, SPACE AGE, HUNDAI, SCHNEIDER, CGL, NGEF, ALSTOM, CONTROL & SWITCHGEAR CO. LTD.
8	MCB	CGL, GEC, ALSTOM, HAVELLS, MDS, L&T, SIEMENS, STANDARD, SCHNEIDER, NGEF, ABB
9	FUSES & FUSES SWITCH ON / OFF SWITCHES, HRC FUSES WITH BASE	GEC, ALSTOM, L&T, NGEF, SIEMENS, COOPER BUSMAN, EE, STANDARD
10	SWITCH SOCKET OUTLET INDUSTRIAL	BCH, BEST & CROMPTON, CGL, GEC, REY ROLLE, BARN, ANCHOR.
11	AMMETER & VOLTMETER	AUTOMATIC ELECTRIC,ABB,IMP, MECO, L&T, RISHAB, SILKANS
12	METAL CLADE PLUG & SOCKET (INCLUNIND WELDING SOCKET)	BCH, BEST & CROMPTON, CGL, EE, REY ROLLE, BARN, EASUN
13	HT AC MOTORS	BHEL, CGL, GEC, ALSTOM,KIRLOSKAR ELECTRIC CO; NGEF, SIEMENS, ABB, GE, HITACHI, TOSHIBA, LG,JYOTI LIMITED MARATHON ELECTRICAL, ANSALOD (ITALY), MELCO (JAPAN)

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
14	LT AC Motors	ABB, CROMPTON GREAVES, ALSTOM INDUSTRIAL, GEC, KIRLOSKAR ELECTRIC CO;NGEF, JYOTI, SIEMENS, BHARAT BIJLEE LTD; LG , TOSHIBA, ANSALDO, GE, MELCO, MARATHON , BHEL
15	LT AC Geared Motors	GEC, ALSTOM, KIRLOSKER, ELECTRIC CO.
16	DC Motors	GE-USA OR EQUIVALENT ALSTOM LTD/BHEL/ CROMPTON GREAVES LTD./GE/ KIRLOSKAR ELECTRIC CO. LTD. , SIEMENS / MELCO/ABB
17	Thruster brake	ELECTROMAG DEVICES, STROM KRAFT CONTROLS
18	DC Electro magnetic Brakes	BCH, ELECTROMAG DEVICES, STROM KRAFT CONTROLS, ELECTRONICS & POWER CONTROL.
19	Pull Cord Switch, Belt Sway Switch / Relay	AG MECHANICAL ENTERPRISE, AG SYSTEM CONTROL, DEV ENTERPRISE, PBL.
20	CONTROL/ SELECTOR SWITCH	BCH, GEC, ALSTOM, JYOTI, KEYCEE, RECOM, RICO, SWITRON, ABB, L&T, SIEMENS, KROUS-NAIMER SALZER
21	PUSH BUTTONS	BCH,GEC, ALSTOM, L&T, TELKNIC, SIEMENS, VAISHNO, RASS CONTROL
22	TERMINAL BLOCK	CONNECTWELL, ELEMEX, TECHNOPLAST , TOSHA, VINPAR, PHOENIX, WAGO
23	CT's & PT's	A.E., ABB, ASEA, G&W, GUJARAT PLUGIN (DIGITRONICS), JYOTI, KAPPA, , ECS, SIEMENS,AVK-SEG & CONTROLS, PRECISE,INSUTECH., PRAYOG
24	LIGHTING TRANSFORMER	AMAN, POWER PACK, INDICOIL, PRECISE, VOLTAS, UNIVERSAL MAGNETIC, VOLTAMP, AMES IMPEX, KIRLOSKAR ELECTRIC AE
25	CONTROL TRANSFORMER	A.E., AMAN, GUJARAT PLUGIN (DIGITRONICS), GUJ. TRANSFORMER, INDUSTRIAL PRAYOG, NEG, LOGICSTAT, AVK-SEG & CONTROLS ,PRECISE
26	6.6 KV / 433 V DRY TYPE ST	CGL, BHEL, VOLTAMP, INTRA-VIDYUT, DU PONT-RELIA. TRAN; AMESIMPEX, INDCOIL VOLTAS/BHARAT BIJLI / VIJAY ELECTRICAL
27	NEUTRAL GROUNDING TRANSFORMER	PS ELECTRICALS, PRAYOG, INTRA-VIDYUT, AMEX-IMPEX, DU PONTRELIA TRAN. VOLTMP. VIJAY ELECTRICALS
28	NEUTRAL GROUNDING RESISTOR	PEFCO, STROM KRAFT, RESITECH, RS, NARKHADE, POWER CONTROL EQUIPMENT, INDCOIL, BCH, LACHHMAN ELECTRONICS, RSI SWITCHGEAR, RESITECH
29	415 V MCC & PMCC	L&T, SIEMENS, GE POWER, CONTROLS AND SWITCH GEAR, SCHNEIDER, CONTROLS & SCHEMATICS, SPACEAGE, SCHNIDER/ AREVA
30	ESP/ AUXILIARY CONTROL PANEL < MAIN SWITCH BOARD	LARSON & TOUBRO LTD; CHENNAI, SIEMENS INDIA LTD; CHENNAI, SCHENIDER ELECTRIC-NASIK, CONTROL& SWITCH GEAR CO. LTD; NEW DELHI

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
31	CONTROL PANEL FOR CWP	PROCON-INDIA, PANAM CONTROLS-INDIA, PYROTECH-UDAIPUR
32	415 V / 3 PHASE/ AC SQ. INDUCTION MOTOR	KIRLOSKAR, BBL, SIEMENS, ABB CROMPTON, GE, MARATHON, ALSTOM
33	LT AIR C.B.	ABB, CGL, ALSTOM, CS TERASAKI, L&T, GEC, NGEF, VOLTAS., SIEMENS, SCHNEIDER, SPACEAGE-HYUNDAI
34	CONTACTOR	ABB, BCH, L&T, TELEMCHANIQUE & CONTROLS (I) LTD., SIEMENS, SCHNEIDER, SPACEAGE-HYUNDAI
35	MOTORISED ACTUATORS (ELECTRICAL ACTUATOR) FOR VALVE / GATE/ FLAPS/DAMPERS etc.	AUMA, BEACON, ROTORK, LIMIT TORQUE, TECHNO-MECH, ACTUATORS INDIA, PRECISION, CONTINENTAL PROFILES, HMT
36	Actuator (Electrical & Pneumatic)	AUMA, BEACON, ROTORK, LIMIT TORQUE, TECHNO MECH, ACTUATORS INDIA, PRECISION, CONTINENTAL PROFILES, HMT SMC PNEUMATICS/BACHMANN/KELTROL CONTROL /INSTRUMENTATION LTD / HEIN-LEHMANN
37	HOOTER/ BELLS	ILK, INSTALARM, PROCON.
38	INDICATING METERS	AUTOMATIC ELECTRONIC LTD; GEC, ALSTOM, L&T, IMP, MECO RISHABH / CONZERV/ENERCON
39	LIGHT FITTING LUMINAIRES	BAJAJ, CROMPTON, PHILIPS, WIPRO, SPACEAGE FOLLOWING PACKAGE SUPPLIER USING ABOVE MAKE IS ACCEPTABLE :- L N T/PHILIPS/SPACEAGE/TECHNO ELECTRICAL/BAJAJ/CGL) Energy efficient type GE /CGL/ L&T/TECHNO ELECTRICAL Flame proof type BALIGA/ CEAG/ BAJAJ, CGL, PHILIPS
40	CABLE GLAND	BRACO, COMET, CONTRACT, HARDWARE INDUSTRIES, ELECT ENG; LAPP
41	CABLE TRAYS	AV ENGINEERS, BARODA GALVANISERS, INDIANA, NIRMAL ENGG; PAREKH ENGINEERS, VATCO, SADHNA, JAMNA METAL
42	LIGHTING PANEL AND PUSHBUTTON STATIONS	HENSEL, Siemens, Havell's, Bajaj, Philips, L & T,
43	CONTROL PANEL, CONTROL DESK, AUXILIARY PANEL & INDICATING DESKS	ABB, BEST & CROMPTON, ELEMECH, GEC, ALSTOM, NIRMAL, NGEF, OSAKA, SIEMENS, TLK, EASUN REYROLL, ELPRO, L&T, PYRO TECH, PROCON, RITTAL, BELLS, FOX BORO, ILK, APW, PECON
44	MOSAIC GRIDS	SUB- KLEW – GERMANY, SIEMENS – GERMANY, SYMO - SWITZERLAND/PYROTECH, ICA
45	MOSAIC GRID PANELS	PYROTECH, ICA/ SUB-KLEW – GERMANY, SIEMENS – GERMANY, SYMO - SWITZERLAND/PYROTECH /IL KOTA /CHENNAI CONTROLS ADDITIONAL SUB VENDOR CONTROL & SCHMATICS/VIMAC/RITAL
46	THYRISTOR PANELS	ABB, KIRLOSKAR, L&T, OSAKA, SIEMENS

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
47	RELAY PANELS	ALSTOM, ABB, EASUN REY ROLLE
48	415 V 240V AC 24 V DC LIGHTING DISTRIBUTION BOARD / DCDB 415 V PCCs	USHA ENGINEERS , SHEETAL ENGRS., ELECTRICAL FABRICATION AND ERECTION,BARODA, INDUSTRIAL CONTROLS, PBB, OSAKA, ELEMECH, NIRMAL, TECH NO ELECT., L&T, SIEMENS, ALSTOM, GE POWER, CONTROL & SWITCH GEAR, CONTROLS & SCHEMATICS, HEI, SPACEAGE, VIDYUT CONTROLS, KRYPTON, ADLEC, ADVANCE, RITTAL, JASPER ENGG., HENSEL, HAVELLS , INDO ASIAN, NATIONAL ENGRS., STEMEC , MAKTEL SYSTEM, POPULAR SWITCHGEAR, SINTEX
49	ACDB/DCDB/MLDB	L & T, HAVELLS/PYROTECH,MDS/INDU. SWGR./ C&S / SIEMENS/ALSTOM/GE POWER/CONTROLS SWITCHGEAR
50	TERMINAL BOX	GEC, ALSTOM, ASEA, CONNECT WELL, ELMEX
51	PANEL HEATERS & THERMOSTATE	VILECO, ANCO, RANUTROL, CSC, ISO TEMP., KC & SONS, TEMPTROL
52	KWH METER/Mvar meter /MW/Energy meter	IMP, GEC, SIMCO, SIEMENS, ENERCON
53	MINITURE PB/ ILLUMANATED PB	H&B, IL, SYLO
54	PUSH BUTTONS FOR FIELD MOUNTED PANELS	SIEMENS, L&T, C&S-NEW DELHI.
55	SINGLE LAMP FOR FIELD MOUNTED PANELS	SIEMENS, L&T, GEC, ALSTOM, TECHNIC
56	UPS	IL-JAIPUR, HI-REL-GANDHINAGAR , TATA, LIEBERT , DB ELECTRONICS, EMERSON, SOCOMEC, GUTUR FUJI / SIEMENS / APCAREM erlin Gerin PTE/ CHLORIDE-UK /GOUTOR/KELTRON
57	SMF BATTERY FOR UPS	AMAR RAJA, HBL NIFE, EXIDE
58	LT XLPE POWER CABLES AND PVC CONTROL CABLES	HAVELLS, TORRENT, NICCO, FINOLAX, RAVIN, GOVIND, LAPP, INDUSTRIAL CABLES, KRISHNA ELECTRIC, FINE CAB., SPL CABLES, RADIANT, SUYOG, PARAMOUNT, VIKAS CABLES, CORDS, ALPHA, GEMS CAB., TCL, ROLLEX, KEI, CRYSTAL, POLYCAB, DELTON, RELIANCE ENGINEERS, RPG, ASSOCIATE CABLES, ELKAY TELELINKS, UNIVERSAL, FGI CCI/UNIVERSAL
59	HT POWER CABLES	UNIVERSAL, HAVELLS, POLYCAB, TORRENT, NICCO, FINOLAX, INDUSTRIAL CABLE, RPG, FORTGLOSTER KEI/INCAB / ASIAN/ CCI / SIEMENS, ALSTOM, BHEL, CGL, ABB,MARATHON CCI/HGI ADDITIONAL: RADIANT CABLE/ INCAB/INDUSTRIES CABLE
60	FIRE ALARM CABLING	FORT GLOSTER , INCAB, IACL, NICCO

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
61	220 VOLT DC BATTERY	EMCO, EXIDE, SABMIFE, HBL-SABNIFE, FUJI Lead Aid -Plante battery- EXCIDE., NI-CD BATTERY AMAR RAJA/ HBL KNIFE /SAB NIFE/FUJI/AMCO/SAFT SEALED MAINTENANCE FREE BATTERY VRLA BATTERY. EXCIDE / AMAR RAJA/HBL KNIFE/SAB KNIFE/FUJI/AMCO/SAFT
62	220 VOLT DC BATTERY CHARGER	CHHABI, MASS-TECH, AMARA RAJA POWER SYSTEM LTD., STATCON, SABNIFE, CALDYNE, BCH, KAYBEE HBL, DUBAS, SABNIFE POWER SYSTM,DB POWER ELECTRONICS AUTOMATIC ELECTRIC LTD./ HBL-NIFE/ HIND RECTIFIES/ DUBAS ENGG.
63	FIRE PROOF PENETRATIONS SYSTEM	LLOYD INSULATION , MULTIKILN FIRE , NAVAIR INTERNATIONAL LTD.
64	1.1 KV NON SEG PHASE BUS DUCT	CONTROLS & SWITCHGEARS, SPACEAGE, ELPRO, STARDRIVE, EMFORM ADDI VENDOR.ISOLATED PHASE BUS-DUCT (IPBD) : BHEL, ADDI.VENDOR SEGREGATED PHASE BUS-DUCT (SPDB) : BHEL, NON-PHASE SEGREGATED BUS-DUCT (NPSBD): ESWARAN & SONS/KLK INDUSTRIES/BEST & CROMPTON/ENGINEERING CONSTRUCTION COR. Additional Sub-vendors for NPSBD: Rajrajan/Globe Electrical/Control & Schematics / Power Gear
65	ANNUCIATION	IL- KOTA, PROCON, RIS TRICON, RONAN. MASSIBUS, PYRO TECH. IIC
66	ANTI- SURGE CONTROLLER	MTL, P&F, PHONEIX
67	SURGE ABSORBER	MTL, WEIDMULLER, P&F
68	ERECTION HARDWARE	MICROPRECISION, WESMEC ENGG., MET PRESS, SMC PNEUMATIC, SAPAG
69	AC To DC Convertor	PHOENIX, SIEMENS, COSEL-GERMANY
70	400 KV SWITCHYARD	ABB; SIEMENS; AREVA; L&T; BHEL FOR GIS: HITACHI /TOSHIBA/ABB; SIEMENS; AREVA; FOR AIS: ABB; SIEMENS; AREVA; L&T; BHEL
71	C.B.	ABB; SIEMENS; ALSTOM; CGL
72	DISCONNECTOR	ABB; STERLLING; HIVELEN;GR POWER,BIMCO; ELPRO
73	SURGE ARRESTERS	OBLUM; ALSTOM; ELPRO; CGL ,LAMCO
74	BUS SUPPORT INSULATORS	VSI; WSI; IEC; MODERN
75	CTs/VTs/CVTs	ABB; CGL; WSI
76	ACSR CONDUCTORS	APAR; OMERGA; SMITA; HVPL STYERLITE; KEI
77	CLAMPS &CONNECTORS	KLEMMENS; TYCO; FRAMATOME; RASHTRIYA UDYOG
78	STRUCTURE	UTKAL/RICHARDSON & GUDAS; BARODA STRCUTRUALS; KALPATRU; TECHNO ENGG; M V ENGG; METALLITE / TRIVENI

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
79	INSULATION HARDWARE	RASHTRIYA UDYOG; INTERNATIONAL TRANSMISSION PRODUCTS;MODERN MELLEABLES; TYCO; EMC
80	MARSHALLING KIOSKS/JB	CONTROLS & SWITCHGEAR; ANDREW YULESPACEAGE SWITCHGEAR;BCH; ENTERPRISING ENGINEERS; MIKA ELECTROCONTROLS;
81	SUBSTATION MANAGEMENT SYSTEM / SCADA CONTROL / RELAY PANELS / RELAYS	ABB ; SIEMENS ; AREVA
82	TARIFF METERING	SIEMENS , ABB , SEMS, L&T
83	G.T., S.T. & U.T.	BHEL, CGL, ABB, ALSTOM, HYUNDAI, TOSHIBA, SIEMENS, FOR GT : AREVA/CGL/ABB/TELK/BHEL JHANSI, FOR ST & UT : CGL/BHARAT BIJLI/AREVA/ VOLTAMP BARODA/BHEL JHANSI
84	AUXILIARY TRANSFORMER	EMCO, ALSTOM, VOLTAMP, BHARAT BIJLEE APPROVED FOR ONAN--CGL/VOLTAMP TRANS/AREVA /EMCO/BBL/VIJAY ELECT/BHEL/ALSTOM/SIEMENS FOR DRY TYPE: CGL/VOLTAMP TRANS/KIRLOSKAR/ VIJAY ELECTRICAL/BHEL/AMEX IMPEX/UNIVERSAL/ HYUNDAI
85	MV SWITCHGEAR	BHEL,ABB, SIEMENS, ALSTOM, TOSHIBA, SCHNEIDER, JYOTI
86	LV SWITCHGEAR	L&T, SIEMENS, GE, CONTROLS & SWITCHGEAR, EUFORM, SPACEAGE ABB/ALSTOM/SCHNEIDER ELECTRICAL
87	BUS DUCT	BHEL, CONTROLS & SWITCHGEAR; EUFORM, GE, SPACEAGE IPBDPOWER GEAR /BHEL/CONTROL & SWGRNSPBD -LVC & S /STAR DRIVE/POWER GEAR/ SPACE AGE/ENPRO/ELPRO/REEP/UNILEC/ CONTROL & SCHEMATIC/RAJ RAJAN/BEST & CROMPTONMV BUS DUCT (SPBD)C & S /STAR DRIVE/POWER GEAR/SPACE AGE/BHEL/ALSTOMAdditional Sub-vendors for SPBD: Globe ElectricalsNon-Phase segregated Bus-duct (NPSBD): Eswaran & Sons/KLK Industries/Best & Crompton/Engineering Construction Cor. Additional Sub-vendors for NPSBD: Elpro/Rajrajan/Globe Electrical/Control
88	DG SET	MAN B & W, MODI-MIRLEES, CATERPILLAR, WARTSILA POWERICA,JACKSON,SUDHIR GUNSET, SUPERNOVA, CUMMILS ADDITIONAL: CATERPILLER/CUMMINS/ WARTSILIA / MAN B & W POWERICA/ SUDHIR/GMMCO LIMITED/ KIRLOSKAR/ CUMMINS/VOLVO/ STEMFORD/ JACKSON/
89	ILLUMINATION FITTINGS	BAJAJ, CGL, PHILIPS, SPACEAGE, BALIJA (FLAME PROOF) FOLLOWING PACKAGE SUPPLIER USING ABOVE MAKE IS ACCEPTABLE: L&T/PHILIPS/ SPACEAGE / TECHNO ELECTRICAL/BAJAJ/CGL) Energy efficient type GE /CGL/ L&T/TECHNO ELECTRICAL Flame proof type BALIGA/CEAG/BAJAJ, CGL, PHILIPS)

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
90	PUBLIC ADDRESS SYSTEM	PHILIPS , INDUSTRONIC , GAITRONICS BOSCH /BNA /ECIL ADDITIONALSUB VENDOR ANDREW YULE /MOTWANE
91	EPABX	PHILIPS, SIEMENS, BPL, TATA ELECOM, ERICSSON
92	GENERATOR PROTECTION/ PROTECTION PANELS	ALSTOM, ABB, SIEMENS AREVA
93	GENERATOR CIRCUIT BREAKER	ALSTOM, ABB, MISTUBISHI
CONTROL & INSTRUMENTATION		
1	Pressure Switches	SWITZER , INDFOSS , DELTA , UK, DRESSER , USA., VASUTECH, DANFOSS ,PYRO ELECTRIC, CHEMTROL, ASHCROFT, DWYER, SOR,E&H/,,GIC(Mumbai), Precision (Ahmedabad), Trafag (Ranipet), GENERAL INSTRUMENTS CONSORTIUM ,GOA G IC(Mumbai), Precision (Ahmedabad), Trafag (Ranipet)
2	Temperature Switches	SWITZER, INDFOSS, DELTA, UK, DRESSER, USA., DANFOSS, GIC (Mumbai) GIC (Mumbai), Precision (Ahmedabad), Trafag (Ranipet)
3	Level Switches	LEVCON, MEGNETROL, V. AUTOMAT, E&H, MASONELIN DANFOSS, SBEM(PUNE), INDFOSS, SWITZER, PYRO ELECTRIC, CHEMTROL, ASHCROFT, DE LTA CONTROLS, DELTA UK/ DRESSER USA/ DK Inst(Kolkata), Sigma Inst(Mumbai), BH EL(Trichy), Levelstate (UK), Solarton/ Mobrey (UK) DK Inst (Kolkata), Sigma Inst(Mumbai), BHEL (Trichy), Levelstate (UK), Solarton / Mobrey (UK)
4	Limit Switches	BCH, ELECTROMAG DEVICES, STROM KRAFT CONTROLS, ELECTRONICS & POWER CONTROL, SRERING CONTROLS, SIEMENS, JAI BALAJI, ENGINEER AGENCIES, BHARATHIYA CULTER &HAMMER, KAYCEE, HONEYWELL, RL TECHNOLOGIES / CHENNAI KA SCHMERSAL, GERMANY, JOHAN VOLLENBROICH, GERMANY, IFM ELECTRONIC, GERMANY , JAYASHREE ELECTRON PVT. LTD, PEPPERL+FUCHS (INDIA) PVT LTD, ELECTRO MECHANICAL INDIA, KOLKATA, ELECTRICAL EQUPT. CORPN. NEW DELHI, AG Systems, (AG Electronics) MUMBAI, Beta Systems engineering, RL TECHNOLOGIES / CHENNAI. KA SCHMERSAL, GERMANY, JOHAN VOLLENBROICH, GERMANY, IFM ELECTRONIC, GERMANY, JAYASHREE ELECTRON PVT. LTD, PEPPERL+FUCHS (INDIA) PVT LTD, ELECTRO MECHANICAL INDIA, KOLKATA, ELECTRICAL EQUPT. CORPN., NEW DELHI, AG Systems, (AG Electronics) MUMBAI, Beta Systems engineering

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
5	Level Indicator	ENDRESS AND HAUSER- GERMANY, E.IP BULK CONTROLS, KISTLEMORSE, TROLEX, EIP ENVIROLEVEL CONTROLS LTD DELHI, SB ELECTRO MECHNICAL PVT. LTD PUNE, NIVO CONTROLS INDORE EIP ENVIROLEVEL CONTROLS LTD DELHI, SB ELECTRO MECHNICAL PVT. LTD PUNE, NIVO CONTROLS INDORE.
6	Flow Switches	SWITZER , INDFOSS , V. AUTOMAT,GENERAL INSTRUMENT /DELTA UK/ DRESSER USA/ E&H/, Krohne Marshall (Pune)-CHEMTROLS INDUSTRIES LTD., MUMBAI / Krohne Marshall (Pune)
7	Transducer	AE, SOUTHREN , MECO, SIEMENS, ABB, Adept (Pune), Elster (Mumbai), Lectrotek (Pune), Masibus (Gandhinagar), MECO(Mumbai), Pyrotech(Udaipur), Adept (Pune), Elster (Mumbai), Lectrotek (Pune), Masibus (Gandhinagar), M ECO(Mumbai), Pyrotech (Udaipur),
8	Electronic Transmitter	H&B, ROSEMOUNT, IL, FUJI MAKE, ABB, Emerson, Honeywell, Yokogawa ABB, Emerson.
9	Level Transmitters (Displacer Type)	FISHER, TOKYO KESIO-JAPAN, MAGNETROL, E&H, MASON ELI N, ,Chemtrols (Mumbai), ECKARDT (Germany), MIL Controls(Krerala) Chemtrols (Mumbai), ECKARDT (Germany), MIL Controls (Krerala)
10	Receiver Recorder	IL, FUJI MAKE , LAXSON-CHINO MAKE,CHISSEL, EUROTHERM TOSHNIVAL ,SIKURA, ABB/YOKOGAWA,HONEYWELL / YOKOGAWA/
11	Auto Manual Station 24 x 48 MM , Indicator Size 48x48 MM.	MAIN C&I VENDOR, BELLS, FOX BORO, SIEMENS, ABB, ILK, Proplan (Germany), SYMO (Switzerland), TEW (Germany), GANZ(Budapest), Gossen (Germany), Pyrotech (Udaipur), Weigel (Germany)Proplan(Germany), SYMO (Switzerland), TEW(Germany), GANZ(Budapest), Gossen (Germany), Pyrotech (Udaipur), Weigel (Germany)
12	Microprocessor Based Single Loop Controller	IL, BELLS, FOXBORO, SIEMENS, ABB
13	Control Station (Desk Mounted) 24x48 MM.	MAIN C&I VENDOR, BELLS, FOX BORO, SIEMENS, ABB, ILK, Pyrotech (Udaipur)
14	Receiver Indicator BARGRAPH	TELETERM, CG, H&B, LAXSON CHINO, MASIBUS / HONEYWELL/ ABB / YOKOGAWA/ SIEMENS /Gossen/ Camille bauer/ Metrawatt (Germany), Lektrotek (Pune), Pyrotech.

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
15	Pressure Gauges	BELLS CONTROLS, H.GURU, GENERAL INSTRUMENTS GIC, PYRO ELECTRIC, AN INSTRUMENTS, WIKA, INDFOSS, GLUCK (INDIA), WAAREE, MANOMETER(I), BUDENBERG, KONICS/KOREA, ASCHOFT, Forbes Marshall (Hyd), GIC (Mumbai), ODIN (Ahmedabad), KROHNE MARSHALL PVT LTD., PUNE / Hirlekar Precision Engg. Pvt. Ltd.-FORBES MARSHALL PVT. LTD., PUNE Forbes Marshall (Hyd), GIC (Mumbai), ODIN (Ahmedabad), KROHNE MARSHALL PVT LTD., PUNE / Hirlekar Precision Engg. Pvt. Ltd.
16	Draft Gauges	BELLS CONTROLS, SWITZER, H.GURU, GENERAL INSTRUMENTS, GIC, DRESSER, AN INSTRU, MANOMETER, WIKA, GOA THERMOSTATIC, MANOMETER, WIKA, GOA THERMOSTATIC
17	Level Gauges	LEVCON, TECHNOMATIC, TOSHNIWAL, MAGNETROL, KROHN E, E&H, V AUTOMAT, CHEMTROLS, , DK Inst (Kolkata), SBEM (Pune), Sigma Inst (Mumbai)
18	Differential Pressure Indicator.	SWITZER, BELLS CONTROLS, GENERAL INSTRUMENTS, WIKA, AN INSTRUMENTS, H.GURU
19	Temperature Gauges.	BELLS CONTROLS, H.GURU, GENERAL INSTRUMENTS GIC, PYRO ELECTRIC, AN INSTRUMENTS, WIKA GERMANY, DRESSER, INDFOSS, WAAREE, ASCHOFT, Forbes Marshall (Hyd), Goa Thermostatic Inst(Goa), Wika (India)
20	Thermo couples/RTD/ Temperature Elements	GENERAL INSTRUMENTS- MUMBAI / GOA, PYROTECH, DETRIVE, PYRO INST; PYRO ELECTRIC, TEMPSER, PANAM ENGINEERS, HONEYWELL, YOKOGAWA, ROSSEL, Industrial Insts (Kolkata), DETRIV INSTRU., TECHNO INSTRU., Toshnival / NAGMAN SENSORS, CHENNAI / ALTOP INDUSTRIES, VADODARA / BELLS CONTROLS LIMITED / WAREE INSTRUMENTS LIMITED, / Radixelectro system P.Ltd
21	Temperature Convertor Transmitter	TELETERM, TOSHNIWAL, ROSEMOUNT, BLUE STAR, YOKAGAWA, RIS, ABB/ EMERSON/
22	Mass Flow Meter	MICROMOTION, KROHNE MARSHALL, ROSEMOUNT, ULTRA FILTER, ABB, YBL, DIELEN, E&H
23	Rotameter	INSTRUMENT ENGR. HYD. TRANSDUCER AND CONTROL, HYD., V. AUTOMAT, Eureka (Pune), Fluidyne Ins(Mumbai), Placka (Chennai), CHEMTROLS SAMIL (INDIA) PVT. LTD.
24	PH / Conductivity meter /ORP meter	ABB, DKK, POLYMETRON, , HACH, BROWN & LEUBBE
25	Dew Point Apparatus	ADP MANUFACTURER, WALKER (UK), ULTRAFILTER (GERMANY)
26	Air Filter Regulator	SHAVO, PLACKA, MASONEILAN,, VEWAN, DIVYA CONTROL, NUCON/ VELJAN HYDRAIR, HYDERABAD/ SAGA INDUSTRIES / KERALA

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
27	24 Volt DC Supply System	AFCOSET , CHHABI , STENDARD, Amar Raja(Tirupati), Caldyne (Kolkata), HBL Power (Hyd), Mastech (Mumbai), DB Power (Pune), Chloride (UK), ELTEK-SGS (Pune)
28	Vibration Measuring System / Vibration Monitoring System	SHINKAVA, BENTLY NEVADA, IRD, VIBROMETER,, Rockwell (USA/ India), SKF (USA/ India), Rockwell (USA/ India), SKF (USA/ India)
29	Cables: Inst. &Compensating Cables	NICCO, DELTON, TORRENT, RELIANCE, FINOLAX UNIVERSAL, INCAB, FORT GLOSTER, CCI , TOSHNIWAL, URJA, VIKAS, NICCO, ASSOCIATED, CORDS, LAPP, BELDEN-USA,KEI/BELDON,POLYCAB/ Advance Cables (Bangalore), Goyolene (Mumbai), Habia (Sweden) , Heavel (Bangalore), Kerpen (Germany), Paramount (Alwar), Thermo cables (Hyd), Thermo Electric (Netherland), GEMSCAB, KEI, KEC,ELKAY TELELINK.
30	Annubar	DIETRICH (FISHER ROSEMOUNT), MICROPRECISION, TECHNOMATIC
31	SOE	MAIN C&I VENDOR. BELLS, FOX BORO, SIEMENS, ABB, ILK
32	Temperature Scanners.	PROCON, DIGICONT, MASSIBUS,
33	Ultrasonic Level Transmitter	ENDRESS & HAUSER , V.AUTOMAT , ROSEMOUNT, NIVEL CO. , CHEMTROL,SAPCON (VEGA)/,,Krhone (France), Simens Miltronics (Canada),
34	Remote Electronic Drum Level Indicator	HYDRASETP (SOLATRON),LEVELSTATE UK, Yarway
35	Mass flow meter (Coriolis Principle)	EMERSON, E&H, YOKOGAWA, ABB, MICROMOTION / ROSEMOUNT.
36	Electronic Indicators / Controllers / Microprocessor Based Recorders / Receiver Indicator.	HONEYWELL, ABB, YOKOGAWA, LAXSONS – CHINO, GOSSEN ,BELLS, FUJI, EUROTHERM, SIEMENS, Masibus (Gandhinagar), Pyrotech, Teletherm (Chennai)
37	Smart Transmitter (P,L,F, DP)	FISHER ROSEMOUNT (3051 MODEL), YOKOGAWA -JAPAN , FUJI, ABB (2600 MODEL)
38	I/P Converters	MOORE CONTROLS, EMERSON, WATSON SMITH (MTL), H&B(ABB), SMC PNEUMATIC, Fairchild (USA), MTL (India)
39	PLC	ROCKWELL, GEFANUC, ABB, SIEMENS, HONEYWELL, GROUP SCHNEIDER, ALLEN BRADLEY, YOKOGAWA
40	DCS	YOKOGAWA, ABB, SIEMENS, HONEYWELL, OVATION-INVENSYN INDIA PVT LTD ,CHENNAI /L&T -GE /BHEL
41	SWAS and Analyzers	POLYMETRON /EW LOWE, UK MAKE ,A B B KENT, U. K. MAKE ,D K K JAPAN MAKE, FORBES MARSHAL, ABB (India), Emerson Process(India), IL Kota, Yokogawa (India), Honeywell (India)-STEM EQUIPMENTS [SEPL,INDIA]

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
42	Flue Gas Analyzers	LAND COMBUSTION, CODEL, AMETEK, DURAG,,ABB, Emerson Process, Fuji, Maihak AG, Siemens Germany, Yokogawa, Procal (UK), SICK Gmbh, Opsis (Sweden), Teledyne (USA)-CHEMTROLS INDUSTRIES LTD.,MUMBAI
43	Pressure Reducing & Desuperheating Stations	SPIRAX MARSHALL, SULZER, KEYSTONE, YARWAY, FISHER SANMAR, ILP
44	Safety Barrier	MTL P & F
45	Inst. Calibration Equipment	YOKOGAWA, BEAMEX, DRUCK, DOT. SCANDURA, TINSLEY, EUROTRON, BHEL-EDN approved vendors.
46	IMPULSE AND SAMPLE PIPING TUBES AND FITTINGS	TPS TECHNITUBE, SUMITAUO-JAPAN TECHNOMATIC – ITALY, PARKER, SWAGELOK, Pipes : BHEL(T), Choksi Tube (India), Heavy Metal tubes(Ahmedabad), India Seamless (India), Jindal saw pipes(India), Mahalakshmi seamless (Maharashtra), Mannesmann (Germany), Ratnamani metals (Ahmedabad), Suraj stainless (Ahmedabad), Trouvay Cauvin (Dubai) Fittings : Astec valves(Thane), Aura (N Delhi), Excel Hydro (Pune), Fluid controls (Mumbai), HP Valves & fittings(Chennai), Metpress Engg (Kolkata), Panam Engrs (Mumbai), Precision Engg. (Mumbai) MULTIMETAL, VALDEX, HP VALVES, MET PRESS-GENERAL INSTRUMENTS CONSORTIUM, GOA.
47	Scanner	PROCON, MASSIBUS,PECON
48	Master Salve Clock	SERTEL, HOPF GERMANY, KELTRON, ABB, HON EYWELL, L&T – GE ENERGY, SIEMENS, Hathway (UK), Masibus (Gandhinagar), Moser Baer(Switzerland), Sands (Chennai), Advanced Micronics (Bangalore)
49	HART Management System	MTL, P & F, EMERSON PROCESS, USA, DAMAN
50	LVS	BARCO, CLARIFY, SYNELEC, Christie (USA, Bangalore), Delta (Thailand, Gurgaon), Planer (USA)
51	LIE, LIR	IL KOTA, PYROTECH, RITTAL, Chemin (pondicherry), ECIL (Hyd), Forbes Marshall (Pune), Prammen Industries, SAJAS, PRAMMEN,CHEMIN SYSPRO
52	O2 CO SPM Analyzer	CODEL INSTRUMENTAL LTD., UK, SICK, GMBH, GERMANY, LAND INSTRUMENTS INTERNATIONAL, UK, EMERSON PROCESS MANAGEMENT CHEMTROLS, YOKOGAWA, FORBES MARSHALL, AMETEKAIL Siemens Land Combustion, Marvelco, ABB Ltd, Fuji, AIL, Durag Gmbh, Enotech Gmbh, Teledyne (USA).
53	CCTV	BOSCH, GERMANY. HONEYWELL, GODREJ, PELCO, DIMOND, TLT, MIRCON TEK, TIPL-S V NETWORK TECHNOLOGIES, HYDERABAD, L&T PERITO.
54	Position Transmitter	ABB-GERMANY, HONEYWELL-UK, USA CAMILLE BAUER, Switzerland, RL TECHNOLOGIES, CHENNAI, BAUER, SWITZERLAND.

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
55	Valve manifolds	ARJUN INC, NEW DELHI, BALDOTA VALVEAND FITTING CO PVT LT,MUMBAI, EXCEL HYDRO PNEUMATICS PVT LD.,MUMBAI, METPRESS ENGINEERING WORKS, KOLKATA, PRECISION ENGG. INDUSTRIES, MUMBAI, FLOWTECH KOLKATA, HP VALVES & FITTINGS, CHENNAI, ASTEC VALVES & FITTINGS PVT. LTD., THENE, HYDAIRENGG. WORKS, LONAVAL ,Aura (N Delhi)
56	HART Communicator	EMERSON PROCESS (FORMERLY FISHER ROSEMOUNT), USA, DAMAN, YOKOGAWA, JAPAN (YOKOGAWA INDIA LTD, BANGALORE), MERIAM, USA; CHEMTROLS, MUMBAI, ABB, GERMAN, INDIA, FUJI, JAPAN, HONEYWELL USA.
57	Zero speed/ Proximity switch	TIFENBACH, GMBH, GERMANY/AG SYSTEMS, (AG ELECTRONICS) MUMBAI / PEPPERL+FUCHS (INDIA) PVT LTD
58	Flow Integraters	ABB / EMERSON / ENDRESS HAUSER / Gossen / Camille bauer/ Metrawatt, Masibus (Gandhinagar), MCIH (Chennai), Ronan Engg (USA), Yokogawa
59	PCS	HP / IBM/ DELL/ACER ,, IBM-Lenovo
60	TFT Monitor	HP / IBM / DELL, NEC, Samsung, IBM Lenovo, DIMOND, TLT, MIRCON TEK, TIPL
61	Dot matrix Printer	EPSON, WIPRO, HP
62	Printers (Laser/Inkjet)	HP, CANON, WI PRO, SAMSUNG
63	ELECTRONIC WEIGHBRIDGE	AVERY
64	PLC CUM ENGINEERING STATION	PLC CUM ENGINEERING STATION SHALL BE SUPPLIED WITH RELAVENT MAKE PLC
65	SILICA ANALYSER	YOKOGAWA / ABB / AMETEK / FORBES MARSHAL / EMERSON
66	AMBIENT AIR AND WEATHER MONITORING SYSTEM	THERMOFISHER, ENVIROTECH, CHEMTROLS
67	HEA IGNITORS	CBL, HINDUSTAN THERMOMETER, DURAG INDIA
68	FLAME MONITORING CAMERA	DIMOND, TLT, MIRCON TEK, TIPL
69	FLAME SCANNERS	BHEL-TRY
70	BOILER TUBE LEAK DETECTION SYSTEM	BHEL-TRY

Note: Make of any other equipment / item / components not specified in the above list shall be subject to the approval of GSECL.

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30	Elevator Motor with VVVF drive	1 no of each type
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3. Control and Instrumentation:

Sr No	Description	Nos/Set
A	Measuring Instrument	
(a)	All type of Transmitters including sensors	10% or 1 No each type and model whichever is more.
(b)	RTD of each type & length (with head assembly, terminal block & nipple)	10% or 2 nos each type and length l whichever is more.
(c)	Thermocouples of each type like K-type, R-type etc (with head assembly, terminal block & nipple)	10% or 2 nos each type and length l whichever is more
(d)	Cold junction compensation boxes of each model (if applicable)	10% or 2 nos whichever is more
(e)	Thermostatic units for each model of CJC Box (if applicable)	10% or 2 nos whichever is more
(f)	Temperature Transmitters	10% of each type and length
(g)	Thermowell	10% or 1 nos each type and length l whichever is more(to be divided into various insertion lengths in proportion to main population)
B	Limit switches for isolation valves	2 no of each type
C	Local indicators like temperature gauge, pressure gauges, differential Pressure gauge, flow gauges, flow meters etc.	5% or 1 no of each make, model and type whichever is more (to be divided to various ranges in proportion to main of all make ,model ,type population)
D	Process Actuated Switch Devices include all type of Pressure differential pressure, flow ,temperature, differential temperature, level switch devices	5 % or 1 no of each make, model and type whichever is more
E	Any other instrument (flow Transmitters, Density meter)	10% or 1 no of each type and model whichever is more.
F	Analyzers (SO ₂ ,ph) for FGD system	10% or 2 Nos each type complete with accessories
G	Process Connection Piping (For impulse Piping/ Tubing and Air Supply Piping as Applicable)	
(a)	Valves of all types and models	10% or 1 no of each type, class, size and model whichever is more.
(b)	2 way, 3 way., 5 way valve manifolds	10% or 1 no of each type, class,

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		size and model whichever is more.
(c)	Fitting	10% or 1 packet each type, class, size and model whichever is more.
(d)	Purge Meters	5% of each model or 1 no whichever is more.
(e)	Filter regulators	20% each model or 2 nos whichever is more.
H	Cables	
(a)	Pre-Fabricated cable of each type	10% or 1 no of each type and model whichever is more.
(b)	Other cables	5% of each type, pair and size of actual installed quantity.
I	24 V DC Power Supply System	
(a)	AC/DC isolator, contactors, timers, relays	10% of each type and rating.
(b)	Fuses of each type and rating	200%
(c)	Fuse free Circuit breakers	5% of each type and rating.
(d)	Electronic modules of all types	10% of each type
(e)	Cooling Fan	2 Nos of each type
(f)	Relays of all types including overload relays	10% of each type and rating
(g)	Capacitor	1 set
J	PLC Control System	
(a)	Power Supply unit	1 no of each type and model
(b)	Electronics modules of each type and model for control system (This shall include all type of cards like I/O cards, controller cards, CPU modules or card, Logic Cards., Communication modules etc.	20% or 2 nos of each type and model whichever is more.
(c)	Interconnecting cable	10% of each type and size
(d)	Cooling Fan in PLC system/cabinet	2 Nos
(e)	Indication Lamps of all types	100%
(f)	Keyboards & mouse	2 Nos of each type
(g)	Printer and their parts	
1	Color laser printer (A4)	1 No
2	Long term storage unit	1 No
(h)	HMI/PLC Devices	
1	Work station with licensed software loaded along with monitor	2 Nos of each type and model
2	Server for unit LAN or information work Station (as applicable)	1 Nos
3	Network components like Switch/ repeaters/ hubs/ media converter etc. (as Applicable)	2 nos of each type and model.
4	Bulk Storage drive unit	2 nos

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(i)	Cables and connectors:	
1	Prefab interconnecting cables with connector	2 no of each type and length
2	System bus cable with connectors	2 no of each type and length
3	I/O bus cable with connectors for remote I/O units	2 no of each type and length
4	Power supply modules & power packs for control system	10% of each type and model
(j)	Bus couplet/ interface hardware and other communication devices.	10% of each type and model
(k)	Relays	10% of each type and model
(l)	Batteries used for battery backup of RAMs	10% of each type and model
(m)	Fused	10% of each type and model
(n)	Cooling fans for power supply	10% of each type and model
K	Other Related Control and instruments/ Equipment Lime Feeders:	
(a)	Motion monitor	10% or 2 whichever is more.
(b)	Speed pick up	10% or 2 whichever is more
(c)	Torque switch (if applicable)	10% or 2 whichever is more
(d)	Load cell	10% or 2 whichever is more
(e)	Electronic cards & Power Supply cards	10% or 2 whichever is more
(f)	Clutch (if applicable)	10% or 2 whichever is more
(g)	Load indication lamps	200%
(h)	Panel meters	10% or 2 whichever is more
(i)	Limit switch assembly for lime-on-belt, no lime flow, shear pin failure etc.	10% or 2 whichever is more
L	Control Valves, Actuator & Accessories (Following item shall be provided under this clause for all modulating control valves being supplied under this package)	
(a)	Pneumatic and electro- hydraulic actuator assembly	10% or 1 no of each type, model and rating, whichever is more
(b)	Valve trim (including cage, plug, stem, seat ring, guide bushings etc.)	1 set for each type of control valve
(c)	Diaphragms, O rings, seals etc for all types make etc.	100%
(d)	Pressure gauge of all types, make, rating etc	10% or 2 no of each type whichever is more
(e)	Solenoid Valves (if applicable)	10% or 2 no of each type whichever is more
(f)	Positioner units (complete units) & accessories (link assembly)	10% or 1 no of each type whichever is more
(g)	Pneumatic air filter/ Regulator of each type, make rating etc.	10% or 2 no whichever is more
(h)	Airlock relays	10% or 2 no of each type

Signature of Bidder	Company's Round Seal	Date:	Place:

		whichever is more
M	Pneumatics Isolation / Block Valves, Actuator & Accessories (for all ON/OFF valves supplied under this package)	
(a)	Pneumatic actuator assembly	10% or 2 no of each type , ,model and rating whichever is more
(b)	Diaphragms, O rings, seals etc for all types make etc.	100%
(c)	Limit Switches (complete unit) & accessories (link assembly)	10% or 2 nos whichever is more.
(d)	Solenoid Valves (if applicable)	10% or 2 no of each type whichever is more
N	Vibration Monitoring System	
(a)	sensors	10% or minimum 02 nos whichever is more
(b)	Power Supply Module Cards	10% or minimum 02 nos whichever is more
(c)	Driver/ interface Cards & all other electronic cards.	10% or minimum 02 nos whichever is more
(d)	Prefab sensor Cable & Connectors of alltype, makes, range	10% or minimum 02 nos whichever is more
O	Uninterrupted Power Supply including Static Switch (if applicable)	
(a)	Silicon Controlled Thyristor, Diodes and power transistors.	100%
(b)	Capacitors	1 Set
(c)	CTs, CVT's, VT's chokes, AC/DC isolators, Contactors, timers, relays,	10 % of each type
(d)	Fuse of each type and rating	200%
(e)	Fuse free Circuit Breaker	5%
(f)	Electronic modules	10% of each type
(g)	Indicating lamp	100
(h)	Lamp Holders with series resistor, if any	10%
(i)	Cooling Fan	2 nos of each type
(j)	Digital/analog panel meters/indicators	1 no of each type
(k)	Relays of all types including overload relays.	10%

4. Cranes and Hoists:

Sr No	Description	Quantity
	Miscellaneous Cranes	
1.1	One set consisting of 2 nos. bearing for:	
	a) CT wheel	1 set
	b) LT wheel	1 set

Signature of Bidder	Company's Round Seal	Date:	Place:

APPENDIX – S

List of Approved Sub-Vendors

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
MECHANICAL		
1	Water Pumps	WORTHINGTON, MATHER & PLATT, KIRLOSKAR, KSB, MAX FLOW, FLOWMORE, SAM, BEACON WEIR LTD; AKAY, SULZER PUMPS INDIA LTD; VOLTAS, JYOTI LTD; FLOWSERVE INDIA CONTROLS PVT LTD.
2	Disposal Pumps	INDURE, SAM, WEIR, KISHORE PUMPS
3	Sump Pumps / Submersible Pumps	FLOWMORE PVT.LTD; KIRLOSKAR BROS. LTD; KSB PUMPS LTD; KISHOR PUMPS PVT.LTD; SU MOTORS, JYOTI PVT.LTD; WPIL LIMITED, BEACON WEIR LIMITED, SAM TURBO, HYD IND.
4	Lube. Oil Pumps(Centrifugal)	KSB-PUNE, KIRLOSKAR EBARA-KIRLOSKARWADI, SULZER-MUMBAI
5	Lube Oil Pumps (Screw Type)	ALLWEILER-GERMANY, IMO PUMP-USA, TUSHACO DAMAN, LEISTRITZ (EMPIRE)-GERMANY
6	Jacking Oil Pump	TUSHACO, (DELTA CORP)-DAMAN / VAPI, HAGULLAND DENSION-HYDERABAD
7	Jacking Oil Pumps With Motor (Screw Type)	TUSHACO PUMPS LTD. MUMBAI, ALLWEILER AG GERMANY, SIEMENS / KWU-GERMANY
8	Aux. Oil Pump & Emergency Oil Pump With Motor (AOP & EOP)	KSB-PUNE, MATHER & PLATT-PUNE, KBL-PUNE, BUFFALO-USA, KIRLOSKAR, GE-USA
9	Main & Aux. Hydraulic Pumps	HARTMAN CONTROLS INC.- USA, GE-USA, DELTA CORP.-INDIA
10	Vacuum Pumps	BOC EDWARDS HICK HARGIRES-UK, NI-TECH INC. USA/ FLOWTECH SOUTH AFRICA, STERLING SIHI GMBH-GERMANY, D.H.BUDENBERG LTD. UK, TRAN SCAT USA, TRAN SCAT-USA, PPI, KAKATI / VACUNAIR / GARDNER / NASH ELMO INDUSTRIES GMBH, GERMANY / UNIQUE SYSTEMS INC., USA
11	Boiler feed water pumps	K S B, KIRLOSKAR EBARA, SULZER, INGERSOLL RAND, TORISHIMA, WEIR PUMPS/ BHEL (INCORPORATION WITH MHI), CLYDE UNION PUMPS INDIA.
12	Condensate Extraction Pumps	KIRLOSKAR EBARA, KSB, SULZER PUMPS, WEIR PUMPS / TORISHIMA/CHANGSHA/BHEL (INCORPORATION WITH MHI)
13	Concrete Volute	KIRLOSKAR

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
14	General Service Pump	SULZER PUMP, SAM TURBO LTD; KSB PUMPS, KIRLOSKAR, VOLTAS
15	GATE/GLOBE/ CHECK VALVES	
	Cast Steel Valves	FOURESS, L&T, LEADER, SAKHI,MACNEILL, MAGORE, CRESENT, GEETA , KBL, AV VALVE BOSS, AUDCO
	Forged Steel Valves	AUDCO, FOURESS, LEADER , KSB, BDK,HI -TECH, L&T
	Cast Iron Valves	FOURESS/ L&T/KIRLOSKAR/BDK/LEADER/AV ENGG./ VAAS /GALAXY/HAWA VALVES/LEVCON/BANKIM/ I.M. ENGINEERS /H.SARKAR/AUDCO/SHIVA DURGA/ UPADHYAY VALVES/ CRESCENT/ OSCAR / AV VALVES/ SELTTEC/ GEETA/ IMET/ BOSS/LEADER VALVE
	G. M. Valves	LEADER / BOMBAY METAL / SANT / A.V. VALVES / GG / BDK/ AUDCO/ VAAS/ ILK / MIL/ FOURESS / JASH SCHUTTE
	Slewing Ring Bearing	FAG/SKF/ROTHERDE
	Bronze	LEADER, IMET, AV ENGG., BOSS
	Dual Plate Check Valve	ADVANCE, AUDCO, UPADHYAY, C&R, L&T
	General (As Above)	SHANCO,BDK,H SARKAR,GALAXY, L&T
16	Needle Valve	LEADER, AV ENGG. , BLUE STAR , BLISS ANAND, CRESENT, AKSONS, BDK, FLUID LINE
17	Ball Valves	AKSONS, AKAY, CRESENT, BDK, FLUID LINE, AUDCO,KIRLOSKAR,LEADER VALVES,KSB PUMPS, L&T
18	Safety Valves	BLISS, ANAND, FIBRE, FALNGER, LEADER, SARAIN , JN MASHALL, L&T, TYCO SAN MAR LTD; FOURERS ENGG; BHEL-TRICHY
19	Vent Cocks/Valves	AV ENGG. , LEADER, GALAXY
20	Plug Valve	AUDCO, LEADER, IMET, DEZURIK
21	Butterfly Valve	FOURESS,GEETA,FLOVEL,L&T,CRESCENT,IL(PALGHAT, BARODA FLOWTECH, AUDCO, ADVANCE, KIRLOSKAR, TYCO, KEYSTONE, MIL, FISHER SAN MAR, INSTRUMENTATION LTD, Sub vender -- CRANE PROCESS, BDK
22	Knife Gate Valve	DEZURIK, FOURESS
23	Control Valve/Flow Elements	MILCONTROLS, FOURESS, FISHER, XOMAX, AVCON, BLUESTAR, MASONEILEN, MIC RO PRECISION, TECHNOMATIC, DIATRIECH STANDARD, (IL, PALGHAT FOR DIAGNOSTIC AND PROGRAMMING STATION AND SPECIAL LABINSTRUMENTS.),SANMAN,CCI,SULZER,DRESSER,ABB, INSTRUMENTATION LIMITED,FORBES MARSHALL ARCA
24	BFP RC Control Valve	MASONEILAN (DRESSER)-FRANCE, CONTROL COMPONENTS INC-USA
25	Suction Strainers (BFP, BP & CEP)	OTOKLIN- MUMBAI, MULTITEX-NEW DELHI, GUJARATH OTOFILT-AHMEDABAD
26	Actuators (For BF Valves)	ROTORK CONTROLS (INDIA) LTD. CHENNAI, AUMA (INDIA) LTD. BANGALORE, MARSH ENGINEERS PUNE, LIMITORQUE INDIA LTD. DELHI

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
27	Solenoid Valves	AVCON,ROTEX,ASCO,HERION,SIETZ,ADVANCE,BLUE STAR,NUCON,VELJAN HYDRAIR,SMC PNEUMATIC
28	Drain Valve	SEMPELL AG-GERMANY, REINEKE-GERMANY,INSTRUMENTATION LTD
29	Valves(Gate, Globe, NRV) Flanges (LP Heaters, Miscellaneous Tanks, Gland Steam Condenser	LEADER VALVES, BHEL, AUDCO VALVES, KSB,SAMPELL,DREWANCE MICON AND FOURESS
30	Valves & Specialties	AUDCO; SEMPELL; JNM; KSB; CRESENT; BDK; FOURESS; GEA; MESOLINE(FRANCE), L&T
31	Lifting Beam	INDO ASIATIC ENGINEER PVT.LTD.DELHI,STANDARD CASTING PVT.LTD DELHI,GROWTH SHOP TISCO-JAMSHEDPUR,UNITECH MACHINES SAHARANPUR
32	MS Pipes / ERW(Black And Galvanized)	ITC, SURYA ROSHNI, ZENITH, INDUS ,MAHARASHTRA TUBES, JINDAL, SAIL, AJANTA, HSL,GST,BST, JAIN TUBES, TATA, MAN INDUSTRIES,RATNAMANI
33	CI Pipes	IISCO, ELECTRO STEEL
34	Seamless Carbon Steel Pipes	MAHARASHTRA SEAM LESS, ISMT, KALYANI, INDUS, TATA, SAIL,RATNAMANI
35	Carbon Steel Pipes And Fittings	MS FITTINGS,TRUTE FORGE,NITIN,ABASI,PARAMOUNT FORGE,ITC,SAIL,SURYA ROSHNI,RATNAMANI
36	Forge Steel Pipes And Fittings.	NITIN,TRUTEFORGE,TUBE PRODUCTS
37	Stainless Steel Pipes	JINDAL, RATNAMANI, REMI
38	Turbine Integral Piping	BEND JOINTS-BHOPAL, UNITECH-SAHARANPUR, BHEL PIPING CENTRE-CHENNAI, DARSHINI ENTERPRISE-YAMU NANAGAR
39	CPVC Pipes, Valves And Fittings	GEORGE FISHER , ASTRAL
40	Pipe Flanges, Companion Flanges	TRUTE FORGE, PERFECT, SIVANANDA, PUNJAB STEEL WORKS, ABASI, HI ENGINEERS , MS FITTINGS
41	Bolt And Nuts	TATA,JK,PRECISION, GMW, UNBRAKO
42	Gaskets	CHAMPION, GASKET INDIA,MECH PACKING, INMARCO, PERMANITE, HINDUSTAN FERRODO
43	Spring Hangers And Hangers Components	SARATHI, MYRICKS, PIPING AND ENERGY PRODUCT, PIPE HANGERS &SUPPORT PVT LTD
44	Bearings	SKF , FAG, NTN , NBC , NORMA , KINGSBURY,TIMKEN, TATA, COOPER, INA
45	Journal Bearing BFP & BP	COLHERENE-UK, WAUKESHA BEARINGS (GLACIER) UK, MITCHELL- UK, MITCHELL INDIA- BANGALORE
46	Thrust Cum Journal Bearing For CEP	WAUKESHA BEARINGS (GLACIER)- UK, MITCHELL-UK, MITCHELL INDIA-BANGALORE

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
47	Thrust Bearing (BFP & BP)	WAUKESHA BEARINGS (GLACIER)-UK, MITCHELL-UK, MITCHELL INDIA- BANGALORE, KINGSBURY-USA
48	Mechanical Seal (BFP)	BURGMANN-GERMANY, BURGMANN-INDIA (PO ON BURGMANN INDIA & SEALS MANUFACTURED BY BURGMANN-GERMANY), Durametallic.
49	Thrust Cum Journal Bearing For CWP	MITCHELL INDIA-BANGALORE,OMEGA
50	Mechanical Seal (BP & CEP)	BURGMANN INDIA , EAGLE POONAWALA LTD.(FORMELY SEALOL HINDUSTAN)-PUNE, FLOWERVE SANMAR (FORMERLY DURAMETTALIC) CHENNAI
51	Gear Box	RADICON, ELECON, FMG, NAW, KIRLOSKAR, SHANTHI GEARS, GREAVES, FLENDER, SEW, CYCLO TRANS; NEW ALLENBERY, WALCHAND NAGAR-PUNE, RENK AG GERMANY, LUFKIN-USA, FRANCE, FLENDER GRAFFENSTADEN -FRANCE, BHS-GERMANY, TRIVENI ENGG, MYSORE
52	Planetary Gear Box	M/S FLENDER, GERMAN COLOBORATION MANUFACTURED IN INDIA
53	Belt Vulcanizing Machine	NILOS INDIA , S V DATTAR, CHANDRA & CHANDRA
54	Wire Ropes	USHA MARTIN, BOMBAY WIRE,UNITED WIRE
55	"Y" Strainer	GREAVE COTTON, LEADER, BLISS ANAND, JAYPEE, MACN EILL MAGORE
56	Air Blower	MANEKLAL, KAY ENGG., INDCON,C-DOCTOR
57	Site Flow Indicator	GREAVES COTTON , LEADER , MACMEIL , AV ENGG., LEVCON, AUTOMAT , ROTA INSTRUMENTS, EUREKA, FORBES MARSHALL, TRAC
58	Air Heater	ESCORTS, LAMDA INDUSTRIES, Patel Air temp (India) Ltd
59	Expansion Joints(Rubber)	D WREN, FLEXICON LIMITED, Keld Ellentoft India Pvt Ltd. Madras
60	Expansion Joints(Steel)	SUR, MB EXPANSIONS, FLY IDYNE,EXPANSION JOINT SYSTEMS INC. USA
61	Painting Materials	BERGER ,SHALIMAR , ASIAN PAINTS, NEROLAC, JHONSON AND NICHOLSON,AKZO NOBEL
62	Under Ground Coating Material	SHALIMAR TAR PRODUCTS, PYPKOTE,KIRLOSKAR
63	Corrocoat Painting And Application	KIRLOSKAR
64	Thermal Insulating Materials With Accessories	LLOYDS, ROCK WOOL, EXCLITE
65	Compressors/Compressed air system	KG KHOSLA, KIRLOSKAR, ELGI, CONSOLIDATED PNEUMATIC, INGERSOL, ATLAS COPCO, CHICAGO PNEUMATIC, DOCTOR AND COMPANY PVT. LTD, COIMBATORE, PATEL AIRTEMP (INDIA) LTD, RAKANPUR, VEESONS ENERGY SYSTEM PVT. LTD, TIRUCHY

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
66	Air Drying Plant	PACE, SABROE, ULTRATROC, INDCON, DHIR PNEUMATIC, MELLCON, ELGI / INGESSOLL RAND / KG KHOSLA/ CONSOLIDATED PNEUMATIC/ CHICAGO/DELAIR, TRIDENT,
67	Pressure Vessels, Tanks, Air Receivers.	SV ENGG. , PRAGATI ENGG., TEXMACO, ANUP , KANARA, VISHWAKARMA , SATGURU , VIRAT TRANS , HEAT TRANSFER, VIJAY FAB, BINNY ENG. LTD; TECHNOFAB, GMW, RAUNAQ
68	Misc. Tanks	GENERAL MECHANICAL WORKS, SAKTHI HI-TECH CONSTRUCTIONS PVT.LTD; TECHNOFAB ENGG.LTD; UNITECH MACHINES LTD; THERMOPADS PVT LIMITED, PAL ENGG. CORPORATION; UNITECH MACHINES LTD.; TECHNO ELECTRIC & ENGG. CO. LTD.; VIJAY TANKS & VESSELS LTD., BARODA
69	Air Pressure Regulator	SHAVO NORGREN , PLACKA, JRU INSTRUMENTS (EARLIER PLACKA), CHENNAI
70	Oil Lubricator	SHAVO NORGREN , PLACKA
71	Duplex Oil Filter (Lub Oil)	BOLL & KIRCH FILTERBAU GMBH- GERMANY, HYDAC FILTER TECHNIC- GERMANY, K&H EPPENSTEINER GERMANY, EPE EPPENSTIENER- GERMANY, INTERNORMAN FILTER-MUMBAI
72	Duplex Filter (Jacking Oil)	EPE EPPENSTIENER- GERMANY, HYDAC- GERMANY, K&H EPPENSTEINER- GERMANY
73	Oil Purification Unit (Oil Centrifuge)	ALFA LEVAL INDIA LTD. PUNE, WEST FALLIA SEPARATOR INDIA PVT.LTD; SERVIZI- ITALY, PENNWALT INDIA LTD. INDIA, WESTFALLIA SEPARATOR, INDIA / SERVICE ITALY
74	Damper (Viscous)	DAMPER (VISCIOUS), Pennwalt India Ltd. India
75	LP By Pass System Including LP By Pass Valve, Hydraulic Spray Valve & H PSU	BOSCH REXROTH- GERMANY, WELL AND TUXHORN GERMANY, CCI- SWITZERLAND, BOMAFI GERMANY, BOPP & REUTHER- GERMANY, HORA, BOSCH REXROTH- GERMANY, WELL AND TUXHORN - GERMANY, CCI- SWITZERLAND, BOMAFI GERMANY, BOPP & REUTHER- GERMANY
76	H2 Gas Analyzer Cabinet	ABB LTD BANGALORE, SIEMENS-INDIA, YOKOGAWA- BANGALORE, HONEYWELL AUTOMATION PUNE, CHEMTROLL- MUMBAI
77	Welded Austenitic Tubes (For Condenser)	CST VALINOX HYDERABAD, SCHOELLER WERK GMBH & CO. GERMANY, RATNAMANI- AHMEDABAD, VALTIMET-FRANCE
78	Pre Filter /After Filter In Compressed Air System	FINE FILTERS, Rotex, Shavo Norgen, Mumbai
79	Filters	HILLARD-USA, MICROFLO FILTERS, MULTITEX-INDIA
80	Heating Elements	ESCORTS , RACOLD
81	Heat Exchanger	KPC, HEAT TRANS, EAGLE, BEAM

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
82	Heat Exchangers (Plate Type)	ALFA LAVAL (INDIA) LTD; TRANTER INDIA PRIVATE LIMITED-PUNE, GEA ECOFLEX INDIA PVT LTD; IDMC ANAND, GEI
83	Auto Drain Valve In Air Circuit	ULTRAFILTER,GREAVES
84	Mechanical Exhauster	NASH, SIEMENS,NI-TECH INC.USA
85	Ceramic Liners	NTB HITECH
86	Handling Equipment: Elec. Operated	UNIVERSAL HOIST-O- FABRIK, CONSOLIDATED HOISTS PVT. LTD; ARMSEL MHE PVT. LTD; DYNAMECH CRANES PVT. LTD; LIFTING EQUIPMENTS & ACCESSORIES, POWER BUILT PVT. LTD. V.V. NAGAR
87	Handling Equipment-Mechanical	LIFTING EQUIPMENTS &ACCESSORIES,UNIVERSAL HOIST-O-FABRIK,ARMSEL MHE PVT.LTD
88	Chain Pulley Block	HERCULES HOISTS LTD; LIFTING EQUIPMENTS & ACCESSORIES, CONSOLIDATED HOIST PVT LTD;BEMCO PVT LTD, TUOBRO FURGUSON(INDIA)PVT.LTD; GRIP ENGRS; TRANSPADE, GREAVES, , UNIVERSAL HOIST, ARMSEL, POWER BUILD, AVON CRANE,WMI
89	Electric Hoists	AVON CRANES PVT.LTD; HERCULES HOISTS LTD; EDDYCRANES PVT.LTD; LIFTING EQUIPMENTS &ACCESSORIES, REVA INDUSTRIES LTD; CONSOLIDATED HOIST PVT LTD; TUOBRO FURGUSON(INDIA)PVT.LTD; GRIP ENGRS; TRANSPADE, GREAVES, INDEF, UNIVERSAL HOIST, ARMSEL, POWER BUILD, TRACTEL TIRFOR
90	Double Girder EOT Cranes Up to 50t (CWPB & Other Areas)	FURNACE&FOUNDRY EQUIPMENT CO; WMI CRANES LTD; THE TATA IRON &STEEL CO.LTD; UNIQUE INDUSTRIAL HANDLERS PVT.LTD; MUKAND LIMITED, ANUPAM INDUSTRIES LTD; AVON CRANES PVT.LTD; REVA INDUSTRIES LTD, HEAVY ENGG. CORPORATION LTD., ALPHA SERVICES ARMSEL MHE PVT. LTD., BANGALORE CENTURY CRANE ENGINEERS PVT. LTD. CRANEX LIMITED, NEW DELHI; DEMAG CRANES &COMPONENTS (I) PVT. LTD.
91	Single Girder HOT/EOT Cranes	CONSOLIDATED HOIST PVT LTD; LIFTING EQUIPMENTS & ACCESSORIES, REVA INDUSTRIES LTD., ALPHA SERVICES, GARLICK, BATLIBOI, KHANDLWAL, REWA, VIDYUT,GREAVES, CHITRAM, CRANEX, ACME, WMI,UNIQUE, ANUPAM INDUSTRIES LTD,THE TATA IRON & STEEL CO.LTD, FURNACE & FOUNDRY EQUIPMENT CO,MUKAND LIMITED
92	Double Girder EOT Crane Above 50t To 150t (TG/GT Hall & Other Areas	ANUPAM INDUSTRIES LTD; FURNACE & FOUNDRY EQUIPMENT CO; MUKAND LIMITED, THE TATA IRON & STEEL CO.LTD; UNIQUE INDUSTRIAL HANDLERS PVT.LTD; WMI CRANES LTD,REVA INDUSTRIES LTD.,HEAVY ENGG. CORPORATION LTD.

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
93	Fire Protection System	KIDDE INDIA LIMITED, MUMBAI, NEW FIRE ENGINEERS PVT.LTD; UNITECH MACHINES LTD; WORMALD FIRE SYSTEMS, GENERAL MECHANICAL WORKS, MEHTA & ASSOCIATES FIRE PROTECTION SYSTEM PVT. LTD. AHMEDABAD, TECHNOFAB, AGNICE / FIRE PRO / NEW FIRE /TYCO / STEELAGE/ VIJAY/MATHER & PLTT/ MINIMAX/ KUEVERJI DEVSI /PAVLO MARINE, UTC FIRE & SECURITY INDIA LTD.
94	A/C System	ASEA BROWN BOVERI LTD; BLUE STAR LTD; VOLTAS LTD., CARRIER AIRCON/CARRIER/ FRICK INDIA,STERLING AND WILSON PRIVATE LIMITED,
95	Ventilation System	ASEA BROWN BOVERI LTD; AIR LINK ENGINEERS PVT.LTD; ALSTOM LTD; BLUE STAR LTD; C.DOCTOR &CO.PVT.LTD; HYDERABAD POLLUTION CONTROLS LTD; VOLTAS LTD; APC SYSTEM,SK SYSTEMS PRIVATE LIMITED,KONDLI,ROOTS COOLING SYSTEMS PVT.LTD ,M/s Draft Air Pvt Ltd.
96	Ventilation Fan	INDUSTRIAL FAN, C DOCTOR, DUVENT, KIRLOSKAR AAF, PATEL AIR TEMP
97	Portable Fire Extinguishers	VIJAY, LIGHTEX, SAFEX
98	Infra Red Detectors	NEOLA
99	Breathing Apparatus	IMPORTED , FENZI, SAKURA
100	Membrane	DOW, KOTCH
101	Oil System/Lube Oil System	INSTRUMENTATION LTD; MIL CONTROLS LIMITED, R.K. CONTROL INSTRUMENTS PVT.LTD; SAMSON CONTROLS PRIVATE LIMITED,SOUTHERN LUBRICANTS- BANGALORE, PRAKASH LUB EQPTS- CALCUTTA, LEONARD ENGG. PVT KTD. BANGALORE, POWERMAX-CHENNAI, LINCOLN HELIOS-BANGALORE, T.A HYDRAULICSHYDERABAD, HYDROPOWER CORPO; UNITY
102	SB Pr. Reducing Valve &Control Valve : HP	INSTRUMENTATION LTD; MIL CONTROLS LIMITED, FISHER SANMAR LIMITED, DRESSER VALVE INDIA PRIVATE LTD
103	Pump: Fuel Oil Pump	TUSHACO PUMPS PVT.LTD; U.T.PUMPS & SYSTEMS LTD; ALEKTON ENGG.INDUSTRIES P.LTD; JOH HEINRICH BORNEMANN GMBH & CO KG, HEATLY &GRAHAM, MATZ PUMPS
104	BCWP	KSB AKTIENGESELLSCHAFT, TORISHIMA PUMP MFG CO.LTD; HAYWARD TYLER LTD; SAM PUMPS, FLOW MORE
105	Elevator-Passenger & Goods	KONE ELEVATOR INDIA PVT.LTD; OTIS ELEVATOR CO (I) LTD; ORBIS ELEVATOR AHMEDABAD, TECHNO ELEVATOR AHMEDABAD; JOHNSON LIFTS PRIVATE LIMITED.
106	Actuator: Pneumatic(OP/CL)	KELTRON CONTROLS, INSTRUMENTATION LTD.,FORBES MARSHALL,FOURESS

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
107	C.P.U.	VA TECH WABAG GmbH-VIENNA, DRIPLEX WATER ENGG. LTD; ORGANO CORPORATION, ION EXCHANGE (INDIA) LTD., THERMAX LTD., M/s Unitech
108	Wagon Tippler	ELECON/L&T/TRF/KRUPP, INDIA/METSO MINERALS/TKII
109	Apron Feeder	KRUPP - INDIA / ELECON / TRF / L&T/MBE
110	Crusher (Ring Granulator)	KRUPP, INDIA, / ELECON / TRF / L&T / MBE/ SAYAJI/ MPSI-USA/ TRF
111	Belt Conv. (Idlers, Pulleys)	L&T/ ELECON / TRF / MBE / KALI MATERIAL HANDLING SYSTEM / RADIANT/KRUPP INDIA/
112	Belting Nylon	NORTHLAND / PHOENIX - YULE / HILTON / ORIENTAL / MRF / NIRLON LTD. / HINDUSTAN RUBBER/NRC
113	Vibrating Grizzly Feeder / Roller Screen	KRUPP - INDIA / ELECON / TRF / L&T / MBE
114	Stacker Reclaimer	ELECON/TRF/KRUPP/L&T/MBE/FLSMIDTH/METSO MINERALS
115	Travelling Tripper	ELECON / TRF / KRUPP / L&T / MBE
116	Belt Weigher	POWER BUILD/JENSON & NICHOLSON / TRANSWEIGH/ AVERY / ENACARDIORITE/IPA
117	Magnetic Separators Foreign Metal Picker & Detector	POWER BUILD/ELECTROMAG/MAGNETIC CORPORATION OF INDIA/WMI
118	Dust Suppression System	APC / KAVERI/F.HARLEY & CO/PREMIER ENVIROMENTAL / BHEL/EAGLE AGRO TECH IND/DUVENT/ BATLIBOI/ DUSTVEN
119	Fluid Coupling / Scoop Type Coupling	PEMBRIL / FLU IDOMAT /VOITH INDIA / ELECON
120	Belt Cleaner	TECHNO - FAB /HOSCH EQUIPMENT INDIA (HEIPL) / KAVERI / THEJO ENGRS. / SCORPIO/ SPILLBAN/ELECON
121	Thrustor Brakes	BUBENZER/ EMCO PRECIMA/ SIEGERLAND BREMSEN/ SIEMA STROMAG/ KATEEL ENGG./ TECH NO CRATS/ ELECTROMAG
122	Vibration Isolation System	GERB,INSTRUMENTATION ENGINEERS PRIVATE LIMITED
123	Hyd. Power Pack For Stacker Reclaimer	REXORTH/ L&T KOMATSU/VICKERS SYSTEM
124	Hyd. Cylinders	WIPRO/VEZJAN/EIMCO
125	Hyd. Cylinders	VOITH TURBO-GERMANY, VOITH TURBO PVT LTD. HYDERABAD
126	Connecting Coupling For MD BFP Set & CEP	FLEXIBOX LTD. UK, TURBOFLEX-UK, EUROFLEX-UK, EUROFLEX TRANSMISSION LTD.HYDERABAD
127	Connecting Coupling For CWP	EUROFLEX TRANSMISSION LTD. HYDERABAD, TRIVENI FLEXI BOX -BANGALORE, UNIQUE TRANSMISSION-KOLKATA
128	Connecting Coupling (Membrane Type)	EUROFLEX TRANSMISSION-HYDERABAD, RENK A GERMANY, JOHN CRANE-UK, KOPFLEX-USA, BIBBY TURBOFLEX (FORMERLY EUROFLEX)-UK, AMERIDRIVES (ZURN)-USA
129	Connecting Coupling (Gear Type)	FLENDER GRAFFENSTADEN-FRANCE, RENK AG GERMANY, LUFKIN- USA/FRANCE, BHS-GERMANY

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
130	Disconnecting Coupling	ZURN INC-USA
131	ERW Pipes	JINDAL/SURYA ROSHNI/SAIL/ISSCO
132	Bearing For Idlers & Pulleys	SKF/FAG/TATA/ABL/NEI(NBC)/M/S cooper
133	Pipes For Idlers	ZENITH/ SURYA ROSHNI/JINDAL/GOOD LUCK STEEL, TATA
134	Mill Handling System	CONSOLIDATED HOIST-PUNE/ ARMSEL MHE PVT. LTD. BANGALORE/ UNIVERSAL HOIST-O-FABRIK MUMBAI/ DYNAMECH CRANES PVT. LTD. MUMBAI - as per Sr no 86,92
135	Grinding Roll	AIA ENGINEERING, AHMEDABAD, MAGOTTEAUX INDUSTRIES
136	Bull Ring Segments	AIA ENGINEERING, AHMEDABAD, BHEL HYDERABAD
137	Inner Cone	BHEL EPD- BANGALORE, BHEL IP-JAGDISHPUR
138	Air Cylinder	VELJAN HYDRAIR-HYDERABAD, NUCON INDUSTRIES HYDERABAD, PRECISION ENGG (PREAC) BANGALORE, SALZGITTER HYRAU LICS-HYD ERABAD, ASCO-CHENNAI
139	Mill Reject System	MACMET INDIA LIMITED- KOLKATA, MACAWBER BEEKAY PVT.LTD; UNITED CONVEYOR CORPORATION-USA, DC INDTL .PLANT SERVICES PVT.LTD; UNITED CONVEYOR CORPORATION (INDIA)PVT.LTD.-KOLKATA, ELECON LTD. V.V.NAGAR, MACAWBER BEEKAY PVT.LTD. / UNITED CONVEYOR CORPORATION, USA / DC INDTL. PLANT SERVICES PVT.LTD / UNITED CONVEYOR CORPORATION (INDIA)PVT.LTD., KOLKATA MILL REJECT (CONVEYOR TYPE): TECPRO SYSTEMS LIMITED MACMET INDIA LIMITED, KOLKATA TECH NIP SEIFFERT GmbH
140	Coal Handling Plant	L&T ECC DIVISION- CHENNAI, ELECON- V.V.NAGAR, TRF LIMITED- JAMSHEDPUR, KRUPP INDUSTRIES PUNE, MCNALLY BHARAT ENGINEERING COMPANY LTD, M/S TECHPRO
141	Aux. PRDS	COPES VULCAN LTD.- U.K; CONTROL COMPONENT INC.- USA, HOLTER REGELARMATUREN GMBH & CO.KG, INSTRUMENTATION LTD; YARWAY CORPORATION- U.S.A, MIL CONTROLS -INDIA
142	Cooling Towers	BDT LIMITED, NATIONAL BUILDINGS CONSTRUCTION CORPORATION LTD; GAMMON INDIA LTD; LARSEN TOUBRO LTD; PAHARPUR COOLING TOWERS LTD; GEA, HAMMON, LANCO
143	COLTCS	EIMCO WATER TECHNOLOGIES – LLC - USA, TECHNOS-FRANCE, TAPROGGE GMBH, GEA ENERGY SYSTEM , MACMET, OTOKLIN , BRACKETT GREEN USA INC.
144	Travelling Water Screens	GENERAL MECHANICAL WORKS, MACMET INDIA LTD, VOLTAS
145	Self Cleaning/Debris Filter	EIMCO WATER TECHNOLOGIES –LLC- USA, FILTRATION ENGINEERS (I) PVT.LTD; TAPROGGE GMBH, MULTITEX FILTRATION ENGINEERS LTD, GEA BGR ENERGY SYSTEM INDIA LTD

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
146	D.M. Plant	MECON LIMITED-RANCHI, DOSHION LIMITED AHMEDABAD, DRIPLEX WATER ENGG. LTD; THERMAX LTD; ION EXCHANGE (INDIA) LTD; PARAMOUNT LIMITED, VA TECH WABAG LIMITED,CLEAR WATER LTD.
147	Effluent Treatment Plant	DRIPLEX WATER ENGG. LTD; SHRIRAM EPC LIMITED CHENNAI, TRIVENI ENGINEERING & INDUSTRIES LTD. NOIDA, GANNON DUNKERLEY & CO.LTD.NEW DELHI, CLEAR WATER LTD; GEO MILLER & CO. LTD; THERMAX LTD; HINDUSTAN DORR-OLIVER LTD; ION EXCHANGE (INDIA) LTD; PARAMOUNT LIMITED, VATECH WABAG LIMITED, DOSHION VEOLIA WATER SOLUTIONS PVT.LTD. / TECHNOFAB ENGG.LTD./ MECON LIMITED RANCHI / UEM.
148	Pretreatment Plant	MECON LIMITED-RANCHI, GANNON DUNKERLEY & CO.LTD. NEW DELHI, CLEAR WATER LTD; DRIPLEX WATER ENGG. LTD; GEO MILLER & CO. LTD; HINDUSTAN DORR-OLIVER LTD; ION EXCHANGE (INDIA) LTD; THERMAX LTD; VA TECH WABAG LIMITED
149	Chem. Dosing Plant	ENPRO INDUSTRIES PVT.LTD.PUNE, PSI ENGINEERING SYSTEMS (P) LTD.CHENNAI, TECHNO CONSULTANTS, MILTON ROY INDIA (P) LTD; SWELORE ENGG.PVT.LTD; V.K.PUMP INDUSTRIES PVT.LTD; POSITIVE METERING PUMPS (I) PVT. LTD.
150	CW Ozonation	WEDELO-GERMANY,OZONIA-SWITZERLAND, ORAIPL-NAGPUR/DEGREMONT
151	CO2 Fire Protection	NEW FIRE ENG; NITIN IND; AGNI
152	Chlorination Plant	BABUBHAI NAROTAM DASS & CO; CHLORO CONTROL EQUIPMENT CO; IEC FABCHEM LIMITED, METITO POLLUTION CONTROL I.PVT.LTD; PENNWALT INDIA LTD; TOSHCON JESCO (INDIA) PVT.LTD., M/s Banaco, M/s Titanium Tantalum Products
153	CW Treatment Plant	TD; DRIPCLEAR WATER LLEX WATER ENGG. LTD; ION EXCHANGE (INDIA) LTD; THERMAX LTD
154	Inlet Ducting	PVK ENG; INDIRA IND; LIOYDS INSULATION
155	Sub-Vendors for Cement	NARMADA CEMENT COMPANY, GUJARAT AMBUJA CEMENT CO. LTD., SAURASHTRA CEMENT &CHEMICALS, SIDDHI CEMENT, J.K.CEMENT, L&T CEMENT (ULTRATECH), SHRI DIGVIJAYA CEMENT CO. LTD. , BINANI CEMENT, VIKRAM CEMENT , SANGHI CEMENT, LAXMI CEMENT

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
156	Sub-Vendors for Steel	STEEL AUTHORITY OF INDIA , TATA IRON & STEEL CO. LTD; JINDAL, LLOYDS, ESSAR STEEL LTD; ISPAT, SHAH ALLOYS LTD. AHMEDABAD, MAHAVIR ROLLING MILLS LTD. AHMEDABAD, BHUWALKA STEEL IND. MUMBAI, SUN VIJAY ROLLING AND ENGINEERING LTD. NAGPUR, SHRI BAJRANG ALLOYS LTD. RAIPUR, UNIQUE STRUCTURES AND TOWERS LTD. RAIPUR, ISSCO
157	Desuperheater	ILP, FISHER SANMAR
158	FUEL OIL HANDLING SYSTEM	RAUNAQ INTERNATIONAL LTD. / TECHNOFAB ENGG. LTD. / UNITECH MACHINES LTD. / TECHNO ELECTRIC &ENGG. CO. LTD. / THERMOPADS PVT LIMITED / GENERAL MECHANICAL WORKS PVT. LTD. / INDIAN OILTANKING LIMITED, MUMBAI
159	REFRACTORY	ACE REFRACTORIES / DALMIYA REFRACTORIES, Associated Cement Company Limited, Katni
160	LUB OIL TRANSFER PUMPS	UT PUMPS & SYSTEMS LTD.,MATZ PUMPS PVT.LTD.,TUSHACO PUMPS PVT.LTD
161	SIDE STREAM FILTRATION SYSTEM	ION EXCHANGE (INDIA) LTD., THERMAX LTD., DRIPLEX WATER ENGG. LTD,CLEAR WATER LTD.
162	FIRE TENDER & EQUIPMENTS	STEELAGE INDUSTRIES LTD. / VIJAY FIRE VEHICLES AND PUMPS LTD./WADIA BODY BUILDERS
163	THERMAL INSULATION OF STEAM TURBINE	LLOYD INSULATIONS, INDIA; MIN WOOL, INDIA; KAEFER PUNJ LLOYD, THERMOCARE ROCKWOOL PVT. LTD.
164	WELDED AUSTENTIC TUBES (FOR CONDENSER)	SCHOELLER WERKE GMBH & CO,GERMANY,MULTITEX FILTRATION ENGINEERS LTD.,CST, Valinox, Hyderabad, Manish udhyog, Hardwar
165	CHIMNEY	L & T ECC / GAMMON/ SIMPLEX INFRASTRUCTURE LIMITED/ /GANNON DUNKERLEY & CO. LTD./ LANCO
166	Civil construction	M/s J K Construction, M/s BJCL,M/s Shriram engineering Construction, M/s TIPL, M/s Gammon India Ltd, M/s Simplex Infrastructures Ltd., GERB VIBRATION CONTROL SYSTEMS PVT LIMITED
167	FABRICATION & ERECTION OF STRUCTURAL STEEL	Petron civil Engineering limited, L & T ECC, Ramky ifracture, M/s Sunil Hi Tech
168	GRATINGS, PLATFORMS & HANDRAILS	Indiana Gratings Pvt. Ltd., India, Galfan Engineers Pvt. Ltd., India, Kande Anand Udyog, India, Greatweld Steel Grating Pvt. Ltd., India ,GMW VADODARA.
169	Boiler & Auxiliaries Erection	M/s Sunil Hi Tech, M/s Karpara Engg, M/s Power Mech Pvt. Ltd, Tata Projects, M/s TPS Builders Limited, L&T-ECC, Dowel erectors, M/s Petron Engineering Construction Ltd. India.
170	TG & Auxiliaries Erection	M/s Indwell Engg, M/s Power Mech, L&T- ECC,M/s Universal erection, M/s Alpha Power Engg. Service Pvt. Ltd

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
171	ASH HANDLING PLAN	MACAWBER BEEKAY / UCCI / DCIPS / Indure PVT Ltd./ UCC (USA)/ MCNALLY BHARAT /TECH PRO
172	FUEL OIL HANDLING SYSTEM	RAUNAQ INTERNATIONAL LTD. / TECHNOFAB ENGG.LTD. / UNITECH MACHINES LTD. / TECHNO ELECTRIC &ENGG. CO. LTD. / THERMOPADS PVT LIMITED / GENERAL MECHANICAL WORKS PVT. LTD. / INDIAN OIL TANKING LIMITED,MUMBAI / VIJAY TANKS & VESSELS LTD.,BARODA
ELECTRICAL		
1	Protective Relays	ABB, JYOTI, SIEMENS, ESSUN & RAY, ROLLE, GEC, ALSTOM, L&T, CSEG, MAKE OF MAIN PROTECTIVE RELAY SHALL BE RESTRICTED TO AREVA, ABB, SIEMENS AS PER NIT.
2	AUXILIARY RELAY	BCH,GEC, ALSTOM, L&T, SIEMENS, ABB
3	OVERLOAD RELAY, THERMAL OVER LOAD RELAY	L&T, SIEMENS, TELEMCHANIQUE & CONTROLS, ABB, BCH,CGL, SCHNEIDER, SPACEAGE-HYUNDAI
4	PROTECTIVE RELAY, MOTOR PROTECTION RELAY	ABB, ALSTOM, GEC, EASUN, Siemens, Areva
5	TIMER AUXILIARY CONTROL RELAY	ABB, BCH, GEC, L&T, ALSTOM, SIEMENS, TELEMCHANIQUE & CONTROLS.
6	INTER POSING RELAY FOR COMMANDS O/P TO MCC	JYOTI, H&B, GEC, ALSTOM, OEN, OMRON, HONEYWELL ENGLISH ELECTRICAL,SIEMENS, ABB
7	MCCB	GE, HAVELLS, MDS, L&T, SIEMENS, STANDARD, SPACE AGE, HUNDAI, SCHNEIDER, CGL, NGEF, ALSTOM, CONTROL & SWITCHGEAR CO. LTD.
8	MCB	CGL, GEC, ALSTOM, HAVELLS, MDS, L&T, SIEMENS, STANDARD, SCHNEIDER, NGEF, ABB
9	FUSES & FUSES SWITCH ON / OFF SWITCHES, HRC FUSES WITH BASE	GEC, ALSTOM, L&T, NGEF, SIEMENS, COOPER BUSMAN, EE, STANDARD
10	SWITCH SOCKET OUTLET INDUSTRIAL	BCH, BEST & CROMPTON, CGL, GEC, REY ROLLE, BARN, ANCHOR.
11	AMMETER & VOLTMETER	AUTOMATIC ELECTRIC,ABB,IMP, MECO, L&T, RISHAB, SILKANS
12	METAL CLADE PLUG & SOCKET (INCLUNIND WELDING SOCKET)	BCH, BEST & CROMPTON, CGL, EE, REY ROLLE, BARN, EASUN
13	HT AC MOTORS	BHEL, CGL, GEC, ALSTOM,KIRLOSKAR ELECTRIC CO; NGEF, SIEMENS, ABB, GE, HITACHI, TOSHIBA, LG,JYOTI LIMITED MARATHON ELECTRICAL, ANSALOD (ITALY), MELCO (JAPAN)

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
14	LT AC Motors	ABB, CROMPTON GREAVES, ALSTOM INDUSTRIAL, GEC, KIRLOSKAR ELECTRIC CO;NGEF, JYOTI, SIEMENS, BHARAT BIJLEE LTD; LG , TOSHIBA, ANSALDO, GE, MELCO, MARATHON , BHEL
15	LT AC Geared Motors	GEC, ALSTOM, KIRLOSKER, ELECTRIC CO.
16	DC Motors	GE-USA OR EQUIVALENT ALSTOM LTD/BHEL/ CROMPTON GREAVES LTD./GE/ KIRLOSKAR ELECTRIC CO. LTD. , SIEMENS / MELCO/ABB
17	Thruster brake	ELECTROMAG DEVICES, STROM KRAFT CONTROLS
18	DC Electro magnetic Brakes	BCH, ELECTROMAG DEVICES, STROM KRAFT CONTROLS, ELECTRONICS & POWER CONTROL.
19	Pull Cord Switch, Belt Sway Switch / Relay	AG MECHANICAL ENTERPRISE, AG SYSTEM CONTROL, DEV ENTERPRISE, PBL.
20	CONTROL/ SELECTOR SWITCH	BCH, GEC, ALSTOM, JYOTI, KEYCEE, RECOM, RICO, SWITRON, ABB, L&T, SIEMENS, KROUS-NAIMER SALZER
21	PUSH BUTTONS	BCH,GEC, ALSTOM, L&T, TELKNIC, SIEMENS, VAISHNO, RASS CONTROL
22	TERMINAL BLOCK	CONNECTWELL, ELEMEX, TECHNOPLAST , TOSHA, VINPAR, PHOENIX, WAGO
23	CT's & PT's	A.E., ABB, ASEA, G&W, GUJARAT PLUGIN (DIGITRONICS), JYOTI, KAPPA, , ECS, SIEMENS,AVK-SEG & CONTROLS, PRECISE,INSUTECH., PRAYOG
24	LIGHTING TRANSFORMER	AMAN, POWER PACK, INDICOIL, PRECISE, VOLTAS, UNIVERSAL MAGNETIC, VOLTAMP, AMES IMPEX, KIRLOSKAR ELECTRIC AE
25	CONTROL TRANSFORMER	A.E., AMAN, GUJARAT PLUGIN (DIGITRONICS), GUJ. TRANSFORMER, INDUSTRIAL PRAYOG, NEG, LOGICSTAT, AVK-SEG & CONTROLS ,PRECISE
26	6.6 KV / 433 V DRY TYPE ST	CGL, BHEL, VOLTAMP, INTRA-VIDYUT, DU PONT-RELIA. TRAN; AMESIMPEX, INDCOIL VOLTAS/BHARAT BIJLI / VIJAY ELECTRICAL
27	NEUTRAL GROUNDING TRANSFORMER	PS ELECTRICALS, PRAYOG, INTRA-VIDYUT, AMEX-IMPEX, DU PONTRELIA TRAN. VOLTMP. VIJAY ELECTRICALS
28	NEUTRAL GROUNDING RESISTOR	PEFCO, STROM KRAFT, RESITECH, RS, NARKHADE, POWER CONTROL EQUIPMENT, INDCOIL, BCH, LACHHMAN ELECTRONICS, RSI SWITCHGEAR, RESITECH
29	415 V MCC & PMCC	L&T, SIEMENS, GE POWER, CONTROLS AND SWITCH GEAR, SCHNEIDER, CONTROLS & SCHEMATICS, SPACEAGE, SCHNIDER/ AREVA
30	ESP/ AUXILIARY CONTROL PANEL < MAIN SWITCH BOARD	LARSON & TOUBRO LTD; CHENNAI, SIEMENS INDIA LTD; CHENNAI, SCHENIDER ELECTRIC-NASIK, CONTROL& SWITCH GEAR CO. LTD; NEW DELHI

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
31	CONTROL PANEL FOR CWP	PROCON-INDIA, PANAM CONTROLS-INDIA, PYROTECH-UDAIPUR
32	415 V / 3 PHASE/ AC SQ. INDUCTION MOTOR	KIRLOSKAR, BBL, SIEMENS, ABB CROMPTON, GE, MARATHON, ALSTOM
33	LT AIR C.B.	ABB, CGL, ALSTOM, CS TERASAKI, L&T, GEC, NGEF, VOLTAS., SIEMENS, SCHNEIDER, SPACEAGE-HYUNDAI
34	CONTACTOR	ABB, BCH, L&T, TELEMCHANIQUE & CONTROLS (I) LTD., SIEMENS, SCHNEIDER, SPACEAGE-HYUNDAI
35	MOTORISED ACTUATORS (ELECTRICAL ACTUATOR) FOR VALVE / GATE/ FLAPS/DAMPERS etc.	AUMA, BEACON, ROTORK, LIMIT TORQUE, TECHNO-MECH, ACTUATORS INDIA, PRECISION, CONTINENTAL PROFILES, HMT
36	Actuator (Electrical & Pneumatic)	AUMA, BEACON, ROTORK, LIMIT TORQUE, TECHNO MECH, ACTUATORS INDIA, PRECISION, CONTINENTAL PROFILES, HMT SMC PNEUMATICS/BACHMANN/KELTROL CONTROL /INSTRUMENTATION LTD / HEIN-LEHMANN
37	HOOTER/ BELLS	ILK, INSTALARM, PROCON.
38	INDICATING METERS	AUTOMATIC ELECTRONIC LTD; GEC, ALSTOM, L&T, IMP, MECO RISHABH / CONZERV/ENERCON
39	LIGHT FITTING LUMINAIRES	BAJAJ, CROMPTON, PHILIPS, WIPRO, SPACEAGE FOLLOWING PACKAGE SUPPLIER USING ABOVE MAKE IS ACCEPTABLE :- L N T/PHILIPS/SPACEAGE/TECHNO ELECTRICAL/BAJAJ/CGL) Energy efficient type GE /CGL/ L&T/TECHNO ELECTRICAL Flame proof type BALIGA/ CEAG/ BAJAJ, CGL, PHILIPS
40	CABLE GLAND	BRACO, COMET, CONTRACT, HARDWARE INDUSTRIES, ELECT ENG; LAPP
41	CABLE TRAYS	AV ENGINEERS, BARODA GALVANISERS, INDIANA, NIRMAL ENGG; PAREKH ENGINEERS, VATCO, SADHNA, JAMNA METAL
42	LIGHTING PANEL AND PUSHBUTTON STATIONS	HENSEL, Siemens, Havell's, Bajaj, Philips, L & T,
43	CONTROL PANEL, CONTROL DESK, AUXILIARY PANEL & INDICATING DESKS	ABB, BEST & CROMPTON, ELEMECH, GEC, ALSTOM, NIRMAL, NGEF, OSAKA, SIEMENS, TLK, EASUN REYROLL, ELPRO, L&T, PYRO TECH, PROCON, RITTAL, BELLS, FOX BORO, ILK, APW, PECON
44	MOSAIC GRIDS	SUB- KLEW – GERMANY, SIEMENS – GERMANY, SYMO - SWITZERLAND/PYROTECH, ICA
45	MOSAIC GRID PANELS	PYROTECH, ICA/ SUB-KLEW – GERMANY, SIEMENS – GERMANY, SYMO - SWITZERLAND/PYROTECH /IL KOTA /CHENNAI CONTROLS ADDITIONAL SUB VENDOR CONTROL & SCHMATICS/VIMAC/RITAL
46	THYRISTOR PANELS	ABB, KIRLOSKAR, L&T, OSAKA, SIEMENS

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
47	RELAY PANELS	ALSTOM, ABB, EASUN REY ROLLE
48	415 V 240V AC 24 V DC LIGHTING DISTRIBUTION BOARD / DCDB 415 V PCCs	USHA ENGINEERS , SHEETAL ENGRS., ELECTRICAL FABRICATION AND ERECTION,BARODA, INDUSTRIAL CONTROLS, PBB, OSAKA, ELEMECH, NIRMAL, TECH NO ELECT., L&T, SIEMENS, ALSTOM, GE POWER, CONTROL & SWITCH GEAR, CONTROLS & SCHEMATICS, HEI, SPACEAGE, VIDYUT CONTROLS, KRYPTON, ADLEC, ADVANCE, RITTAL, JASPER ENGG., HENSEL, HAVELLS , INDO ASIAN, NATIONAL ENGRS., STEMEC , MAKTEL SYSTEM, POPULAR SWITCHGEAR, SINTEX
49	ACDB/DCDB/MLDB	L & T, HAVELLS/PYROTECH,MDS/INDU. SWGR./ C&S / SIEMENS/ALSTOM/GE POWER/CONTROLS SWITCHGEAR
50	TERMINAL BOX	GEC, ALSTOM, ASEA, CONNECT WELL, ELMEX
51	PANEL HEATERS & THERMOSTATE	VILECO, ANCO, RANUTROL, CSC, ISO TEMP., KC & SONS, TEMPTROL
52	KWH METER/Mvar meter /MW/Energy meter	IMP, GEC, SIMCO, SIEMENS, ENERCON
53	MINITURE PB/ ILLUMANATED PB	H&B, IL, SYLO
54	PUSH BUTTONS FOR FIELD MOUNTED PANELS	SIEMENS, L&T, C&S-NEW DELHI.
55	SINGLE LAMP FOR FIELD MOUNTED PANELS	SIEMENS, L&T, GEC, ALSTOM, TECHNIC
56	UPS	IL-JAIPUR, HI-REL-GANDHINAGAR , TATA, LIEBERT , DB ELECTRONICS, EMERSON, SOCOMEC, GUTUR FUJI / SIEMENS / APCAREM erlin Gerin PTE/ CHLORIDE-UK /GOUTOR/KELTRON
57	SMF BATTERY FOR UPS	AMAR RAJA, HBL NIFE, EXIDE
58	LT XLPE POWER CABLES AND PVC CONTROL CABLES	HAVELLS, TORRENT, NICCO, FINOLAX, RAVIN, GOVIND, LAPP, INDUSTRIAL CABLES, KRISHNA ELECTRIC, FINE CAB., SPL CABLES, RADIANT, SUYOG, PARAMOUNT, VIKAS CABLES, CORDS, ALPHA, GEMS CAB., TCL, ROLLEX, KEI, CRYSTAL, POLYCAB, DELTON, RELIANCE ENGINEERS, RPG, ASSOCIATE CABLES, ELKAY TELELINKS, UNIVERSAL, FGI CCI/UNIVERSAL
59	HT POWER CABLES	UNIVERSAL, HAVELLS, POLYCAB, TORRENT, NICCO, FINOLAX, INDUSTRIAL CABLE, RPG, FORTGLOSTER KEI/INCAB / ASIAN/ CCI / SIEMENS, ALSTOM, BHEL, CGL, ABB,MARATHON CCI/HGI ADDITIONAL: RADIANT CABLE/ INCAB/INDUSTRIES CABLE
60	FIRE ALARM CABLING	FORT GLOSTER , INCAB, IACL, NICCO

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SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
61	220 VOLT DC BATTERY	EMCO, EXIDE, SABMIFE, HBL-SABNIFE, FUJI Lead Aid -Plante battery- EXCIDE., NI-CD BATTERY AMAR RAJA/ HBL KNIFE /SAB NIFE/FUJI/AMCO/SAFT SEALED MAINTENANCE FREE BATTERY VRLA BATTERY. EXCIDE / AMAR RAJA/HBL KNIFE/SAB KNIFE/FUJI/AMCO/SAFT
62	220 VOLT DC BATTERY CHARGER	CHHABI, MASS-TECH, AMARA RAJA POWER SYSTEM LTD., STATCON, SABNIFE, CALDYNE, BCH, KAYBEE HBL, DUBAS, SABNIFE POWER SYSTM,DB POWER ELECTRONICS AUTOMATIC ELECTRIC LTD./ HBL-NIFE/ HIND RECTIFIES/ DUBAS ENGG.
63	FIRE PROOF PENETRATIONS SYSTEM	LLOYD INSULATION , MULTIKILN FIRE , NAVAIR INTERNATIONAL LTD.
64	1.1 KV NON SEG PHASE BUS DUCT	CONTROLS & SWITCHGEARS, SPACEAGE, ELPRO, STARDRIVE, EMFORM ADDI VENDOR.ISOLATED PHASE BUS-DUCT (IPBD) : BHEL, ADDI.VENDOR SEGREGATED PHASE BUS-DUCT (SPDB) : BHEL, NON-PHASE SEGREGATED BUS-DUCT (NPSBD): ESWARAN & SONS/KLK INDUSTRIES/BEST & CROMPTON/ENGINEERING CONSTRUCTION COR. Additional Sub-vendors for NPSBD: Rajrajan/Globe Electrical/Control & Schematics / Power Gear
65	ANNUCIATION	IL- KOTA, PROCON, RIS TRICON, RONAN. MASSIBUS, PYRO TECH. IIC
66	ANTI- SURGE CONTROLLER	MTL, P&F, PHONEIX
67	SURGE ABSORBER	MTL, WEIDMULLER, P&F
68	ERECTION HARDWARE	MICROPRECISION, WESMEC ENGG., MET PRESS, SMC PNEUMATIC, SAPAG
69	AC To DC Convertor	PHOENIX, SIEMENS, COSEL-GERMANY
70	400 KV SWITCHYARD	ABB; SIEMENS; AREVA; L&T; BHEL FOR GIS: HITACHI /TOSHIBA/ABB; SIEMENS; AREVA; FOR AIS: ABB; SIEMENS; AREVA; L&T; BHEL
71	C.B.	ABB; SIEMENS; ALSTOM; CGL
72	DISCONNECTOR	ABB; STERLLING; HIVELEN;GR POWER,BIMCO; ELPRO
73	SURGE ARRESTERS	OBLUM; ALSTOM; ELPRO; CGL ,LAMCO
74	BUS SUPPORT INSULATORS	VSI; WSI; IEC; MODERN
75	CTs/VTs/CVTs	ABB; CGL; WSI
76	ACSR CONDUCTORS	APAR; OMERGA; SMITA; HVPL STYERLITE; KEI
77	CLAMPS &CONNECTORS	KLEMMENS; TYCO; FRAMATOME; RASHTRIYA UDYOG
78	STRUCTURE	UTKAL/RICHARDSON & GUDAS; BARODA STRCUTRUALS; KALPATRU; TECHNO ENGG; M V ENGG; METALLITE / TRIVENI

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
79	INSULATION HARDWARE	RASHTRIYA UDYOG; INTERNATIONAL TRANSMISSION PRODUCTS;MODERN MELLEABLES; TYCO; EMC
80	MARSHALLING KIOSKS/JB	CONTROLS & SWITCHGEAR; ANDREW YULESPACEAGE SWITCHGEAR;BCH; ENTERPRISING ENGINEERS; MIKA ELECTROCONTROLS;
81	SUBSTATION MANAGEMENT SYSTEM / SCADA CONTROL / RELAY PANELS / RELAYS	ABB ; SIEMENS ; AREVA
82	TARIFF METERING	SIEMENS , ABB , SEMS, L&T
83	G.T., S.T. & U.T.	BHEL, CGL, ABB, ALSTOM, HYUNDAI, TOSHIBA, SIEMENS, FOR GT : AREVA/CGL/ABB/TELK/BHEL JHANSI, FOR ST & UT : CGL/BHARAT BIJLI/AREVA/ VOLTAMP BARODA/BHEL JHANSI
84	AUXILIARY TRANSFORMER	EMCO, ALSTOM, VOLTAMP, BHARAT BIJLEE APPROVED FOR ONAN--CGL/VOLTAMP TRANS/AREVA /EMCO/BBL/VIJAY ELECT/BHEL/ALSTOM/SIEMENS FOR DRY TYPE: CGL/VOLTAMP TRANS/KIRLOSKAR/ VIJAY ELECTRICAL/BHEL/AMEX IMPEX/UNIVERSAL/ HYUNDAI
85	MV SWITCHGEAR	BHEL,ABB, SIEMENS, ALSTOM, TOSHIBA, SCHNEIDER, JYOTI
86	LV SWITCHGEAR	L&T, SIEMENS, GE, CONTROLS & SWITCHGEAR, EUFORM, SPACEAGE ABB/ALSTOM/SCHNEIDER ELECTRICAL
87	BUS DUCT	BHEL, CONTROLS & SWITCHGEAR; EUFORM, GE, SPACEAGE IPBDPOWER GEAR /BHEL/CONTROL & SWGRNSPBD -LVC & S /STAR DRIVE/POWER GEAR/ SPACE AGE/ENPRO/ELPRO/REEP/UNILEC/ CONTROL & SCHEMATIC/RAJ RAJAN/BEST & CROMPTONMV BUS DUCT (SPBD)C & S /STAR DRIVE/POWER GEAR/SPACE AGE/BHEL/ALSTOMAdditional Sub-vendors for SPBD: Globe ElectricalsNon-Phase segregated Bus-duct (NPSBD): Eswaran & Sons/KLK Industries/Best & Crompton/Engineering Construction Cor. Additional Sub-vendors for NPSBD: Elpro/Rajrajan/Globe Electrical/Control
88	DG SET	MAN B & W, MODI-MIRLEES, CATERPILLAR, WARTSILA POWERICA,JACKSON,SUDHIR GUNSET, SUPERNOVA, CUMMILS ADDITIONAL: CATERPILLER/CUMMINS/ WARTSILIA / MAN B & W POWERICA/ SUDHIR/GMMCO LIMITED/ KIRLOSKAR/ CUMMINS/VOLVO/ STEMFORD/ JACKSON/
89	ILLUMINATION FITTINGS	BAJAJ, CGL, PHILIPS, SPACEAGE, BALIJA (FLAME PROOF) FOLLOWING PACKAGE SUPPLIER USING ABOVE MAKE IS ACCEPTABLE: L&T/PHILIPS/ SPACEAGE / TECHNO ELECTRICAL/BAJAJ/CGL) Energy efficient type GE /CGL/ L&T/TECHNO ELECTRICAL Flame proof type BALIGA/CEAG/BAJAJ, CGL, PHILIPS)

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
90	PUBLIC ADDRESS SYSTEM	PHILIPS , INDUSTRONIC , GAITRONICS BOSCH /BNA /ECIL ADDITIONALSUB VENDOR ANDREW YULE /MOTWANE
91	EPABX	PHILIPS, SIEMENS, BPL, TATA ELECOM, ERICSSON
92	GENERATOR PROTECTION/ PROTECTION PANELS	ALSTOM, ABB, SIEMENS AREVA
93	GENERATOR CIRCUIT BREAKER	ALSTOM, ABB, MISTUBISHI
CONTROL & INSTRUMENTATION		
1	Pressure Switches	SWITZER , INDFOSS , DELTA , UK, DRESSER , USA., VASUTECH, DANFOSS ,PYRO ELECTRIC, CHEMTROL, ASHCROFT, DWYER, SOR,E&H/,,GIC(Mumbai), Precision (Ahmedabad), Trafag (Ranipet), GENERAL INSTRUMENTS CONSORTIUM ,GOA G IC(Mumbai), Precision (Ahmedabad), Trafag (Ranipet)
2	Temperature Switches	SWITZER, INDFOSS, DELTA, UK, DRESSER, USA., DANFOSS, GIC (Mumbai) GIC (Mumbai), Precision (Ahmedabad), Trafag (Ranipet)
3	Level Switches	LEVCON, MEGNETROL, V. AUTOMAT, E&H, MASONELIN DANFOSS, SBEM(PUNE), INDFOSS, SWITZER, PYRO ELECTRIC, CHEMTROL, ASHCROFT, DE LTA CONTROLS, DELTA UK/ DRESSER USA/ DK Inst(Kolkata), Sigma Inst(Mumbai), BH EL(Trichy), Levelstate (UK), Solarton/ Mobrey (UK) DK Inst (Kolkata), Sigma Inst(Mumbai), BHEL (Trichy), Levelstate (UK), Solarton / Mobrey (UK)
4	Limit Switches	BCH, ELECTROMAG DEVICES, STROM KRAFT CONTROLS, ELECTRONICS & POWER CONTROL, SRERING CONTROLS, SIEMENS, JAI BALAJI, ENGINEER AGENCIES, BHARATHIYA CULTER &HAMMER, KAYCEE, HONEYWELL, RL TECHNOLOGIES / CHENNAI KA SCHMERSAL, GERMANY, JOHAN VOLLENBROICH, GERMANY, IFM ELECTRONIC, GERMANY , JAYASHREE ELECTRON PVT. LTD, PEPPERL+FUCHS (INDIA) PVT LTD, ELECTRO MECHANICAL INDIA, KOLKATA, ELECTRICAL EQUPT. CORPN. NEW DELHI, AG Systems, (AG Electronics) MUMBAI, Beta Systems engineering, RL TECHNOLOGIES / CHENNAI. KA SCHMERSAL, GERMANY, JOHAN VOLLENBROICH, GERMANY, IFM ELECTRONIC, GERMANY, JAYASHREE ELECTRON PVT. LTD, PEPPERL+FUCHS (INDIA) PVT LTD, ELECTRO MECHANICAL INDIA, KOLKATA, ELECTRICAL EQUPT. CORPN., NEW DELHI, AG Systems, (AG Electronics) MUMBAI, Beta Systems engineering

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
5	Level Indicator	ENDRESS AND HAUSER- GERMANY, E.IP BULK CONTROLS, KISTLEMORSE, TROLEX, EIP ENVIROLEVEL CONTROLS LTD DELHI, SB ELECTRO MECHNICAL PVT. LTD PUNE, NIVO CONTROLS INDORE EIP ENVIROLEVEL CONTROLS LTD DELHI, SB ELECTRO MECHNICAL PVT. LTD PUNE, NIVO CONTROLS INDORE.
6	Flow Switches	SWITZER , INDFOSS , V. AUTOMAT,GENERAL INSTRUMENT /DELTA UK/ DRESSER USA/ E&H/, Krohne Marshall (Pune)-CHEMTROLS INDUSTRIES LTD., MUMBAI / Krohne Marshall (Pune)
7	Transducer	AE, SOUTHREN , MECO, SIEMENS, ABB, Adept (Pune), Elster (Mumbai), Lectrotek (Pune), Masibus (Gandhinagar), MECO(Mumbai), Pyrotech(Udaipur), Adept (Pune), Elster (Mumbai), Lectrotek (Pune), Masibus (Gandhinagar), M ECO(Mumbai), Pyrotech (Udaipur),
8	Electronic Transmitter	H&B, ROSEMOUNT, IL, FUJI MAKE, ABB, Emerson, Honeywell, Yokogawa ABB, Emerson.
9	Level Transmitters (Displacer Type)	FISHER, TOKYO KESIO-JAPAN, MAGNETROL, E&H, MASON ELI N, ,Chemtrols (Mumbai), ECKARDT (Germany), MIL Controls(Krerala) Chemtrols (Mumbai), ECKARDT (Germany), MIL Controls (Krerala)
10	Receiver Recorder	IL, FUJI MAKE , LAXSON-CHINO MAKE,CHISSEL, EUROTHERM TOSHNIVAL ,SIKURA, ABB/YOKOGAWA,HONEYWELL / YOKOGAWA/
11	Auto Manual Station 24 x 48 MM , Indicator Size 48x48 MM.	MAIN C&I VENDOR, BELLS, FOX BORO, SIEMENS, ABB, ILK, Proplan (Germany), SYMO (Switzerland), TEW (Germany), GANZ(Budapest), Gossen (Germany), Pyrotech (Udaipur), Weigel (Germany)Proplan(Germany), SYMO (Switzerland), TEW(Germany), GANZ(Budapest), Gossen (Germany), Pyrotech (Udaipur), Weigel (Germany)
12	Microprocessor Based Single Loop Controller	IL, BELLS, FOXBORO, SIEMENS, ABB
13	Control Station (Desk Mounted) 24x48 MM.	MAIN C&I VENDOR, BELLS, FOX BORO, SIEMENS, ABB, ILK, Pyrotech (Udaipur)
14	Receiver Indicator BARGRAPH	TELETHERM, CG, H&B, LAXSON CHINO, MASIBUS / HONEYWELL/ ABB / YOKOGAWA/ SIEMENS /Gossen/ Camille bauer/ Metrawatt (Germany), Lektrotek (Pune), Pyrotech.

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
15	Pressure Gauges	BELLS CONTROLS, H.GURU, GENERAL INSTRUMENTS GIC, PYRO ELECTRIC, AN INSTRUMENTS, WIKA, INDFOSS, GLUCK (INDIA), WAAREE, MANOMETER(I), BUDENBERG, KONICS/KOREA, ASCHOFT, Forbes Marshall (Hyd), GIC (Mumbai), ODIN (Ahmedabad), KROHNE MARSHALL PVT LTD., PUNE / Hirlekar Precision Engg. Pvt. Ltd.-FORBES MARSHALL PVT. LTD., PUNE Forbes Marshall (Hyd), GIC (Mumbai), ODIN (Ahmedabad), KROHNE MARSHALL PVT LTD., PUNE / Hirlekar Precision Engg. Pvt. Ltd.
16	Draft Gauges	BELLS CONTROLS, SWITZER, H.GURU, GENERAL INSTRUMENTS, GIC, DRESSER, AN INSTRU, MANOMETER, WIKA, GOA THERMOSTATIC, MANOMETER, WIKA, GOA THERMOSTATIC
17	Level Gauges	LEVCON, TECHNOMATIC, TOSHNIWAL, MAGNETROL, KROHN E, E&H, V AUTOMAT, CHEMTROLS, , DK Inst (Kolkata), SBEM (Pune), Sigma Inst (Mumbai)
18	Differential Pressure Indicator.	SWITZER, BELLS CONTROLS, GENERAL INSTRUMENTS, WIKA, AN INSTRUMENTS, H.GURU
19	Temperature Gauges.	BELLS CONTROLS, H.GURU, GENERAL INSTRUMENTS GIC, PYRO ELECTRIC, AN INSTRUMENTS, WIKA GERMANY, DRESSER, INDFOSS, WAAREE, ASCHOFT, Forbes Marshall (Hyd), Goa Thermostatic Inst(Goa), Wika (India)
20	Thermo couples/RTD/ Temperature Elements	GENERAL INSTRUMENTS- MUMBAI / GOA, PYROTECH, DETRIVE, PYRO INST; PYRO ELECTRIC, TEMPSIN, PANAM ENGINEERS, HONEYWELL, YOKOGAWA, ROSSEL, Industrial Insts (Kolkata), DETRIV INSTRU., TECHNO INSTRU., Toshnival / NAGMAN SENSORS, CHENNAI / ALTOP INDUSTRIES, VADODARA / BELLS CONTROLS LIMITED / WAREE INSTRUMENTS LIMITED, / Radixelectro system P.Ltd
21	Temperature Convertor Transmitter	TELETERM, TOSHNIWAL, ROSEMOUNT, BLUE STAR, YOKAGAWA, RIS, ABB/ EMERSON/
22	Mass Flow Meter	MICROMOTION, KROHNE MARSHALL, ROSEMOUNT, ULTRA FILTER, ABB, YBL, DIELEN, E&H
23	Rotameter	INSTRUMENT ENGR. HYD. TRANSDUCER AND CONTROL, HYD., V. AUTOMAT, Eureka (Pune), Fluidyne Ins(Mumbai), Placka (Chennai), CHEMTROLS SAMIL (INDIA) PVT. LTD.
24	PH / Conductivity meter /ORP meter	ABB, DKK, POLYMETRON, , HACH, BROWN & LEUBBE
25	Dew Point Apparatus	ADP MANUFACTURER, WALKER (UK), ULTRAFILTER (GERMANY)
26	Air Filter Regulator	SHAVO, PLACKA, MASONEILAN,, VEWAN, DIVYA CONTROL, NUCON/ VELJAN HYDRAIR, HYDERABAD/ SAGA INDUSTRIES / KERALA

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
27	24 Volt DC Supply System	AFCOSET , CHHABI , STENDARD, Amar Raja(Tirupati), Caldyne (Kolkata), HBL Power (Hyd), Mastech (Mumbai), DB Power (Pune), Chloride (UK), ELTEK-SGS (Pune)
28	Vibration Measuring System / Vibration Monitoring System	SHINKAVA, BENTLY NEVADA, IRD, VIBROMETER,, Rockwell (USA/ India), SKF (USA/ India), Rockwell (USA/ India), SKF (USA/ India)
29	Cables: Inst. &Compensating Cables	NICCO, DELTON, TORRENT, RELIANCE, FINOLAX UNIVERSAL, INCAB, FORT GLOSTER, CCI , TOSHNIWAL, URJA, VIKAS, NICCO, ASSOCIATED, CORDS, LAPP, BELDEN-USA,KEI/BELDON,POLYCAB/ Advance Cables (Bangalore), Goyolene (Mumbai), Habia (Sweden) , Heavel (Bangalore), Kerpen (Germany), Paramount (Alwar), Thermo cables (Hyd), Thermo Electric (Netherland), GEMSCAB, KEI, KEC,ELKAY TELELINK.
30	Annubar	DIETRICH (FISHER ROSEMOUNT), MICROPRECISION, TECHNOMATIC
31	SOE	MAIN C&I VENDOR. BELLS, FOX BORO, SIEMENS, ABB, ILK
32	Temperature Scanners.	PROCON, DIGICONT, MASSIBUS,
33	Ultrasonic Level Transmitter	ENDRESS & HAUSER , V.AUTOMAT , ROSEMOUNT, NIVEL CO. , CHEMTROL,SAPCON (VEGA)/,,Krhone (France), Simens Miltronics (Canada),
34	Remote Electronic Drum Level Indicator	HYDRASETP (SOLATRON),LEVELSTATE UK, Yarway
35	Mass flow meter (Coriolis Principle)	EMERSON, E&H, YOKOGAWA, ABB, MICROMOTION / ROSEMOUNT.
36	Electronic Indicators / Controllers / Microprocessor Based Recorders / Receiver Indicator.	HONEYWELL, ABB, YOKOGAWA, LAXSONS – CHINO, GOSSEN ,BELLS, FUJI, EUROTHERM, SIEMENS, Masibus (Gandhinagar), Pyrotech, Teletherm (Chennai)
37	Smart Transmitter (P,L,F, DP)	FISHER ROSEMOUNT (3051 MODEL), YOKOGAWA -JAPAN , FUJI, ABB (2600 MODEL)
38	I/P Converters	MOORE CONTROLS, EMERSON, WATSON SMITH (MTL), H&B(ABB), SMC PNEUMATIC, Fairchild (USA), MTL (India)
39	PLC	ROCKWELL, GEFANUC, ABB, SIEMENS, HONEYWELL, GROUP SCHNEIDER, ALLEN BRADLEY, YOKOGAWA
40	DCS	YOKOGAWA, ABB, SIEMENS, HONEYWELL, OVATION-INVENSYN INDIA PVT LTD ,CHENNAI /L&T -GE /BHEL
41	SWAS and Analyzers	POLYMETRON /EW LOWE, UK MAKE ,A B B KENT, U. K. MAKE ,D K K JAPAN MAKE,FORBES MARSHAL, ABB (India), Emerson Process(India), IL Kota, Yokogawa (India), Honeywell (India)-STEM EQUIPMENTS [SEPL,INDIA]

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
42	Flue Gas Analyzers	LAND COMBUSTION, CODEL, AMETEK, DURAG,,ABB, Emerson Process, Fuji, Maihak AG, Siemens Germany, Yokogawa, Procal (UK), SICK Gmbh, Opsis (Sweden), Teledyne (USA)-CHEMTROLS INDUSTRIES LTD.,MUMBAI
43	Pressure Reducing & Desuperheating Stations	SPIRAX MARSHALL, SULZER, KEYSTONE, YARWAY, FISHER SANMAR, ILP
44	Safety Barrier	MTL P & F
45	Inst. Calibration Equipment	YOKOGAWA, BEAMEX, DRUCK, DOT. SCANDURA, TINSLEY, EUROTRON, BHEL-EDN approved vendors.
46	IMPULSE AND SAMPLE PIPING TUBES AND FITTINGS	TPS TECHNITUBE, SUMITAUO-JAPAN TECHNOMATIC – ITALY, PARKER, SWAGELOK, Pipes : BHEL(T), Choksi Tube (India), Heavy Metal tubes(Ahmedabad), India Seamless (India), Jindal saw pipes(India), Mahalakshmi seamless (Maharashtra), Mannesmann (Germany), Ratnamani metals (Ahmedabad), Suraj stainless (Ahmedabad), Trouvay Cauvin (Dubai) Fittings : Astec valves(Thane), Aura (N Delhi), Excel Hydro (Pune), Fluid controls (Mumbai), HP Valves & fittings(Chennai), Metpress Engg (Kolkata), Panam Engrs (Mumbai), Precision Engg. (Mumbai) MULTIMETAL, VALDEX, HP VALVES, MET PRESS-GENERAL INSTRUMENTS CONSORTIUM, GOA.
47	Scanner	PROCON, MASSIBUS,PECON
48	Master Salve Clock	SERTEL, HOPF GERMANY, KELTRON, ABB, HON EYWELL, L&T – GE ENERGY, SIEMENS, Hathway (UK), Masibus (Gandhinagar), Moser Baer(Switzerland), Sands (Chennai), Advanced Micronics (Bangalore)
49	HART Management System	MTL, P & F, EMERSON PROCESS, USA, DAMAN
50	LVS	BARCO, CLARIFY, SYNELEC, Christie (USA, Bangalore), Delta (Thailand, Gurgaon), Planer (USA)
51	LIE, LIR	IL KOTA, PYROTECH, RITTAL, Chemin (pondicherry), ECIL (Hyd), Forbes Marshall (Pune), Prammen Industries, SAJAS, PRAMMEN,CHEMIN SYSPRO
52	O2 CO SPM Analyzer	CODEL INSTRUMENTAL LTD., UK, SICK, GMBH, GERMANY, LAND INSTRUMENTS INTERNATIONAL, UK, EMERSON PROCESS MANAGEMENT CHEMTROLS, YOKOGAWA, FORBES MARSHALL, AMETEKAIL Siemens Land Combustion, Marvelco, ABB Ltd, Fuji, AIL, Durag Gmbh, Enotech Gmbh, Teledyne (USA).
53	CCTV	BOSCH, GERMANY. HONEYWELL, GODREJ, PELCO, DIMOND, TLT, MIRCON TEK, TIPL-S V NETWORK TECHNOLOGIES, HYDERABAD, L&T PERITO.
54	Position Transmitter	ABB-GERMANY, HONEYWELL-UK, USA CAMILLE BAUER, Switzerland, RL TECHNOLOGIES, CHENNAI, BAUER, SWITZERLAND.

Signature of Bidder	Company's Round Seal	Date:	Place:

SR. NO.	DETAILS OF EQUIPMENT/SYSTEM	APPROVED VENDOR
55	Valve manifolds	ARJUN INC, NEW DELHI, BALDOTA VALVEAND FITTING CO PVT LT,MUMBAI, EXCEL HYDRO PNEUMATICS PVT LD.,MUMBAI, METPRESS ENGINEERING WORKS, KOLKATA, PRECISION ENGG. INDUSTRIES, MUMBAI, FLOWTECH KOLKATA, HP VALVES & FITTINGS, CHENNAI, ASTEC VALVES & FITTINGS PVT. LTD., THENE, HYDAIRENGG. WORKS, LONAVAL ,Aura (N Delhi)
56	HART Communicator	EMERSON PROCESS (FORMERLY FISHER ROSEMOUNT), USA, DAMAN, YOKOGAWA, JAPAN (YOKOGAWA INDIA LTD, BANGALORE), MERIAM, USA; CHEMTROLS, MUMBAI, ABB, GERMAN, INDIA, FUJI, JAPAN, HONEYWELL USA.
57	Zero speed/ Proximity switch	TIFENBACH, GMBH, GERMANY/AG SYSTEMS, (AG ELECTRONICS) MUMBAI / PEPPERL+FUCHS (INDIA) PVT LTD
58	Flow Integraters	ABB / EMERSON / ENDRESS HAUSER / Gossen / Camille bauer/ Metrawatt, Masibus (Gandhinagar), MCIH (Chennai), Ronan Engg (USA), Yokogawa
59	PCS	HP / IBM/ DELL/ACER ,, IBM-Lenovo
60	TFT Monitor	HP / IBM / DELL, NEC, Samsung, IBM Lenovo, DIMOND, TLT, MIRCON TEK, TIPL
61	Dot matrix Printer	EPSON, WIPRO, HP
62	Printers (Laser/Inkjet)	HP, CANON, WI PRO, SAMSUNG
63	ELECTRONIC WEIGHBRIDGE	AVERY
64	PLC CUM ENGINEERING STATION	PLC CUM ENGINEERING STATION SHALL BE SUPPLIED WITH RELAVENT MAKE PLC
65	SILICA ANALYSER	YOKOGAWA / ABB / AMETEK / FORBES MARSHAL / EMERSON
66	AMBIENT AIR AND WEATHER MONITORING SYSTEM	THERMOFISHER, ENVIROTECH, CHEMTROLS
67	HEA IGNITORS	CBL, HINDUSTAN THERMOMETER, DURAG INDIA
68	FLAME MONITORING CAMERA	DIMOND, TLT, MIRCON TEK, TIPL
69	FLAME SCANNERS	BHEL-TRY
70	BOILER TUBE LEAK DETECTION SYSTEM	BHEL-TRY

Note: Make of any other equipment / item / components not specified in the above list shall be subject to the approval of GSECL.

Signature of Bidder	Company's Round Seal	Date:	Place:



AN ISO 9001 & 14001 COMPANY

TENDER DOCUMENT

NIT No: EPI/WRO/CON/968/342

FOR

Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS based control system and associated works” on EPC mode for the project Supply, Installation, Testing and Commissioning of FGD System for 1X500 MW Unit #6 Ukai TPS”

VOLUME – IV

Price Bid



TENDER INVITING AGENCY

**Engineering Projects (India) Limited
Contracts Division, Western Regional Office,
6A, Bakhtawar, Nariman Point
Mumbai – 400021**

Validate

Print



Item Wise BoQ

Tender Inviting Authority: Engineering Projects (India) Limited, Mumbai

Name of Work: Tender for “Design, Engineering, Supply, Erection, Testing and Commissioning of DCS Based Control System and Associated Works” on EPC Mode for the project “Supply, Installation, Commissioning & Testing of FGD system for 500 MW Unit No.6 of Ukai TPS”.

Contract No: EPI/WRO/CON/968/342 Dated: 30.05.2025

Name of the Bidder/ Bidding Firm / Company :									
PRICE SCHEDULE (This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)									
NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER	NUMBER	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	BASIC RATE In Figures To be entered by the Bidder in Rs. P	GST (If applicable in Percentage)	GST Amount in Rs. P	TOTAL AMOUNT excluding GST in Rs. P	TOTAL AMOUNT including GST Rs. P	TOTAL AMOUNT (With GST) In Words
1	2	4	5	7	8	9	11	12	13
1	Design, Engineering, Supply, Erection, Testing and Commissioning of DCS Based Control System and Associated Works" on EPC Mode for the project "Supply, Installation, Commissioning & Testing of FGD system for 500 MW Unit No.6 of Ukai TPS" as per volume-III	1.00	LS		18.00	0.00	0.00	0.00	INR Zero Only
2	ANNUAL MAINTENANCE CONTRACT RATE FOR THREE YEARS AS CALLED FOR IN THE TENDER (Refer Clause 11 of Vol-III) WARRANTY & Annual Maintenance Contract services COST of maintaining DDCMIS for three years of trouble free operation of the FGD plant with DDCMIS availability as specified incl.free repair/replacement of all cards/ modules/ peripherals/components /cables etc., and correction of software problems as per Volume -III of specs incl service provider charges for communication if any.	1.00	LS		18.00	0.00	0.00	0.00	INR Zero Only
Total in Figures							0.00	0.00	INR Zero Only
Quoted Rate in Words		INR Zero Only							