



CENTRAL COALFIELDS LIMITED

A Mini Ratna Company

BID DOCUMENT

FOR

Survey, Planning, Designing, Drawing and Construction of 5 No.s Sewage Treatment Plant (STP) of different capacity based on Sequential Batch Reactor (SBR) Technology and Sewerage system pipeline network from inside individual house hold/ other buildings in the Colony to STP including all civil, mechanical and Electrical work with boundary wall around the plant including Operation and Maintenance for 04 (four) years at Barka Sayal Area on TURN-KEY basis.



CENTRAL COALFIELDS LIMITED

(A Subsidiary of Coal India Ltd.)

Darbhnaga House, Ranchi, Jharkhand - 834001

CONTENT

SL. NO.	DESCRIPTION	PAGE NO.
1.	E-Tender Notice	1-19
2.	Instructions to Bidders	20-29
3.	General Terms and Conditions of Contract	30-56
4.	Additional Terms & Conditions of Contract	57-61
5.	Special Terms and conditions	62-63
6.	General Technical Conditions	64-75
7.	Process Diagram for STP [Sequential Batch Reactor (SBR) Technology]	75
8.	Scope of Works and General/Technical Specifications	76-99
9.	Specifications for Civil/Mechanical/Electrical Works	100-156
10.	Erection Conditions of Contract	157-171
11.	Safety Code	172-176
12.	Technical Specification	177
13.	E-tender Portal User Agreement	178-182
14.	Annexures	183-204



CCL

A miniratna cat-I company

सेंट्रल कोलफील्ड्स लिमिटेड
(कोल इंडिया की अनुषंगी इकाई)
दरभंगा हाउस रांची- 834 029

CENTRAL COALFIELDS LIMITED

(A Subsidiary of Coal India Limited)

CIVIL ENGINEERING DEPARTMENT

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NITसंख्या.: GM(C)/Tender/2022-23/260

दिनांक: 13.07.2022

e-TENDER NOTICE No. 10 of 2022-23

1. Digitally signed and encrypted e-Tenders are invited under Two Parts system on the e-Procurement portal of Coal India Limited (<https://coalindiatenders.nic.in>) from the reputed and experienced contractors for the following work on **Turnkey basis** :

Description of work	Location	Estimated Value (excluding GST) (Updated Cost) [In INR/₹.]	Earnest Money [In INR/₹.]	Period of Completion (in Days)
Survey, Planning, Designing, Drawing and Construction of 5 Nos Sewage Treatment Plant (STP) of different capacity based on Sequential Batch Reactor (SBR) Technology and Sewerage system pipeline network from inside individual house hold/ other buildings in the Colony to STP including all civil, mechanical and Electrical work with boundary wall around the plant including Operation and Maintenance for 04 (four) years at Barka Sayal Area on TURN-KEY basis.	Urimari Project Barka- Sayal Area	14,16,63,847.00	17,70,800.00	Total Contract Period : 1885 (One Thousand eight Hundred eighty five) days a. Construction Period of STP including sewage Network : 365 days b. Trial run and commissioning : 60 days c. Operation and Maintenance Period : 1460 days

Note : - The Operation and Maintenance Period also denotes as Defect Liability Period (DLP) in Tender and/or Contract on Turnkey Basis.

Details of GST Registration of CCL :

GSTIN of CCL	Jharkhand
	20AAACC7476RHZT

Salient Details of Tender :

Goods & Services Tax (GST)	Applicable
Input Tax Credit (ITC) to CCL	Not Available
Price Variation Clause	Applicable
Payment of Wages to Contractor's Labours	As per Minimum Wages Act of Central/State Govt. (higher)
Participation of Joint Venture	Allowed

Note : NIT and Bid documents will be available on the website <https://www.coalindiatenders.nic.in> and can be downloaded by the bidder up to the bid submission end date. The details of the tender will be mirrored on the Central Public Procurement (CPP) Portal of Govt. of India (<https://eprocure.gov.in>)

2. Time Schedule of Tender

SL. No.	Particulars	Date	Time
a.	Tender e-Publication date	15.07.2022	17:00 hours
b.	Document download start date	16.07.2022	10:00 hours
c.	Document download end date	08.08.2022	17:00 hours
d.	Bid Submission start date	23.07.2022	10:00 hours
e.	Bid submission end date	08.08.2022	17:00 hours
f.	Start date for seeking Clarification on-line	16.07.2022	10:00 hours
g.	Last date for seeking Clarification on-line	01.08.2022	17:00 hours
h.	Date of Pre-bid Meeting	20.07.2022	11:30 hours
i.	Technical Bid (Cover I) opening date	09.08.2022	11:00 hours
j.	Price Bid (Cover II) opening date	To be notified later	

3. **Deposit of EMD :**

The bidder will have to make the payment of EMD through ONLINE mode only.

- 3.1** In Online mode the bidder can make payment of EMD either through **NET-BANKING** from designated Bank(s) or through **NEFT/RTGS** from any scheduled Bank(s).

NET-BANKING: In case of payment through net-banking the money will be immediately transferred to CIL/ Subsidiary's designated Account.

NEFT/RTGS: In case of payment through NEFT/RTGS from any scheduled bank(s), the bidder will have to make payment as per the Challan(s) generated by system on e-Procurement portal. The payment of EMD through NEFT/RTGS mode should be made well ahead of time to ensure that the EMD amount is transferred to CIL/ Subsidiary account before submission of bid.

- 3.1.1** The Bidder will be allowed to submit his/her/their bid only when the EMD is successfully received in CIL/ Subsidiary's designated account and the information flows from Bank to e-Procurement system.

- 3.1.2** In online payment of EMD, if the payment is made by the bidder within the last date and time of bid submission but not received by CIL/ Subsidiary within the specified period due to any reason(s) whatsoever then the bid will not be accepted. However, the EMD will be refunded back to the bidder.

- ~~**3.1.3** Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) will be exempt from the payment of earnest money (applicable only for Services tenders).~~

~~In case of exemption of EMD, the scanned copy of document (attested by notary public) in support of exemption will have to be uploaded by the bidder during bid submission. However, this option is to be enabled only in those cases where the exemption of EMD to some bidders is allowed as per NIT.~~

4. **Pre-bid Meeting :**

The pre-bid meeting shall be held in the office of Tender Inviting Authority on the scheduled date & time, if specified online. Non-attendance of pre-bid meeting will not be a cause for disqualification of the bidder and it shall be presumed that the bidder does not require any clarification. **The purpose of Pre-bid meeting is to clarify the issues raised by bidders during the meeting.** In case the Pre-Bid Meeting is held, the Minutes of Pre-Bid Meeting will be uploaded on the e-Procurement Portal. The VC link for joining the Pre-bid meet through VC is <https://call.lifesizecloud.com/15184825>.

5. **Seeking Online Clarification by bidder :**

The bidder may seek clarification online within the specified period. The identity of the Bidder will not be disclosed by the system. The department will clarify as far as possible the relevant queries

of bidders. The clarifications given by department will be visible to all the bidders intending to participate in that tender.

6. Eligibility Criteria:

A. Work Experience:

The Intending tenderer must have in its name as a prime contractor experience of having successfully completed similar Turnkey works during last **07 (Seven) years**, ending last day of month previous to the one in which bid applications are invited (i.e. eligibility period) should be either of the following :

Three similar **completed works** each costing not less than the amount equal to 20% of the estimated cost put to tender.

Or

Two similar **completed works** each costing not less than the amount equal to 25% of the estimated cost put to tender.

Or

One similar **completed work** costing not less than the amount equal to 40% of the estimated cost put to tender.

Definition of Similar Work :

“Construction of Acid Mine Drainage Treatment Plant / Sewerage (Sewage) Treatment Plant (STP) / Domestic Effluent Treatment Plant (DETP) / Effluent Treatment Plant (ETP) / Water Treatment Plant (WTP) on Turnkey Basis

Or

Work Identical in Name & Nature of the Tendered Work executed on Turnkey Basis.”

Experience for those works only shall be considered for evaluation purposes, which match eligibility requirement stipulated above, on or before the last day of month previous to one in which tender has been invited (e-Publication date of NIT i.e. date of publication of NIT on e-Procurement portal, <https://coalindiatenders.nic.in>). The experience of incomplete/ongoing works as on last date of eligibility period will not be considered for evaluation. If the referred work includes construction as well as Operation and maintenance after construction, the experience of such work may be considered as ‘acceptable’ if the construction part is completed as on the last date of ‘eligibility period’, even if operation and maintenance work is ongoing, and the certificate issued clearly stipulates the same .

In all the above cases, while considering the value of completed works, the full value of completed work be considered whether or not the date of commencement is within the said 7(seven) years period.

Cost of previous completed works shall be given a simple weightage of 5% (Five Percent) per year to bring them at current price level, while evaluating the qualification requirement of the bidder. Such weightage shall be considered after end date of completion. Updating will be considered for full or part of the year (total no. of days / 365) i.e. considering 365 days in a year, till the last day of month previous to one in which bid has been invited (e-Publication date of NIT i.e. date of publication of NIT on e-Procurement portal (<https://coalindiatenders.nic.in>)).

In case the bidder is not a prime contractor, but a sub-contractor, the bidder’s experience as sub-contractor will be taken into account, against suitable document that the contract in support of qualification is a sub-contract in compliance with the provision of such sub-contracts in the original contract awarded to prime contractor. The document may be issued by owner/Govt. department on behalf of the owner.

For work experience bidders are required to submit Satisfactory Work Completion Certificate indicating actual value of work done and actual period of execution, issued by the employer against the Experience of similar work containing all the information as sought online. In case of Sub-contractor suitable document as per provision of eligibility, if applicable.

Work order, BOQ and/or TDS may be sought during clarification or along with deficient documents.

Note : 1.Foreign bidders may also participate through Joint Venture (JV), if applicable.

2.The experience towards overseas jobs, if submitted, should be vetted/endorsed by the relevant* Embassy/High Commission concerned, towards authenticity of document. (Relevant Embassy/High Commission means the Embassy/High Commission in INDIA of the Country where the bidder has executed the said work or Country of origin of the bidder)

[Joint Venture (JV) shall not be allowed to participate in the tender with estimated cost upto Rs.5.00 Crores.]

The above qualification criteria shall be fulfilled by Joint Venture in the following manner :

The qualifying criteria parameter e.g. experience of the individual partners of the J.V will be as deliberated hereinafter towards fulfillment of qualification criteria related to experience.

- a. In case of completion of single work of similar nature costing, not less than the amount equal to 40% of the estimated cost put to tender :

Any of the JV partner shall have the experience of having completed successfully a single work of similar nature equal to 40% of the estimated cost put to tender.

Or

- b. In case of completion of two works of similar nature each costing not less than the amount equal to 25%of the estimated cost put to tender :

i) Any one partner can match the above requirement.

Or

ii) At least two partners should each have completed at least one work of similar nature each costing not less than the amount equal to 25% of the estimated cost put to tender.

Or

- c. In case of completion of three works of similar nature, each costing not less than the amount equal 20% of the estimated cost put to tender:-

i) Any one partner can match the above requirement.

Or

ii) Any two partners shall match the above requirement through completion of at least one work of similar nature each costing not less than the amount equal 20% of the estimated cost put to tender:

Or

iii) All the three partners shall match the above requirement through completion of at least one work of similar nature each costing not less than the amount equal 20% of the estimated cost put to tender.

The above qualification criteria shall be met collectively by JV partners or JV itself.

The qualifying criteria parameter e.g. experience of the individual partners of the JV will be added together towards fulfilment of qualification criteria related to experience.

However, the participating share of JV Partners shall be as below;

i) Lead Partner shall have at least 50% participating share in JV.

ii) Other partner(s) shall have at least 20% participating share in JV

In respect of the above eligibility criteria the bidders are required to furnish the following information **IN THE EVALUATION SHEET:**

i) Name of work for each experience

ii) Work order Number /Agreement Number of each experience

iii) Name & address of Employer/Work Order Issuing authority of each experience

iv) Percentage (%) share of each experience (in case the experience has been earned by the bidder as a partner in a joint venture firm/partnership firm then the proportionate value of experience

in proportion to actual share of bidder in that joint venture firm/ partnership firm will be considered against eligibility else it shall be taken as 100%).

- v) Executed Value of work against each experience
- vi) Start date & end date of each experience

Note : 1. In case the bidder is a Joint Venture, work experience of any of the partners of JV may be furnished as the work experience of the bidder.
2. If a bidder participates as a Joint Venture (JV), the benefits as per Public Procurement Policy for MSEs order-2012 shall not be applicable for them.

B. Financial Turnover :

Average annual financial turnover during the last 3(three) years, ending 31st March of the previous financial year should be at least 30% of the estimated cost put to tender.

(The "Previous financial year" shall be computed with respect to the e-Publication date of NIT)

The intending bidders must submit the Financial Turnover certificate having a **Unique Document Identification Number (UDIN)** issued by a Practicing Chartered Accountant having a membership number with Institute of Chartered Accountants of India, containing the information as furnished by bidder online.

The foreign bidders should submit Financial Turnover certificate based on IFRS (International Financial Reporting Standards) accounting standard certified by a local practicing public accountant/audit firm duly vetted/endorsed by the relevant* Embassy/ High Commission concerned, towards authenticity of document. (*.Relevant Embassy/High Commission means the Embassy/High Commission in INDIA of the Country where the bidder has obtained Turnover certificate or Country of origin of the bidder)

The qualifying criteria parameter e.g. financial resources (Turnover) of the individual partners of the J.V. will be added together, for the relevant financial year, and the total should not be less than as spelt out above.

Financial turnover shall be given a simple weightage of 5% (Five Percent) per year to bring them at current price level, while evaluating the qualification requirement of the bidder. Such weightage shall be considered from the end date of financial year. Updating will be considered for full or part of the year(total no. of days / 365) i.e. considering 365 days in a year, till the last day of month previous to one in which bid has been invited (e-Publication date of NIT i.e. date of publication of NIT on e-Procurement portal, <https://coalindiarenders.nic.in>).

In respect of the above eligibility criteria the bidders are required to furnish the following information **IN THE EVALUATION SHEET:**

- i) Annual turnover of each of the last 3 years ending 31st March of the previous financial year.
- ii) Name of the Chartered Accountant issuing the Profit and Loss A/c or the Turnover certificate.
- iii) Membership Number of the CA
- iv) Date of issue of financial Turnover certificate

Note :

- a) In case the bidder is a Joint Venture, the turnover of the individual partners of the JV will be added together for each financial year and is to be furnished as the turnover of the bidder for that particular financial year.
- b) In case of JV, if financial turnover of all the partners is not submitted the system will not disqualify the JV and instead shall consider assuming a value of zero for partner/partners who has/have not submitted the financial turnover certificate.
- c) If the bidder does not submit turnover value and certificate for any year out of the three years, system will not disqualify him and instead shall consider all three years for computing the average by assuming a value of "zero" for the year(s) for which no information is given by the bidder.

Scanned copy of documents to be uploaded by bidders (Cover I – confirmatory document):

Financial Turnover certificate having a Unique Document Identification Number (UDIN) with Institute of Chartered Accountants of India.

C. Working Capital :

The Bidder must submit the Certificate of possessing adequate Working Capital (at least 20% of the "Annualized value or Estimated value whichever is less" of this work) inclusive of access to lines of credit and availability of other financial resources to meet the requirement, issued by a Practicing Chartered Accountant having a Membership Number with Institute of Chartered Accountants of India. Such Certificate should contain the Unique Document Identification Number (UDIN). The bidder should possess the Working Capital within three months prior to the date of opening of tender.

In case, access to lines of credit constitutes the availability of Working Capital, Banker's Certificate (Scheduled Commercial Bank) shall also be submitted regarding availability of access to credit (issued within three months prior to the date of opening of tender) to meet the above eligibility criteria.

For foreign Partner(s), Banker's Certificate regarding availability of access to credit (issued within three months prior to the date of opening of tender) should be duly vetted/endorsed by the relevant Embassy/High Commission concerned, towards authenticity of document.

(Relevant Embassy/High Commission means the Embassy/High Commission in India of the Country where the bidder has obtained Banker's Certificate or Country of origin of the bidder).

The qualifying criteria parameter e.g. working capital of the individual partners of the J.V. will be added together, and the total should not be less than as spelt out above. The bidder must produce the evidence of adequacy of a minimum working capital, 20% of the estimated cost of the work.

In respect of the above eligibility criteria the bidders are required to furnish the following information on-line :

Confirmation in the form of YES/NO regarding possessing of Banker's Certificate regarding availability of access to credit (within 3 months prior to the end date of submission of Bid) for a minimum working capital of 20% of the estimated cost of the work.

Note :

- a) In case the bidder is a Joint Venture, the Working Capital of the individual partners of the JV will be added together and is to be furnished as the Working Capital of the bidder.
- b) In case of tender of more than one-year period of construction of plant including trial run and performance guarantee test, the annualised value to be worked out as under:

$$\text{Annualised value} = \frac{\text{Estimated cost of the work (including GST) put to tender. X 365 days}}{\text{Period of construction of plant including trial run and performance guarantee test in days.}}$$

In case of JV, the requirement of Working Capital under this clause shall be met as per following proportion:

- a. The lead member shall have to possess at least 50% share in the required Working Capital in order to qualify in this tender.
- b. All other members shall have to possess at least 25% share in the required Working Capital, in order to qualify in this tender.

Scanned copy of documents to be uploaded by bidders (CONFIRMATORY DOCUMENT):

Certificate of Working Capital with UDIN by a Practicing Chartered Accountant having a membership number with Institute of Chartered Accountants of India containing the information as furnished by bidder online.

D. Permanent Account Number:

The bidder should possess a Permanent Account Number (PAN) issued by Income Tax Department, Govt. of India.

In respect of the above eligibility criteria the bidders are required to furnish the following information on line:

- i. Confirmation in the form of YES/NO regarding possessing PAN

Note : In case of Joint Venture (JV), each INDIAN Partner of JV should possess PAN Card issued by Income Tax Department, Govt. of India and each FOREIGN Partner of JV should possess Verifiable Tax Residency Certificate of respective Country OR JV itself should possess PAN card issued by Income Tax Department, Govt. of India.

[In case the work is awarded to JV, the PAN, in the name of JV, is to be submitted before execution of Agreement]

Scanned copy of documents to be uploaded by bidders (BIDDER SPACE/ MY DOCUMENT/ Other Important Document (OID): PAN CARD of the bidder

E. Goods & Services Tax (GST) Registration :

The bidder should be either GST Registered Bidder under regular scheme

OR

GST Registered Bidder under composition scheme

OR

GST unregistered Bidder

In respect of the above eligibility criteria the bidders are required to furnish the following information on-line:

- i. Confirmation in the form of YES/NO regarding possessing of GST Registration Certificate (with GSTIN)
- ii. Scanned copy of documents to be uploaded by bidders (BIDDER SPACE/ MY DOCUMENT/ Other Important Document (OID): GST Registration of the bidder

Note:

- i). In case of JV a Certificate from a practicing Chartered Accountant having membership number with Institute of Chartered Accountants of India confirming the status of JV w.r.to GST in compliance with relevant GST rules or GST Registration Certificate of JV.
- ii). In case the work/service is awarded to a Joint Venture participating in the tender they have to submit PAN, GST registration (as applicable in the tender and for the bidder status) etc. in the name of the Joint Venture after Award of Work/Service before the payment of first running on account bill.
- iii) If turnover of bidder exceeds exemption/threshold limit, the bidder must have GST registration as per GST Act and rules.
- iv) During the execution of the contract if the GST status of the bidder changes, then the payment of GST, if any, to the contractor will be made as per the GST status declared by the bidder during tender stage based on which cost to company has been ascertained or at actuals, whichever is lower

F. Purchase Preference under 'Make in India' Policy for "Local supplier".

Preference to Make in India (as applicable) vide Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020, issued by Govt. of India as amended from time to time shall be applicable.

In terms of the above said policy, purchase preference shall be given to Class-I local supplier. In terms with the above said policy, Class-I local suppliers and Class-II local suppliers shall be eligible to bid.

The definitions of Class-I *Local Supplier*, Class-II local supplier, Non-Local supplier, *Local Content* and Margin of Purchase Preference as per above mentioned Order are as follows:-

- A. 'Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under said order.
- B. 'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under said order.
- C. 'Non-Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than or equal to 20% as defined under said order
- D. '*Local Content*' means the amount of value added in India which shall be 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.
- E. 'Margin of Purchase Preference' means the maximum extent to which the price quoted by a Class-I local supplier may be above the L1 for the purpose of purchase preference. The margin of purchase preference is 20%.

In respect of the above eligibility criteria the bidder is required to furnish the following information online:

- i) Confirmation in the form of Yes/No regarding possessing of required document indicating percentage of local content as enlisted in NIT.

Note:-

- I. If the estimated value of Procurement is less than Rs. 10 crores, all the Bidders at the time of bidding shall submit either self-certification indicating the percentage of local content in the offered items.
- II. If the estimated value of procurement is more than Rs. 10 crores, all the Bidders shall submit along with its bid a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered account (in respect of suppliers other than companies) giving the percentage of local content.

Scanned copy of documents to be uploaded by bidder(s) in support of information / declaration furnished online by the bidder against Eligibility Criteria as Confirmatory Document.

7. CONFIRMATORY DOCUMENTS :

a) **General Technical Evaluation (GTE) and Bidder's space/ My Document:**

The bidders have to accept unconditionally in GTE (General Technical Evaluation) **the Annexure I** (Letter of Bid), Annexure IX (Integrity Pact), If applicable and Undertaking at **Annexure II** regarding Genuineness of the information furnished by him on-line & authenticity of the scanned copy of documents uploaded by him on-line in support of his eligibility criteria, declaration w.r.t Make in India order dated 16.09.2020 etc. No recycling will be done for this document i.e. no further clarification will be sought from bidder.

Moreover, the following documents shall be considered from the Bidder's space/ My Document and no recycling will be done for these documents i.e. no further clarification will be sought from bidder –

Sl. No.	Eligibility Criteria	Scanned copy of document(s) uploaded by bidder in Bidder's space/ My Document
1	2	3
1.	Permanent Account Number (Ref. Clause No.8(A) of NIT)	PAN card issued by Income Tax department, Govt. of India. In case of JV, PAN card for each Indian partner of JV and Verifiable Tax Residency Certificate of respective country for each foreign partner or JV itself.
2.	Goods and Services Tax (GST) Status of Bidder (Not Applicable for Exempted)	The following documents depending upon the status w.r.to GST as declared by Bidder in the BOQ sheet: a) Status: GST Registered Bidder under regular scheme Document: GST Registration Certificate (i.e. GST identification Number) issued by appropriate authority of India.

	Services) (Ref. Clause No.8(B) of NIT and BOQ)	<p>b) Status: <u>GST Registered Bidder under composition scheme</u> Document: GST Registration Certificate (i.e. GST identification Number) issued by appropriate authority of India.</p> <p>c) Status: <u>GST unregistered bidder:</u> Document: A Certificate with UDIN from a practicing Chartered Accountant having membership number with Institute of Chartered Accountants of India certifying that the bidder is GST unregistered bidder in compliance with the relevant GST rules of India.</p> <p><i>In case of JV a Certificate from a practicing Chartered Accountant having membership number with Institute of Chartered Accountants of India confirming the status of JV w.r.to GST in compliance with relevant GST rules or GST Registration Certificate of JV.</i></p>
3.	Legal Status of the bidder	<p><u>Document(s) covered under any one of the following sub-head(s):</u></p> <p>i. Affidavit or any other document to prove Proprietorship/Individual status of the bidder.</p> <p>ii. Partnership deed containing name of partners</p> <p>iii. Memorandum & Article of Association with certificate of incorporation containing name of bidder.</p> <p>Note : In case of JV :</p> <p>a. Details of all partners as at (i), (ii) & (iii) above (as applicable)</p> <p>b. JV agreement as per NIT Format (Annexure-VIII) containing name of partners and lead partner, Power of Attorney to the Lead Partner and share of each partner.</p> <p>c. Power of Attorney to the Lead Partner.</p> <p>d. Special Note: The bidder has to upload the JV documents as per the format of Annexure -VIII pertaining to subject tender with reference to NIT No. and Tender ID.</p>

b) All the bidders have to submit the information in objective manner confirmed by the uploaded documents. The documents related to the information furnished online by bidder, based on which the auto evaluation takes place, will only be considered. If the bidder uploads any other document, it will be given no cognizance .

The scanned copy of following documents (valid on the end date of bid submission) will be uploaded by the bidder while submitting bid online :

PART-I (Cover-I)

Sl. No.	Submission of Documents related to Eligibility Criteria	Scanned copy of documents (valid on the end date of bid submission) to be uploaded by bidder in support of information/ declaration furnished online by the bidder against Eligibility Criteria (CONFIRMATORY DOCUMENT)
1	2	3
1.	Work Experience [Ref.Cl.No.6(A) of e-Tender Notice]	<p>a). Satisfactory Work Completion Certificate indicating actual value of work done and actual period of execution, issued by the employer against the Experience of similar work, containing all the information as furnished IN THE EVALUATION SHEET.</p> <p>b). In case of sub-contractor, suitable document as per provision of e-Tender Notice.</p> <p>c). Copy of Work Order/TDS Certificate/Bill of Quantity (only when clarification is sought)</p> <p>Note : <i>The experience towards overseas jobs, if submitted, should be vetted/endorsed by the relevant* Embassy/High Commission concerned, towards authenticity of document. (Relevant Embassy/High Commission means the Embassy/High Commission in INDIA of the Country where the bidder has executed the said work or Country of origin of the bidder)</i></p>

2.	Financial Turnover [Ref.Cl.No.6(B) of e-Tender Notice]	<p>Financial Turnover certificate having a Unique Document Identification Number (UDIN) for last 3 (three) financial years, issued by a Practicing Chartered Accountant having a membership number with Institute of Chartered Accountants of India, containing the information as furnished by bidder IN THE EVALUATION SHEET.</p> <p><i>Note : In case of foreign bidders : Financial Turnover certificate for last 3 (three) financial years, based on IFRS (International Financial Reporting Standards) accounting standard certified by a local practicing public accountant/audit firm duly vetted/endorsed by the relevant* Embassy/ High Commission concerned, towards authenticity of document. (*.Relevant Embassy/High Commission means the Embassy/High Commission in INDIA of the Country where the bidder has obtained Turnover certificate or Country of origin of the bidder)</i></p>
3.	Working Capital [Ref.Cl.No.6(C) of e-Tender Notice]	<p>Certificate of possessing adequate working capital at least 20% of the “Annualized Value or Estimated Value whichever is less” of this work inclusive of access to lines of credit and availability of other financial resources, issued by a Practicing Chartered Accountant having a Membership Number with Institute of Chartered Accountants of India, containing the Unique Document Identification Number (UDIN), issued within 3 (Three) months prior to date of Opening of Tender.</p> <p>In case, access to lines of credit constitute the availability of Working Capital, Banker’s Certificate (Scheduled Commercial Bank) regarding availability of access to credit [issued within 3 (Three) months prior to date of Opening of Tender].</p> <p>For foreign Partner(s), Banker’s Certificate regarding availability of access to credit [issued within 3 (Three) months prior to the date of opening of tender, duly vetted/endorsed by the relevant Embassy/High Commission concerned, towards authenticity of document. Relevant Embassy/High Commission means the Embassy/High Commission in India of the Country where the bidder has obtained Banker’s certificate or country of origin of the bidder].</p> <p>In case the bidder is a Joint Venture (JV), the requirement of Working Capital under this clause shall be met as per 13 following proportion;</p> <p>i) The Lead Member shall have to possess at least 50% share in the required Working Capital in order to qualify in this tender (i.e., 50% of 20% of Annualised Value or Estimated Value put to tender, whichever is less).</p> <p>ii) All other members shall have to possess at least 25% share in the required Working Capital, in order to qualify in this tender (i.e., 25% of 20% of Annualised Value or Estimated Value put to tender, whichever is less)</p>
4.	Authorization for Digital Signature Certificate [Ref.Cl.No.8(b) of e-Tender Notice]	<p>a). If the bidder himself is the DSC holder bidding on-line then self declaration of the bidder to this effect.</p> <p style="text-align: center;">OR</p> <p>b). if the DSC holder is bidding online on behalf of the bidder then the Power of Attorney or any sort of legally acceptable document for authorization to submit bid on behalf of the bidder.</p>
5.	Undertaking at Annexure X	<p>Undertaking regarding relatives as employees of company, Registration with CMPF /EPF authorities, Banning/ Delisting of Bidder, Arbitration clause (in case of partnership/Joint Venture firm), Local supplier status of the Bidder as per clause 6F of NIT etc as per the format given in the bid document at Annexure X.</p>

	<p>Note: If the estimated value of procurement is more than Rs. 10 crores, all the Bidders shall submit along with its bid a certificate (with UDIN) from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.</p>
<p>Note: Only one file in .pdf format can be uploaded against each eligibility criteria. Any additional/ other relevant documents to support the information/declaration furnished by bidder online against eligibility criteria may also be attached by the bidder in the same file to be uploaded against respective eligibility criteria.</p>	

8. Submission of Bid:

All the bids are to be submitted online and on the website <https://coalindiatenders.nic.in>. No bid shall be accepted offline.

a. The bidder should strictly comply with following instructions :

- i) The bidders are required to submit offers online in Two Parts in the links Cover-I and Cover-II.
- ii) Two Parts of the bid should contain the details as follows:

Part-I/Cover-I :

- Authorization for DSC
- Undertaking at Annexure X
- Documents related to Eligibility Criteria as detailed at Clause No.6 & 7
- **EVALUATION SHEET**

Part II/Cover-II : Prices only in the Excel format as indicated in the Bid document.

b). In order to submit the Bid, the bidders have to get themselves registered online on the e-Procurement portal of CIL/Subsidiary (**<https://coalindiatenders.nic.in>**) with valid Digital Signature Certificate (DSC) issued from any agency authorized by Controller of Certifying Authority (CCA), Govt. of India and which can be traced up to the chain of trust to the Root Certificate of CCA. The online Registration of the Bidders on the portal will be free of cost and one time activity only. The registration should be in the name of bidder, whereas DSC holder may be either bidder himself or his duly authorized person. The bidder is one whose name will appear as bidder in the e-Procurement Portal.

c). The bidders have to accept the on-line user portal agreement which contains the acceptance of all the Terms and Conditions of NIT and Bid document, undertakings and the e-Tendering system through eProcurement Portal of CIL (<https://coalindiatenders.nic.in>) in order to become an eligible bidder. This will be a part of the agreement.

d). **Letter of Bid :**

The format of Letter of Bid is given at Annexure I of Tender document. This will be the covering letter of the bidder for his submitted bid. The bidders have to accept unconditionally the Letter of Bid in GTE (General Technical Evaluation) at the time of bid submission. No recycling will be done for this document i.e. no further clarification will be sought from bidder(s).

e). **Confirmatory Documents :**

All the confirmatory documents (valid on the end date of bid submission) as enlisted in the e-Tender Notice (Clause No.7) in support of online information furnished by the bidder are to be uploaded in Cover-I by the bidder while submitting the bid online.

f). **EVALUATION SHEET:**

Evaluation Sheet will be in MS-Excel format and will be downloaded by the bidder. The bidder will fill-up all the cells of MS-Excel sheet as per instruction given therein. Thereafter bidder will upload the same Excel file in Cover-II during online bid submission. Any alteration/modification in the file may lead to rejection of bid.

g). Price Bid (Part-II/Cover-II) :

The Price bid containing the Bill of Quantity will be in .xls format (password protected) and will be uploaded during tender creation. This will be downloaded by the bidder and he will quote the rates for all items on this Excel file. Thereafter, the bidder will upload the same Excel file during bid submission in Cover-II. The Price-bid will be in Item Rate or Percentage Rate BOQ format and the bidder will have to quote for all the tendered items and the L-1 will be decided on overall quoted value (i.e. Cost to Company). The Price-bids of the tenderers will have no condition. The Price Bid which is incomplete and not submitted as per instruction given above will be rejected. Any alteration/modification in the Excel format may lead to rejection of bid.

The rates to be quoted by bidder shall be in INDIAN RUPEE only.

The item wise rate quoted by bidder shall be inclusive of all taxes, duties & levies but excluding GST & GST (Compensation to State) Cess, if applicable.

The system will compute the amount of GST and GST (Compensation to State) Cess, as per predefined logic in the BOQ sheet.

The Price bid file will be digitally signed and uploaded by the bidder in Part-II/Cover-II.

Decision about L-1 :

The L-1 will be decided based on "COST TO COMPANY" in the following manner :

(i). If Input Tax Credit is Available :

COST TO COMPANY = Quoted Price of Bidder excluding GST and GST (Compensation to State) Cess.

(ii). If Input Tax Credit is Not Available :

COST TO COMPANY = Quoted Price of Bidder excluding GST and GST (Compensation to State) Cess (+) Amount of GST (+) GST (Compensation to State) Cess.

The payment of GST and GST (Compensation to State) Cess by service availer (i.e. CCL) to contractor/supplier would be made only on the latter submitting a Bill/invoice in accordance with the provision of relevant GST Act and the rules made thereunder and after online filing of valid return on GST portal. Payment of GST & GST (Compensation to State) Cess is responsibility of the contractor/supplier.

Input tax credit is to be availed by CCL as per rule.

If CCL fails to claim Input Tax Credit(ITC) on eligible Inputs, input services and Capital Goods or the ITC claimed is disallowed due to failure on the part of contractor/supplier of goods and services in incorporating the tax invoice issued to CCL in its relevant returns under GST, payment of CGST & SGST or IGST, GST (Compensation to State) Cess shown in tax invoice to the tax authorities, issue of proper tax invoice or any other reason whatsoever, the applicable taxes & cess paid based on such Tax invoice shall be recovered from the current bills or any other dues of the contractor/supplier along with interest, if any.

9. System Requirement to access the e-Tender Portal :

It is the bidder's responsibility to comply with the system requirement i.e. hardware, software and internet connectivity at bidder's premises to access the e-tender portal. Under no circumstances, CIL/Subsidiary shall be liable to the bidders for any direct/indirect loss or damage incurred by them arising out of incorrect use of the e-tender system or internet connectivity failures.

10. Extension of Time Schedule of Tender :

If number of bids received online is found to be less than 03(three) on end date of bid submission then the following critical dates of the Tender will be automatically extended for a period of 04 (four) days ending at 17.00 hrs.

- Last date of submission of Bid.
- Last date of receipt of EMD.
- Date of Opening of Tender.

If any of the above extended Dates falls on Holiday i.e. a non-working day as defined in the e-Procurement Portal then the same is to be rescheduled to the next working day.

This extension will be also applicable in case of receipt of zero bid.

Notes:

1. The validity period of tender should be decided based on the final end date of submission of bids.
2. The auto extension shall work on the basis of number of bids received only. It may so happen that any of these bids may be eventually rejected during Tender Opening, Technical evaluation or further process of evaluation resulting the total number of valid bids becoming less than 03(three).
3. After extension, the tender shall be opened irrespective of available number of bids on the extended date of opening of tender.

11. Opening of Technical Bid:

- 11.1 The Technical bid (Cover-I) will be opened one day after the Bid submission end date or next working day whichever is later. Technical bid (Cover-I) will be decrypted and opened online by the "Bid Openers" with their Digital Signature Certificates after the prescheduled date & time of Tender Opening.
- 11.2 The e-Procurement System will evaluate the Technical bids automatically on the basis of relevant data provided by bidder through a form in an objective and structured manner while submitting bid. If the parameter given by bidder in objective and structured manner does not confirm to required eligibility criteria as specified in the tender document then the bid will be auto rejected.
- 11.3 All the documents uploaded by bidder(s) including i.e. EMD exemption documents (if any) and the Evaluation sheets generated by the system online shall be downloaded after opening of Technical bid (Cover-I). After decryption and opening of Technical bid (Cover-I) the "technical bid opening summary" will be uploaded on the same day.

12. Technical Evaluation of Tender:

- A. After opening of Technical bid, the documents submitted by bidder(s) in cover I as enlisted in the NIT will be downloaded by the Evaluator and shall be put up to the Tender Committee. The Tender Committee will examine the uploaded documents against information/declarations furnished by the bidder(s) online. If it confirms to all of the information/ declarations furnished by the bidder online and does not change the eligibility status of the bidder then the bidder will be considered eligible for opening of price bid.
- B. In case the Tender Committee finds that there is some deficiency in uploaded documents corresponding to the information furnished online or in case corresponding document have not been uploaded by bidder(s) then the same will be specified online by Evaluator clearly indicating the omissions/shortcomings in the uploaded documents and indicating start date and end date allowing 7 days (7 x 24 hours) time for online re-submission by bidder(s). The bidder(s) will get this information on their personalized dashboard under "Upload confirmatory document" link. Additionally, information shall also be sent by system generated email and SMS, but it will be the bidder's responsibility to check the updated status/information on their personalized dash board regularly after opening of bid. No separate communication will be required in this regard. Non-receipt of e- mail and SMS will not be accepted as a reason of non-submission of documents within prescribed time. The bidder(s) will upload the scanned copy of all those specified documents in support of the information/ declarations furnished by them online within the specified period of 7 days. No further clarification shall be sought from Bidder.
- C. It is responsibility of Bidders to upload legible/clearly readable scanned copy of all the required documents as mentioned above.
- D. The tender will be evaluated on the basis of documents uploaded by bidder(s) online. The bidder(s) is/are not required to submit hard copy of any document through offline mode. Any document submitted offline will not be given any cognizance in the evaluation of tender.
- E. In case the bidder(s) submit(s) requisite documents online as per NIT, then the bidder(s) will be considered eligible for opening of Price Bid.

- F.** Seeking clarification shall be restricted to confirmation of submitted document/online information only and it should be only for one time for a period of upto 7 days. The clarification shall be taken in online mode in the e- Procurement portal of CIL only.
- G.** In case bidder(s) fails to confirm the online submitted information(s)/ declaration(s) by the submitted documents as (B) above, their/his bid shall be rejected; however, if the confirmatory documents do not change eligibility status of the bidder in connection his submitted online information(s)/declaration(s), then his/their bid will be accepted for opening of Price Bid.
- H.** After Technical evaluation of tender, “Technical Evaluation Summary” will be uploaded by the evaluator and price bid shall be opened on/after preschedule date and time mentioned in the NIT online in the e- Procurement portal of CIL. However, in case there is any extension of date and time of price bid opening, it shall be notified online and price bid shall be opened online on e-Procurement portal of CIL after rescheduled date and time.
- I.** In case none of the bidder(s) complies the technical eligibility criteria as per NIT, then bidder(s) will be rejected online and re-tender (if required) will be done (with the same or different quantity, as per the instant requirement).
- J.** **If L1 bidder backs out (i.e. Techno commercially established L1 bidder), the EMD will be forfeited and the bidder will be debarred for minimum one (1) year from participating in tenders in CIL/ Subsidiary.**

Note: In case If the defaulter L1 bidder is a Joint Venture (JV) firm, penal action against the JV will also be applicable to all the partners of JV.

- K.** **Preference to Make in India (as applicable) vide Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020, issued by Govt. of India as amended from time to time shall be applicable.**

In terms of the above said policy, purchase preference shall be given to local suppliers in the following manner :

- I.** In the procurement of works which are divisible in nature, the following procedure shall be followed :-
- i) Among all qualified bids, the lowest bid will be termed as L-1. If L-1 is from a Class-I local supplier, the contract for full quantity will be awarded to L-1 at L-1 price by the Purchaser.
 - ii) If L-1 is not a Class-I local supplier, 50% of the order quantity shall be awarded to L-1. Thereafter, the lowest bidder among the Class-I local suppliers will be invited to match the L-1 price for the remaining 50% quantity subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract for that quantity shall be awarded to such local supplier subject to his matching the L-1 price. In case such lowest eligible Class-I supplier fails to match the L-1 price or accept less than the offer quantity, the next higher Class-I local supplier within the margin of purchase preference shall be invited to match the L-1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local supplier, then such balance quantity may also be ordered on L-1 bidder.
- II.** In the procurement of works which are not divisible, and in procurement of services where the bid is evaluated on price alone, the following procedure shall be followed:-
- i) Among all qualified bids, the lowest bid will be termed as L-1. If L-1 is from a Class-I local supplier, the contract will be awarded to L-1.
 - ii) If L-1 is not from a Class-I local supplier, the lowest bidder among the Class-I local suppliers, will be invited to match the L-1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such Class-I local supplier subject to matching the L-1 price.
 - iii) In case such lowest eligible Class-I local supplier fails to match the L-1 price, the Class-I local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L-1 price and so on and contract shall be awarded accordingly. In case none of the Class-I local suppliers within the margin of purchase preference matches the L-1 price, then the contract may be awarded to the L-1 bidder.

Note: The confirmation from the bidder regarding matching of L1 price may be taken in confirmatory document link of e-Procurement portal by recycling 'Any other document' link.

Verification of local content :

- I.** If the estimated value of Procurement is less than Rs. 10 crores, all the Bidders at the time of bidding shall submit either self-certification indicating the percentage of local content in the offered items.

- II. If the estimated value of procurement is more than Rs. 10 crores, all the Bidders shall submit along with its bid a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered account (in respect of suppliers other than companies) giving the percentage of local content.
- III. CIL/ Subsidiary may constitute committees with internal and external experts for independent verification of auditor's / accountant's certificates on random basis and in the case of complaints.
- IV. False declarations will attract banning of business of the bidder for a period up to two year and with process in line with clause 19 of GTC.
- V. A local supplier who has been debarred by any procuring entity for violation of above order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities.

13. Bid Validity:

The Bid Validity Period will be **180 (one hundred eighty) days** from the end date of bid submission. The validity period of tender shall be decided based on the final end date of submission of bids, after extension, if any.

14. Modification and Withdrawal of Bid:

Modification of the submitted bid shall be allowed on-line only before the deadline of submission of tender and the bidder may modify and resubmit the bid on-line as many times as he may wish. Bidders may withdraw their bids online within the end date of bid submission and their EMD will be refunded. However, if the bidder once withdraws his bid, he will not be able to resubmit the bid in that particular tender. For withdrawal of bid after the end date of bid submission, the bidder will have to make a request in writing to the Tender Inviting Authority. Withdrawal of bid may be allowed till issue of work order/LOA with the following provision of penal action:

- a. If the request of withdrawal is received before online notification for opening of price bid, the EMD will be forfeited and bidder will be debarred for 1 (one) year from participating in tenders in CIL/Subsidiary. The Price-bid of remaining bidders will be opened and the tender process shall go on.
- b. If the request of withdrawal is received after online notification for opening of price bid, the EMD will be forfeited and the bidder will be debarred for minimum 1 (one) year from participating in tenders in CIL/Subsidiary. The Price-bid of all eligible bidders including this bidder will be opened and action will follow as under:
 - i. If the bidder withdrawing his bid is other than L 1, the tender process shall go on.
 - ii. If the bidder withdrawing his bid is L-1, then re-tender will be done.

Note :

- i. In case of clause (a) & (b) above, a letter will be issued to the bidder by Tender Inviting Authority with the approval of Tender Accepting Authority (When TAA is CMD then with the approval of concerned Director and in case the TAA is above CMD (i.e. FDs/Empowered Committee/Board) then with the approval of CMD. In case TAA is below CMD, then approval of respective TAA is required), stating that the EMD of bidder is forfeited, and this bidder is debarred for 1 (one) year (in case of clause-a) OR minimum one (1) year (in case of clause-b) from participating in tenders in CIL/Subsidiary. This letter will be circulated to all Areas of the Subsidiary and the updated list will be maintained by all Tender Inviting Authority/Evaluators.
- ii. Penal action against clause (a) & (b) above will be enforced from the date of issue of such order. The standard operating procedure to handle withdrawal of bid after end date of submission shall be as Clause no 14 of Chapter I.

15. Standard Operating Procedure for Withdrawal of Bid:

I. The Mode of withdrawal: -

A. Online Withdrawal of Bids:

- a. The system of online withdrawal is available on the portal up to end date of bid submission, where any bidder can withdraw his/her bid which will attract no penal action from department side.
- b. The system of online withdrawal beyond end date of bid submission and till award of contract is also available but not fully functional and under development stage. Once it is developed and

implemented only online withdrawal shall be considered except for some exceptional cases as mentioned in clause below.

B. Offline Withdrawal of Bids :

- a. A partner of bidder (in case of JV and partnership firms) whose DSC is registered on the e-Procurement portal can access the portal for online withdrawal but when there is a split in the business relationship, the partners whose DSC is not registered on the portal do not have the option of online withdrawal of bid. Hence such partners may opt to use offline method of withdrawal of his/her offer (or express his disassociation from the bidder organization).
- b. Till a fully functional system of online withdrawal of bid (beyond end date of bid submission and till award of contract) is not developed and implemented, offline withdrawal shall also be considered.

II. Acceptance of withdrawal by Tender Committee:

- A.** Every case of withdrawal under Clause I-(A) (b) and Clause I-(B) shall be put up to Tender Committee for deliberation and further course of action.
- B.** The Tender Committee shall apply its due diligence to decide:
 - a. Whether the request for withdrawal of offer has been received from right source and authentic. For this purpose a letter is to be sent by registered post/speed post to the bidder on the address as given by him in the enrollment page of e-Procurement portal, allowing 10 days' time to confirm the withdrawal. If the bidder does not confirm the withdrawal within the stipulated period then it should be construed that there is no withdrawal of bid. In case the withdrawal/disassociation from the firm (Joint Venture or Partnership firm) has been submitted by any other partner then also the confirmation has to be sought from the bidder and if bidder wants to deny the withdrawal/disassociation from the JV or the partnership firm then the bidder shall be required to furnish a legally acceptable document signed by all the partners of the firm to substantiate his claim.
 - b. Whether the withdrawal is due to the reason other than to support any mala fide intention of any participating bidder such as participating or supporting a cartel formation etc.
 - c. If the mala fide intentions in the withdrawal are apprehended then the tender should be cancelled apart from other penal action as per e-Procurement Manual for works and services of CIL and other guidelines/manuals of CIL.
 - d. If no mala fide intentions in the withdrawal are apprehended then the penal action in line with the prescriptions of the e-Procurement Manual for works and services of CIL will be applicable.
 - e. The Tender Committee may also obtain the opinion of legal department in order to ascertain the legal course of action in case of Clause II-(B)(b) and II-(B)(c) above.

15. Tender Status:

It will be the bidder's responsibility to check the status of their Bid online regularly, after the opening of bid till award of contract. Additionally, information shall also be sent by system generated e-mail and SMS at nodal points (Date of bid opening, Requisition for Clarification on Confirmatory document from L-1 bidder, award of work etc.). No separate communication will be required in this regard. Non-receipt of e-mail and SMS will not be accepted as a reason of non-submission of Confirmatory documents within prescribed time. The Tender Status will be in public domain and anyone visiting the site can view it by identifying the tender.

16. Refund of EMD to Unsuccessful Bidders :

- a. If EMD is paid by the bidder in online mode (Direct Debit/NEFT/RTGS) then the EMD of rejected bidders will be refunded at any stage directly to the Bank Account from where it had been received (except the cases where EMD is to be forfeited).
- b. No claim from the bidders will be entertained for non-receipt of the refund in any Account other than the one from where the money is received.
- c. If the refund of EMD is not received by the bidder in the account from which the EMD has been made due to any technical reason then it will be paid through conventional system of e-payment. For this purpose, if required, Tender Inviting Authority will obtain the Mandate Form from the Bidder.
- d. In case the tender is cancelled then EMD of all the participating bidders will be refunded unless it is forfeited by the department.

- e. If the bidder withdraws his/her bid online (i.e. before the end date of submission of tender) then his/her EMD will be refunded automatically after the opening of tender.
 - f. The EMD of successful bidder (on Award of Contract) will be retained by CCL and will be adjusted to Performance Security Deposit.
17. The Company reserves the right to postpone the date of receipt and opening of tenders or to cancel the tenders without assigning any reason whatsoever.
18. This e-Tender Notice shall be deemed to be part of the Contract Agreement.
19. The Company does not bind itself to accept the lowest bid and reserves the right to reject any or all the bid without assigning any reasons whatsoever and also to split up the work between two or more tenderers or accept the tender in part and not in its entirety, at its sole discretion.

20. Addendum/Corrigendum :

Any addendum/corrigendum/date extension etc. in respect of this tender shall be issued on our website (<https://coalindiatenders.nic.in>) only. No separate notification shall be issued in the press. Bidders are therefore requested to visit our website regularly to keep themselves updated.

22. Pre-Contract Integrity Pact :

The bidders have to accept unconditionally the Integrity Pact in GTE (General Technical Evaluation) at the time of bid submission. No recycling will be done for this document i.e. no further clarification will be sought from bidder(s).

Name, address and contact No. of the Independent External Monitors (IEM) nominated for this tender :

Sl. No.	Name	email Id
1	Shri Goddilla Viswanatha Reddy, IfoS (Retd.),	gvreddy.rajforests@gmail.com

23. Restriction of bidder from a country which shares a land border with India and on sub-contracting to contractors from such countries

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority (as per details given in Annexure-XIII).
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or Joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder" from a country which shares a land border with India" for the purpose of this order means:
 - a. An entity incorporated, established or registered in such a country; or
 - b. A subsidiary of an entity incorporated, established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose beneficial owner is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.

IV. The beneficial owner for the purpose of (III) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.
Explanation-
 - a. "Controlling ownership interest" means ownership of or entitlement to more than Twenty Five Percent of shares or capital or profits of the company.
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen per cent of capital or profits of the partnership.
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen per cent of the property or capital or profits of such association or body of individuals.
 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official.
 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen per cent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An agent is a person employed to do any act for another or to represent another in dealings with third person.
- VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the competent Authority.

Note:

1. (a) The intending bidder must submit Certificate as per format given at Annexure X in compliance to order no. F. No.6/18/2019-PPD dt 23/7/20 Of Ministry of Finance, Dept of Expenditure, Public Procurement Division with respect to "restriction of bidders from a country which shares a land border with India and on sub-contracting to contractors from such countries"
AND
(b) Valid registration from competent authority (If applicable).
Registration should be valid at the time of submission of bid and acceptance of bids.
2. Regarding registration with Competent Authority, order no. F. No.6/18/2019-PPD dt 23/7/20may please be referred.
3. Regarding exclusion from restriction, order no. F. No.6/18/2019-PPD dt 23/7/20may please be referred.

S/d on 13.07.2022
General Manager (Civil)/HoD
CCL Ranchi

INSTRUCTIONS TO BIDDERS

1. SCOPE OF BIDDER

1.1 The **CENTRAL COALFIELDS LIMITED** (referred to as Employer in these documents) invites bids for the work(s) on Turnkey basis as mentioned in the Bid Notice. The Bidders should submit Bids for all the works mentioned in the Notice.

1.2 The successful Bidder will be expected to complete the Work(s) by the Intended Completion period specified in the Bid document/Notice.

2. ELIGIBLE BIDDERS

2.1 The Invitation for Bid is open to all Bidders including an individual, proprietorship firm, partnership firm, company registered under Companies Act, any legal entity or joint ventures. The bidders shall be eligible to participate only if they fulfill the qualifying/eligibility criteria specified in e-tender Notice and at Clause 3.

2.2 A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works shall not be eligible to Bid.

2.3 Joint Venture:- Two or three companies/ contractors may jointly undertake contract/contracts. Each entity will be jointly and severally responsible for completing the task as per the contract (applicable for bids with estimated cost above Rs.5.00 Crores).

Joint Venture details :

Name of all partners of a joint venture(not more than 3):

1. Lead partner
2. Partner
3. Partner

Note : Foreign bidders may also participate through Joint Venture (JV).

Note - The participating share of JV Partners shall be as below;

i) Lead Partner shall have at least 50% participating share in JV.

ii) Other partner(s) shall have at least 20% participating share in JV.

Joint Venture must comply the following requirements :

i) Minimum qualification requirements for Joint Venture :

- a) The qualifying criteria parameter e.g. experience of the individual partners of the J.V will be as deliberated under Cl.No.6A of e-Tender Notice towards fulfillment of qualification criteria related to experience.
- b) The qualifying criteria parameter e.g. financial resources (Turnover and Working Capital) of the individual partners of the J.V. will be added together, for the relevant period, and the total value should not be less than as deliberated under Cl.No.6(B) and 6(C) of e-Tender Notice towards fulfillment of qualification criteria related to financial turnover. However, the required Working Capital shall be met by individual JV Partners as spelt out in relevant Clause.

ii) The formation of joint venture or change in the Joint Venture character/ partners after submission of the bid and any change in the bidding regarding Joint Venture will not be permitted.

iii) The bid, and in case of a successful bid - the agreement, shall be signed so as to legally bind all partners jointly and severally and any bid shall be submitted with a copy of the Joint Venture Agreement providing the joint and several liabilities with respect to the contract.

iv) The pre-qualification of a Joint Venture does not necessarily pre-qualify any of its partners individually or as a partner in any other Joint Venture or association. In case of dissolution of a Joint

Venture, each one of the constituent firms may pre-qualify if they meet all the pre-qualification requirements, subject to written approval of the employer.

v) The bid submission must include documentary evidence to the relationship between Joint Venture partners in the form of JV Agreement (**Annexure-VIII**) to legally bind all partners jointly and severally for the proposed agreement which should set out the principles for the constitution, operation, responsibilities regarding work and financial arrangements, participation (percentage share in the total) and liabilities (joint and several) in respect of each and all of the firms in the Joint Venture. Such JV Agreement must evidence the commitment of the parties to bid for the facilities applied for (if pre-qualified) and to execute the contract for the facilities if their bid is successful.

vi) One of the partners shall be nominated as 'In-charge' of the contract and shall be designated as Lead Partner. This authorization shall be evidenced by submitting with the bid a Power of Attorney signed by legally authorized signatories of all the partners.

vii) The JV Agreement must provide that the Lead Partner shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the Joint Venture and the entire execution of the contract shall be done with active participation of the Lead Partner.

viii) The contract agreement should be signed by each Joint Venture Partners. Subsequent declarations/letters/documents shall be signed by lead partner authorized to sign on behalf of the JV or authorized signatory on behalf of JV.

ix) The Letter of Bid (Annexure-I)), Undertaking (Annexure-II) & Integrity Pact (Annexure-IX) should be signed by all the partners of the Joint Venture.

x) An entity can be a partner in only one Joint Venture. Bid submitted by Joint Venture including the same entity as partner will be rejected.

xi) The JV agreement may specify the share of each individual partner for the purpose of execution of this contract. This is required to fulfill eligibility and also for the purpose of apportioning the value of the contract to that extent to individual partner for subsequent submission in other bids if he intends to do so for the purpose of the qualification in that Bid.

xii) The Earnest Money/Bids Security Bank Guarantee can be submitted by the Joint Venture or one or more partners of the Joint Venture.

xiii) The JV agreement must specifically state that it is valid for the project for which bidding is done. If JV breaks up midway before award of work and during bid validity period bid will be rejected.

If JV breaks up midway before award of work and during bid validity/after award of work/during pendency of contract, in addition to normal penalties as per provision of bid document, all the partners of the JV shall be debarred from participating in future bids for a minimum period of 12 months.

xiv) JV agreement shall be registered in accordance with law so as to be legally valid and binding on the members before making any payment.

xv) JV shall open a Bank Account in the name of JV and all payments due to the JV shall be credited by employer to that account only. To facilitate statutory deductions all statutory documents like PAN, GST Registration Certificate with GSTIN, CMPF Registration etc. in the name of the Joint Venture shall be submitted by JV before making any payment.

2.4 the bidders shall have Digital Signature Certificate (DSC) issued from any agency authorized by Controller of Certifying Authority (CCA), Govt. of India and which can be traced up to the chain of trust to the Root certificate of CCA.

2.5 The bidders have to accept unconditionally the online user portal agreement which contains the acceptance of all the Terms and Conditions of NIT and ITB, including General and Special Terms & Conditions, technical specifications, other conditions, if any, along with on-line undertaking in support of the authenticity of the declarations regarding the facts, figures, information and documents furnished by the bidder on-line in order to become an eligible bidder.

2.6 The Company reserves its right to allow Public Enterprises purchase preference facility as admissible under prevailing policy.

2.7 No sub-letting of the work as a whole by the contractor is permissible. Prior permission is required to be taken from the principle employer for engagement of sub-contractors in part work/piece rated work.

3. QUALIFICATION OF THE BIDDER

3.1 In the event that pre-qualification of potential bidders has been undertaken, only bids from pre-qualified bidders will be considered for award of contract.

3.2 If the employer has not undertaken pre-qualification of potential bidders, all bidders shall fulfill the eligibility / qualifying criteria as detailed at point.6 & 7 of e-tender Notice. In addition the bidders shall also fulfill technical requirements to make them eligible for award of contract. Such details shall be submitted as deliberated at e-Tender Notice.

3.3 If the bidder is subsidiary of a company, the experience and resources of the holding company or its other subsidiaries will not be taken into account. However, if the bidder is a holding company, the experience and resources of its wholly owned subsidiaries will be taken into consideration.

3.4 Even though the bidders meet the above eligibility/qualifying criteria, they are subject to be disqualified if they have :

- a. Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements

Notes :

The documents to be furnished by the bidder to prove that he is satisfying the qualification criteria laid down should all be valid on the end date of bid submission and should be in the bidders name except in cases where though the name has changed, owners continued to remain the same and in cases of amalgamation of entities and when a holding company relies on credential of its wholly owned subsidiary.

4. ONE BID PER BIDDER

4.1 Each Bidder shall submit only one Bid, either individually, or as a proprietor, or as a partner in a partnership firm or as a partner in a joint venture or as a Company registered under Companies Act. A Bidder who submits or participates in more than one Bid (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

4.2 Conflict of Interest

A Bidder may be considered to have a Conflict of Interest with one or more parties in this bidding process, if:

- a) they have controlling partner(s) in common; or
- b) they receive or have received any direct or indirect subsidy/financial stake from any of them; or
- c) they have the same legal representative/agent for purposes of this bid; or
- d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or
- e) a Bidder or any of its affiliate participated as a consultant in the preparation of the design or technical specification of the contract that is the subject of the bid; or
- f) in case of a holding company having more than one Subsidiary/Sister Concern having common business ownership/management only one of them can bid. Bidders must proactively declare such sister/common business/management in same/similar line of Business;

All such Bidders having a Conflict of Interest, shall be disqualified.

5. COST OF BIDDING

The Bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible or liable for those costs.

6. SITE VISIT

6.1 The Bidder, at the Bidder's own responsibility, cost and risk, is encouraged to visit and examine the Site of Works and its surroundings, approach road, soil condition, investigation report, existing works, if any, connected to the tendered work, drawings connected to the work, if / as available and obtain all information that may be necessary for preparing the Bid and entering into a contract for execution of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

6.2 It shall be deemed that the Bidder has visited the site/area and got fully acquainted with the working conditions and other prevalent conditions and fluctuations thereto whether he actually visits the site/area or not and has taken all the factors into account while quoting his rates.

6.3 The bidder is expected, before quoting his rate, to go through the requirement of materials / workmanship, specification, requirements and conditions of contract.

6.4 The bidder, in preparing the bid, shall rely on the site investigation report referred to in the bid document (if available), supplemented by any information available to the bidder.

7. CONTENT OF BIDDING DOCUMENTS

The set of bidding documents comprises the documents (all or as available/applicable) listed in below:

i) e-Tender Notice, ii) Instructions to Bidders, Letter of Bid and Undertaking. iii) Conditions of Contract (General Terms & Conditions, Special Terms and conditions, General Technical Conditions, Erection Conditions of Contract, Safety Norms etc.) iv) Specifications and Scope of Work v) Tender drawing vi) Integrity Pact, if applicable; vii) Various Forms of Securities, form of Article of Agreement, viii) Bill of Quantities, ix) e-Tender User Portal Agreement.

8. DISCREPANCIES IN CONTRACT DOCUMENTS & ADJUSTMENTS THEREOF

8.1 The documents forming part of the contract are to be treated as mutually explanatory of one another and in case of discrepancy between schedule of quantity, the specifications and/or drawing, the following order of preference shall be observed :

- a) Description in Bill of Quantities of work.
- b) Particular specification and special conditions, if any
- c) Drawings.
- d) General specifications.
- e) BIS Specifications.

8.2 In the event of varying or conflicting provision in any of the document(s) forming part of the contract, the Accepting Authority's decision/clarification shall hold good with regard to the intention of the document or contract as the case may be.

8.3 Any error in description, quantity or rate in Bill of Quantities or any omission there from, shall not vitiate the contract or release the contractor from discharging his obligations under the contract including execution of work according to the Drawings and Specifications forming part of the particular contract document.

9. CLARIFICATION OF BIDDING DOCUMENTS

A prospective bidder requiring any interpretation or clarification of bidding document may seek clarification online or during pre-bid meeting (if any). The clarifications may be asked from the next day of e-Publication of NIT. The last date for seeking clarification will be as specified online. The department will clarify as far as possible only relevant queries. The clarifications given by department will be visible to all the bidders intending to participate in bid.

10. AMENDMENT OF BIDDING DOCUMENTS

10.1 Before the deadline for submission of Bids, the Employer may modify the bidding documents by issuing addenda.

10.2 Any addendum thus issued shall be a part of the bidding document and shall be displayed in the website.

10.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may extend, as necessary, the deadline for submission of Bids.

11. LANGUAGE OF BID

All documents relating to the Bid shall be in the English language.

12. BID PRICES

12.1 The bidder shall closely study all specification in detail and scope of work which govern the rates he is quoting. The contract shall be for the whole Works as described in Sub-Clause 1.1, based on the scope of work as detailed in the bidding document.

12.2 The Bidder shall submit rates and prices for all items of the Works described in the scope of works.

12.3. All duties, taxes [excluding Goods and Services Tax (GST) and GST (Compensation to State) Cess only] and other levies, royalty, building and construction workers cess (as applicable in States), whether local, municipal, provincial or central pertaining to the contract payable by the Contractor/Supplier under the Contract, or for any other cause as applicable on the last date of submission of Bid, shall be included in the rates, prices and the total Bid Price submitted by the Bidder. Applicable GST payable by bidder under reverse charge mechanism shall be computed by system in BOQ Sheet as per pre-defined logic. All investments, operating expenses, incidentals, overheads, leads, lifts, carriages, tools and plants etc. as may be attendant upon execution and completion of works shall also be included in the rates, prices and total Bid price submitted by the bidder.

However, such duties, taxes, levies etc. which is notified after the last date of submission of Bid and/or any increase over the rate existing on the last date of submission of Bid shall be reimbursed by the company on production of documentary evidence in support of payment actually made to the concerned authorities.

Similarly if there is any decrease in such duties, taxes and levies the same shall become recoverable from the contractor. The details of such duties, taxes and other levies along with rates shall be declared by the bidder.

The item wise rate quoted by bidder shall be inclusive of all taxes, duties & levies but excluding GST & GST (Compensation to State) Cess, if applicable. The payment of GST and GST (Compensation to State) Cess by service availer (i.e. CCL) to contractor/supplier would be made only on the latter submitting a Bill/invoice in accordance with the provision of relevant GST Act and the rules made thereunder and after online filing of valid return on GST portal. Payment of GST & GST (Compensation to State) Cess is responsibility of the contractor/supplier.

Input Tax Credit (ITC) is to be availed by CCL as per rule.

If CCL fails to claim Input Tax Credit(ITC) on eligible Inputs, input services and Capital Goods or the ITC claimed is disallowed due to failure on the part of contractor/supplier of goods and services in incorporating the tax invoice issued to CCL in its relevant returns under GST, payment of CGST & SGST or IGST, GST (Compensation to State) Cess shown in tax invoice to the tax authorities, issue of proper tax invoice or any other reason whatsoever, the applicable taxes & cess paid based on such Tax invoice shall be recovered from the current bills or any other dues of the contractor/supplier along with interest, if any.

12.4. The rates and prices quoted by the Bidder shall be fixed for the duration of the contract and shall not be subject to variations on any account except to the extent variations allowed as per the conditions of the contract indicated in the bidding document.

13.CURRENCIES OF BID AND PAYMENT

The unit rates and prices shall be quoted by the Bidder entirely in Indian Rupees.

14. BID VALIDITY

14.1 The Bid Validity period will be **180 (one hundred eighty) days** from the end date of bid submission. The Bid Validity period shall be decided based on the final end date of submission of bid, after extension, if any.

14.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidder(s) extend the period of validity for a specified additional period. The request and the bidder's response shall be in writing. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid but will be required to extend the validity of his bid security for the period of extension.

15. BID SECURITY/EARNEST MONEY DEPOSIT

15.1 The bidder shall furnish, as part of his bid, a Bid Security/Earnest Money of the amount as shown in e-Tender Notice and in the form as deliberated at Clause 3 of e-Tender Notice. In case of extension of Bid validity on mutual consent, the validity of BG shall be suitably extended.

15.2. Any Bid not accompanied by an acceptable Bid Security/EMD shall be summarily rejected by the employer as non-responsive.

15.3 The Bid Security/Earnest Money may be forfeited :

- a. If the Bidder withdraws the Bid after Bid opening during the period of Bid validity / extended validity with mutual consent. OR
- b. In the case of a successful Bidder, if the Bidder fails within the specified time limit to: (i).sign the Agreement; OR (ii) Furnish the required Performance Security Deposit.

Additionally the bidder will not be allowed to participate in the re-tender. The company reserves the right to debar such defaulting contractor from participating in future bids for a minimum period of 12 months.

15.4 The Bid Security/ EMD deposited with the Employer will not carry any interest.

15.5 No claim from the bidders will be entertained for non-receipt of the refund in any account other than the one from where the money is received.

15.6 If the refund of EMD is not received by the bidder in the account from which the EMD has been made due to any technical reason, then it will be paid through conventional system of e-payment. For this purpose, bidder should submit E-Mandate form in format provided by company.

15.7 In case the tender is cancelled then EMD of all the participating bidders will be refunded unless it is forfeited by the department.

15.8 If the bidder withdraws his/her bid online (i.e. before the end date of submission of tender) then his/her EMD will be refunded automatically after the opening of tender.

16. DEADLINE FOR SUBMISSION OF BIDS

16.1. Bids shall be submitted on line on the web site <https://coalindiatenders.nic.in> within the date and time specified in the e-Tender Notice.

16.2. The employer may extend the deadline for submission of bids by issuing a corrigendum in accordance with provisions of e-Tender Notice/ITB, in which case all rights and obligations of the employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

17. EVALUATION AND COMPARISON OF BIDS.

17.1 Evaluation and comparison of Bids will be done by System online. This online evaluation will be validated by CCL at each stage as deliberated in e-Tender Notice. The bidder shall also comply with system requirement as deliberated in e-Tender Notice. Bid evaluation shall be done after taking into consideration overall quoted price by the bidder and effect of Goods & Service Tax (GST) and GST (Compensation to State) Cess (if applicable). The L-1 will be decided by the System based on "Cost to Company" as per the predefined logic in the BoQ sheet and based on the aggregate of quoted amount for "Works & Services" and "Supply of Plant & Machinery".

17.2 If the Bid of the successful Bidder is seriously unbalanced in relation to the Company's estimate of the cost of work to be performed under the contract, the Employer may require the

Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the methods and schedule proposed.

18. AWARD CRITERIA

18.1 Subject to Clause No.19, the Employer will award the Contract to the best qualified Bidder whose Bid has been determined to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price. Employer shall be the sole judge in this regard.

19. EMPLOYER'S RIGHT TO ACCEPT ANY BID, NEGOTIATE AND TO REJECT ANY OR ALL BIDS

Notwithstanding Clause No.18, the Employer reserves the right to accept, negotiate or reject any Bid, and to cancel the bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

20. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT

20.1 The Bidder, whose Bid has been accepted, will be notified of the award by the Employer prior to expiration of the Bid validity period on e-Procurement portal (<https://coalindiatenders.nic.in>) and additionally by registered/speed post. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, operation and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called "the Contract Price").

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

The works should be completed within the period specified in the e-Tender Notice from expiry of 30 (Thirty) days from the receipt of Letter of Acceptance (LOA) issued by department or from 7th day of handing over of the site, whichever is later.

The date of receipt of Letter of Acceptance (LOA) by the successful bidder shall be taken as the date on which the LOA is uploaded on e-Procurement portal (<https://coalindiatenders.nic.in>).

20.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder, work programme etc. within 60 (sixty) days following the notification of award along with the Letter of Acceptance and/or Work Order issued by department.

In case of failure to submit Performance Security Deposit (PSD) and enter into agreement in specified period or extended period, on written request of contractor, if any, the department in addition to other penal measures as per clause 15.3 of ITB shall debar the selected bidder from participating in re-Tender. In addition, the department may debar the bidder from participating in future bids for at least 12 months.

20.4 In the bidding process, the cause of rejection of Bid of any bidder should be intimated to non-qualified bidder through e-Procurement portal (<https://coalindiatenders.nic.in>).

20.5 The contractor shall enter into and execute contract agreement in the prescribed form. The cost of the stamp papers for the contract agreement shall be borne by the contractor. Two sets of contract document/ agreements shall be prepared and signed by both the parties One of the sets shall be stamped "Original" and the other "Duplicate". The duplicate copy will be supplied to the contractor free of cost and the original is to be retained by the company. For any additional copy, additional cost to be charged.

All additional copies should be certified by the Engineer-in-Charge.

The contractor shall keep copy of these documents on the site/place of work in proper manner so that these are available for inspection at all reasonable times by the Engineer-in-Charge, his representatives or any other officials authorized by the Company for the purpose.

The contract document shall not be used by the contractor for any purpose other than this contract and the contractor shall ensure that all persons employed for this contract strictly adhere to this and maintain secrecy, as required of such documents.

21. PERFORMANCE SECURITY/SECURITY DEPOSIT

- 21.1 Security Deposit shall consist of two parts;
- a. Performance Security to be submitted at award of work and
 - b. Retention Money to be recovered from running bills.

The security deposit shall bear no interest.

For details refer Cl.No.3 of Conditions of Contract (General Terms and Conditions)

22. EMPLOYMENT OF LABOUR

22.1 Contractors are to employ, to the extent possible (as per policy decision of the company valid from time to time), local project affected people and pay wages not less than the minimum wages as per Minimum Wages Act or such other legislations or award of the minimum wage fixed by respective State Govt. or Central Govt. as may be in force or minimum wages recommended by High Power Committee of CIL (for labours engaged in mining activities), as applicable and mentioned in the e-Tender Notice. Payment of arrears to the contract workers on account of revision of minimum wages shall be the responsibility of the contractor.

Payment of Provident Fund for the workmen employed by him for the work as per the Laws prevailing under provision of **CMPF** and allied scheme valid from time to time shall be the responsibility of bidder.

The contractor needs to ensure that the employee has become a member of any of the provident fund as the case may be and the unique membership number of the CMPF/EPF or Allied Scheme needs to be submitted to Employer.

In addition to the above, the Contractor shall provide a copy of the updated passbook having entry made in the CMPF/EPF or Allied Scheme(s) of Provident fund as the case may be by the competent authority annually /as and when asked. Bidder shall also submit copies of statutory returns.

Bidder shall also submit statutory returns.

22.2 The bidder shall comply with statutory requirements of various acts including Child Labour (Prohibition & Regulation) Act, 1986 as amended from time to time and all rules, regulations and schemes framed thereunder from time to time in addition to other applicable labour laws.

22.3 The payment to the contractor's labourers has to be made through Bank only.

22.4 **Bonus is to be paid to the contract workers engaged by the Contractors as per the provisions of Payment of Bonus Act,1965 as amended from time to time.**

22.5 **The contractors shall register themselves on the Contract Labour Payment Management Portal (CLPMP) of CIL within 30 days of issue of work order and will have to enter and update periodically the following details in the portal :**

- a. **Work Order details**
- b. **Contractor workers details and Wages payment details in respect of each Work Order.**

22.6 **All the contract workers shall be covered with the Bio-metric attendance system for payment of wages.**

22.7 **Contractors should deploy Skilled/Trained workers only.**

23. LEGAL JURISDICTION

Matter relating to any dispute or difference arising out of this tender and subsequent contract awarded based on the bid shall be subject to the jurisdiction of Ranchi Court only.

24. DEEMED EXPORTS

If the bidder has quoted any item/items under the deemed exports then it will be the responsibility of the Bidder to get all the benefits under deemed exports from the Government. The Company's responsibility shall only be limited to the issuance of required certificates. The quotation of the Bidder will be unconditional and phrases like "Subject to availability of deemed exports benefit" will not find place in it.

25. CONSULTANTS NOT TO BID & VICE-VERSA:

A firm which has been engaged by the Company to provide Goods or Works for a project or any of its affiliates will be barred from providing consultancy services for the same project. Conversely, a firm hired to provide consultancy services for the preparation or implementation of a project and any of its affiliates will be barred from subsequently providing Goods or Works or services related to the initial assignment for the same project.

26. SUB-CONTRACTOR/ SUB-VENDOR :

26.1 The contractor shall specify major items of supply or services for which he proposes to engage Sub-contractor(s)/ Sub-Vendor (s) in its bid.

Further, the installation/ usage of major equipment /product shall meet the following conditions:

- 1.Indigenously manufactured with BIS/ ISI marking wherever it is mandatory or conforming to BIS standards or ISO certification etc or reputed brand in that order.**
- 2.Overseas manufactured with certification regarding quality like relevant ISO/British Standard Certification/ any other International quality certification etc. Failing which internationally reputed brand in that order.**

The major items/ equipment/ products so specified by the bidder shall be incorporated in the Contract Document. The contractor may from time to time propose any addition or deletion from the list as mentioned in the contract document and will inform the Engineer in Charge/ Designated Officer in Charge with proper justification so as not to impede the progress of work. The same may be accepted by Engineer in Charge/ Designated Officer in Charge. However, such approval of the Engineer-in Charge/ Designated Officer in Charge will not relieve the contractor from any of his obligation, duties and responsibilities under the contract.

Any addition of item(s) in the list shall also meet the conditions specified at 1 & 2 above.

26.2 If a contractor submits his bid, qualifies and does not get the contract because of his not being the lowest, he will be prohibited from working as a sub-contractor for the contractor who is executing the work.

27. e-payment

Successful bidder will be required to submit a Mandate Form in the prescribed format (Annexure-III), duly signed by bidder and the Bank officials for ePayment.

28. Integrity Pact

The bidders have to accept unconditionally the Integrity Pact (Annexure-IX) in GTE (General Technical Evaluation) at the time of bid submission. No recycling will be done for this document i.e. no further clarification will be sought from bidder(s).

29. Changes in Firms Constitution to be intimated

Previous approval in writing of the Engineer-in-Charge shall be obtained before any change is made in the constitution of the Firm. If previous approval is not obtained the same will be treated as a breach of contract and shall have same consequences due to such breach of contract.

30. Miscellaneous.

30.1 The bidders should fill the bid document properly and carefully. They should avoid quoting absurd rates.

30.2 The contractor will have to submit valid H.T. Electrical Contractor's license issued by the electrical licensing board of state of execution or electrical contractor's license issued by any Indian

state duly recognized/endorsed by electrical licensing board of state of execution before execution of agreement.

30.3 After opening of the Tender if the Company decides to negotiate, the tenderer should be in a position to depute their representative, at short notice, with full authority for negotiation on technical and other matters.

30.4 Throughout the bidding documents, the terms 'Bid' and 'Tender' and their derivatives are synonymous.

30.5 The processes for entering into the agreement with the successful bidder will be done offline as per the prevailing manual system. The contractor will submit the following documents within 30 days of issue of LOA, for execution of Agreement :

- i. Non Judicial Stamp Paper of Rs.100.00
- ii. Site handover and takeover certificate, jointly signed by Engineer-in-Charge and the Contractor.
- iii. Labour License as per Contract Labour (Regulation & Abolition) Act, 1970.
- i. Insurance Policy certificates (Worker's Compensation Policy & All Risk Policy) duly pledged in the name of CCL.
- ii. CMPF Registration certificate.**
- iii. Valid H.T. Electrical Contractor's license
- iv. Detail Time and Progress Chart, jointly signed by Engineer-in-Charge and the Contractor.
- v. List of Technical & Supervisory Personnel to be deployed for execution of the work.

31. An Amount of 1% (one percent) of the work value payable to the contractors will be deducted from all Bills towards the worker's welfare under Building and other Construction Worker's Welfare Cess Rules'1998 and Building and other Construction Worker's Welfare Cess Act'1996 (As applicable in the States).

32. Instruction to Bidder shall be a part of contract agreement.

GENERAL TERMS AND CONDITIONS OF CONTRACT

1. DEFINITIONS :
 - i. The word "Company" or "Employer" or "Owner" wherever occurs in the conditions, means the **Central Coalfields Limited**, represented at the headquarters of the Company by the CMD or his authorised representative or any other officer specially deputed for the purpose.
 - ii. The word "Principal Employer" or "Engineer" wherever occurs, means the authorised representative or any other officer specially deputed by the Company for the purpose of contract.
 - iii. The word "Contractor"/"Contractors" or "Manufacturer" wherever occurs means the successful Bidder/Bidders who has/have deposited the necessary Earnest Money and has/have been given written intimation about the acceptance of tender and shall include legal representative of such individual or persons composing a firm or a company or the successors and permitted assignees of such individual, firm or company, as the case may be.
 - iv. "The Site" shall mean the site of the contract work including land and any building and erections thereon and any other land allotted by the company for contractor's use in the performance of the contract.
 - v. The term "sub-contractor", as employed herein, includes those having a direct contract with contractor either on piece rate, items rate, time rate or on any other basis and it includes one who furnishes work to a special design according to the plans or specifications of this work but does not include one who merely supplied materials.
 - vi. "Consulting Engineer"/"Consultant" shall mean any firm or person duly appointed as such from time to time by the owner.

- vii. 'Accepting authority' shall mean the management of the company and includes an authorised representative of the company or any other person or body of persons empowered in this behalf by the company.
- viii. A 'Day' shall mean a day of 24 hours from midnight to midnight.
- ix. General Manager (Civil)/HoD, CCL-HQ. Ranchi will be the Engineer-in-Charge of this work and will be responsible for supervising and administering the contract, certifying payment due to the contractor, valuing variations to the contract, awarding extension of time and valuing compensation events. General Manager (Civil)/HoD, CCL-HQ. Ranchi /Engineer-in-Charge may further appoint his representatives i.e. Staff Officer (Civil), Barka-Sayal Area and notify to the contractor who is directly responsible for supervising the work being executed at the site, on his behalf under the Delegation of Powers of the company. However, overall responsibility, as far as the contract is concerned will be that of the Engineer-in-charge/Designated Officer-in-charge.
- x. The 'contract' shall mean the notice inviting tender, the tender as accepted by the company and the formal agreement executed between the company and the contractor together with the documents referred to therein including conditions of contract, special conditions, if any, specifications, designs & drawings including those to be submitted during progress of work, scope of work, billing schedule/schedule of quantities with rates and amounts.
- xi. The 'works' shall mean and include the furnishing of equipment, labour, and the services in accordance with the contract or parts thereof as the case may be and shall also include all extra or additional, altered or substituted works or any work of emergent nature, which in the opinion of the Engineer-in-charge, become necessary during the progress of the works to obviate any risk or accident or failure or become necessary for security.
- xii. "Specification" shall mean the technical specifications forming a part of the contract and such other schedules and drawings as may be mutually agreed upon.
- xiii. 'Contract price' shall mean the total sum for which tender is accepted by the company.
- xiv. 'Written notice' shall mean a notice or communication in writing and shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an office of the Corporation/Company for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.
- xv. "Letter of Acceptance" of the tender shall mean the official notice issued by the company notifying the contractor that his tender has been accepted.
- xvi. "Date of Contract" shall mean the date on which both the parties have signed the contract agreement.
- xvii. "Manufacturer's Works' or Contractor's Works" shall mean the place of work used by the Manufacturer, the Contractor, their collaborators or sub-contractors for the performance of the works.
- xviii "Inspector" shall mean the Owner or any person nominated by the Owner from time to time, to inspect the equipment stores or Works under the contract and/or the duly authorised representative of the owner.
- xix. When the words "Approved", "Subject to Approval", "Satisfactory", "Equal to", "Proper", "Requested", "As directed", "Where directed", "When directed", "Determined by", "Accepted", "Permitted", or words and phrases of like import are used, the approval, judgment, direction etc. is understood to be a function of the Owner/Engineer/Engineer-in-Charge.
- xx. "Test of Completion" shall mean such tests as prescribed in the contract to be performed by the contractor before the Works is taken over by the Owner.
- xxi. "Start-up" shall mean the time period required to bring the equipment covered under the Contract from an inactive condition, when construction is essentially complete, to the state ready for trial operation. The start-up period shall include preliminary inspection and check out of equipment and supporting sub-systems; initial operation of the complete equipment covered under the Contract to obtain necessary pre-trial operation data, perform calibration and corrective action; shut down inspection and adjustment prior to the trial operation period.
- xxii. "Initial operation" shall mean the first integral operation of the complete equipment covered under the contract with sub-systems and supporting equipment in service.
- xxiii. "Trial Operation", "Reliability Test", Trial Run", "Complete Test" shall mean the extended period of time after the "Start-up" period. During this trial operation period the unit shall be operated over

the full load range. The length of Trial Operation shall be as determined by the Engineer, unless otherwise specified elsewhere in the Contract.

xxiv. "Performance and Guarantee Tests" shall mean all operation checks and tests required to determine and demonstrate capacity, efficiency, and operating characteristics as specified in the contract document.

xxv. "Commercial Operation" shall mean the condition of operation in which the complete equipment covered under the contract is officially declared by the owner to be available for continuous operation at different loads upto and including rated capacity. Such declaration by the owner however, shall not relieve or prejudice any of the contractor's obligation under this contract.

xxvi. "Final Acceptance" shall mean the owner's written acceptance of the works performed under the contract, after successful completion of performance and guarantee tests.

xxvii "Guarantee Period/Maintenance Period" shall mean the period during which the contractor shall remain liable for repair or replacement of any defective part of the works performed under the contract.

Xxviii "Drawings"/"Plans" shall mean all :

- (a) drawings furnished by the owner/consultant as a basis for proposals,
- (b) supplementary drawings furnished by the Owner/Consultant to clarify and to define in greater detail the intent of the contract,
- (c) drawings submitted by the contractor with his proposal provided such drawings are acceptable to the Owner/Consultant,
- (d) drawings furnished by the Owner/Consultant to the Contractor during the progress of the work, and
- (e) engineering data and drawings submitted by the Contractor during the progress of the work provided such drawings are acceptable to the Engineer,

xxix "Codes" shall mean the following, including the latest amendments, and/or replacements, if any :

- (a) Standards of Bureau of Indian Standards relevant to the works under the contract and their specifications.
- (b) Other Internationally approved Standards and/or rules and regulations touching the subject matter of the contract.
 - (i) A.S.M.E. Test codes.
 - (ii) A.I.E.E. Test codes.
 - (iii) American Society of Materials Testing Codes.
 - (iv) Indian Electricity Act and Rules and Regulations made thereunder.
 - (v) Indian Explosive Act and Rules and Regulations made thereunder.
 - (vi) Indian Petroleum Act and Rules and Regulations made thereunder.
 - (vii) Indian Mines Act and Rules and Regulations made thereunder.
- (c) Any other laws, rules, regulations and Acts applicable in the country with

respect to labour, safety, compensation, insurance etc.

xxx Words importing singular only shall also include the plural and vice-versa where the context so requires.

xxxi Words importing "Person" shall include firms, companies, corporations, and associations or bodies of individuals, whether incorporated or not.

xxxii Terms and expressions, not defined herein, shall have the same meaning as are assigned to them in the Indian Sale of Goods Act, failing that in the Indian Contract Act, and failing that in the General Clauses Act.

xxxiii "Commissioning" the plant/project shall mean completion in all respects of construction rendering the plan/project ready for performance test and commercial operation as per xxv.

xxxiv "Government Approvals" shall mean all permits, licenses, authorisations, consents, clearances, decrees, waivers, privileges, approvals from and filing with government instrumentalities necessary for the development, construction and operation of the plant/project.

xxxv "Month" shall mean a calendar month according to the Gregorian calendar.

xxxvi "Bank Guarantee" shall mean the Bank Guarantee to be provided by to.....

2. CONTRACT DOCUMENTS :

The following documents shall constitute the contract documents :

- (i) Articles of Agreement,

- (ii) Notice Inviting Tender,
- (iii) Letter of Acceptance of Tender indicating deviations, if any, from the conditions of contract incorporated in the Tender document issued to the bidder and/or the Bid submitted by the bidder,
- (iv) Conditions of contract, including general terms and conditions, additional terms and conditions, technical terms and conditions, erection terms and conditions, special conditions, if any etc. forming part of the Agreement,
- (v) Specifications, where it is part of Tender Documents,
- (vi) Scope of works/Bills of quantities/schedule of works/quantities and
- (vii) Contract Drawings/finalised work programme.

DISCREPANCIES IN CONTRACT DOCUMENTS & ADJUSTMENTS THEREOF

- (i). The documents forming part of the contract are to be treated as mutually explanatory of one another and in case of discrepancy between schedule of quantity, the specifications and/or drawing, the following order of preference shall be observed;
 - a) Description in Bill of Quantities of work.
 - b) Particular specification and special conditions, if any
 - c) Drawings.
 - d) General specifications.
 - e) BIS Specifications.
- (ii). In the event of varying or conflicting provision in any of the document(s) forming part of the contract, the Accepting Authority's decision/clarification shall hold good with regard to the intention of the document or contract as the case may be.
- (iii). Any error in description, quantity or rate in Bill of Quantities or any omission there from, shall not vitiate the contract or release the contractor from discharging his obligations under the contract including execution of work according to the Drawings and Specifications forming part of the particular contract document.

2.1 After acceptance of tender the Contractor shall be deemed to have carefully examined all Contract Documents to his satisfaction. If he shall have any doubt as to the meaning of any portion of the Contract Documents, he shall before signing the Contract, set forth the particulars thereof, and submit them to the Owner in writing in order that such doubt may be removed. The Owner will provide such clarifications as may be necessary in writing to the Contractor. Any information otherwise obtained from the Owner or the Engineer shall not in any way relieve the Contractor of his responsibility to fulfill his obligations under the Contract.

2.2 The Contractor shall enter into a Contract Agreement with the Owner within 60 (sixty) days from the date of 'Acceptance of Tender' or within such extended time as may be granted by the owner. The performance Bank Guarantee for the proper fulfillment of the contract shall be furnished by the contractor in the prescribed form within thirty (30) days of 'Acceptance of tender'. The performance Guarantee shall be as per terms prescribed in clause 31 of Instructions to Bidders of this tender.

2.3 The owner, after the issue of the letter of Acceptance of Tender, will send one copy of the final agreement to the contractor for his scrutiny and approval.

2.4 The agreement, unless otherwise agreed to, shall be signed within 60 days of the issue of the letter of Acceptance of tender, at the office of the owner on a date and time to be mutually agreed. The contractor shall provide for signing of the contract, performance guarantee in copies as required, appropriate power of attorney and other requisite materials. In case it is agreed mutually that the contract is to be signed beyond the stipulated time, the bid guarantee submitted with the tender will have to be extended accordingly.

2.5 The agreement will be signed in six originals and the contractor shall be provided with one signed original and the rest will be retained by the owner. None of these documents shall be used by the contractor for any purpose other than this contract and the contractor shall ensure that all persons employed for this contract strictly adhere to this and maintain secrecy, as required of such documents.

2.6 The contractor shall provide free of cost to the owner all the engineering data, drawings and descriptive materials submitted with the bid, in at least six (6) copies to form a part of the contract immediately after issue of letter of acceptance.

2.7 Subsequent to signing of the contract, the contractor at his own cost shall provide the owner with at least six (6) true copies of agreement within thirty (30) days after the signing of the contract.

2.8 The contract shall be considered as having come into force from the date of the letter of acceptance of tender issued by the owner.

2.9 The laws applicable to this contract shall be the laws in force in India. The courts of _____ shall have exclusive jurisdiction in all matters arising under this contract.

3.0 CONTRACT PERFORMANCE GUARANTEE/ SECURITY DEPOSIT :

3.1 Security Deposit shall consist of two parts:

a) Performance Security to be submitted at award of work and b) Retention Money to be recovered from running bills. The security deposit shall bear no interest.

3.1.1 Performance Security should be 5.00% of contract amount and should be submitted by the successful bidder within 30 days of issue of LOA in any of the form given below after which bid security/earnest money will be refunded to the contractor.

- a Bank Guarantee in the form given in the bid document from any schedule bank acceptable to the owner. Bank guarantee issued by out station bank shall be operative at their local branch at Ranchi or at their branch at Kolkata (if the issuing bank does not have any branch at Ranchi).

- Govt. Securities, FDR or any other form of deposit stipulated by the owner and duly pledged in favour of owner.

- Demand Draft drawn in favour of Central Coalfields Ltd. (CCL) on any Scheduled Bank payable at its Branch at Ranchi Jharkhand

The Earnest Money/Bid Security deposited shall be discharged when the Bidder has signed the Agreement and furnished the required Performance Security/ 1st part of security deposit.

The Bid Security deposited may be adjusted against the Performance security (1st part of security deposit) at bidder's option.

3.1.2 If performance security is provided by the successful bidder in the form of bank guarantee it shall be issued either -

(a) at Bidder's option by a Scheduled Bank as per provisions of Cl.3.1.1. The BG shall contain complete postal address, telephone number, fax number and email address of both out station bank issuing the BG as well as its local operating branch.

(b) by a foreign bank located in India and acceptable to the employer.

NOTE:

(i) The Bank Guarantee issued by a scheduled bank shall be operative at its branch situated at Ranchi Jharkhand.

(ii) **The Bank Guarantee (BG) issued by the issuing Bank on behalf of contractor in favour of "Central Coalfields Limited" shall be in paper form as well as issued under "Structured Financial Messaging System (SFMS)".**

The details of beneficiary for issue of Bank Guarantee (BG) under SFMS platform is furnished below:

A. State Bank of India as advising Bank of CCL:

1.	Name of the Beneficiary and his details.	i	Name	Central Coalfields Limited
		ii	Area	*
		iii	Bank A/C no. of	10106155123

			beneficiary	
		iv	Customer ID/CIF no of beneficiary	80288731402
		v	Department	Civil
2.	Beneficiary Bank, Branch and address.	i	Beneficiary's Bank	State Bank of India
		ii	Branch and Address	SME Branch, Doranda, ranchi - 834002
		iii	SFMS Code/ IFSC Code	SBIN0009620
		iv	In case of Foreign BG Swift Code	SBININBB387

In case the successful bidder fails to submit the Performance Security within the stipulated time then the award of work shall be cancelled with forfeiture of the bid security/earnest money.

In addition to the above penal measures, the bidder will not be allowed to participate in the re-tendering process. The bidder may also be debarred from participating in future tenders in the subsidiary for a minimum period of 12 Months.

In case of JV/Partnership firm, the banning shall also be applicable to all individual partners of JV/Partnership firm.

3.1.3 Retention Money should be deducted at 5% from running bills. Total of performance security and Retention Money should not exceed 10% of contract amount or lesser sum indicated in the bid document.

Retention Money may be released against equivalent Bank Guarantee only for values above Rs.25.0 lakhs.

3.2 The Guarantee amount shall be payable to the Employer without any condition whatsoever.

3.3 Performance Security/Retention Money shall be converted into Performance Guarantee on successful completion of work in accordance with contract and upon satisfactory trial operations.

Performance security/ Retention Money /security deposit submitted in the form of BG shall be valid for 90 days after the end of Guarantee period.

3.4 The Performance Guarantee shall cover additionally the following guarantees to the Employer:

(a) The successful bidder guarantees the successful and satisfactory operation of the equipment furnished and erected under the contract, as per the specifications and documents,

(b) The successful bidder further guarantees that the equipment provided and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from the employer fully remedy free of expenses to the Employer such defects as developed under the normal use of the said equipment within the period of guarantee specified in the relevant clause of the Conditions of Contract.

3.5 The Contract Performance Guarantee is intended to secure the performance of the entire Contract. However it is not construed as limiting the damages under clause entitled 'Equipment Performance Guarantee' in section Technical Conditions of Contract and damages stipulated in the other clauses in the bidding documents.

3.6 All Bank Guarantees are to be submitted in the format prescribed by the company in the bid document. Bank Guarantee shall be irrevocable and it shall be from any Scheduled Bank acceptable to the owner. The BG issued by outstation bank shall be operative at its local branch at Ranchi or branch at Kolkata.

3.7 The Company shall be at liberty to deduct/appropriate from the Contract Performance Guarantee/Security Deposit such sums as are due and payable by the contractor to the company as may be determined in terms of the contract, and the amount appropriated from the Contract Performance Guarantee/Security Deposit shall have to be restored by Contractor subsequently.

3.8 Performance Security deposit shall be returned to the Contractor after successful completion of 3 (Three) years of Defect Liability Period without any interest. The balance SD i.e. Retention Money shall be released without any interest after successful completion of entire period of the Defect Liability. Any defect/defects in the work, if detected during Guarantee Period/Defect Liability Period shall be rectified or equipment/ system shall be replaced to the satisfaction of the engineer In-charge within the said defect liability/ operation/ maintenance/guarantee period or its due extension till completion of the rectification/ replacement works as required.

4.0 ASSIGNMENT AND SUBLETTING OF CONTRACT

4.1 **The contractor may, after informing the engineer in charge/ designated officer in charge, with proper justification for acceptance, assign or sub-let the contract or any part thereof other than for raw materials, for minor detail or any part of the plant for which makes are identified in the contract document. Suppliers of the equipment/system not identified in the contract document or any change in the identified supplier mentioned in the contract document can be changed and same may be informed to engineer in charge/ designated officer in charge, with proper justification for acceptance. The experience list of the equipment/system vendors under consideration by the contractor for this contract over the list mentioned in the contract document shall be furnished to the engineer in charge/ designated officer in charge prior to procurement of all such items/ equipment. Such assignment of sub-letting shall not relieve the contractor from any obligation, duty or responsibility under the contract. Any assignment as above without prior information of engineer shall be void.**

4.2 For components/equipment procured by the contractors for the purposes of the contract, after obtaining the written approval of the owner, the contractor's purchase specifications and enquiries shall call for quality plans to be submitted by the suppliers along with their proposals. The quality plans called for from the vendors shall set out, during the various stages of manufacture and installation, the quality practices and procedures followed by the vendor's quality control organization, the relevant reference documents/standards used, acceptance level, inspection documentation raised, etc. Such quality plans of the successful vendor shall be discussed and finalized in consultation with the engineer and shall form a part of the purchase order/contract between the contractor and the vendor. Within 3 weeks of the release of the same purchase order/contracts for such bought out items/ components, a copy of the same without price details but together with detailed purchase specifications, quality plans and delivery conditions shall be furnished to the engineer by the contractor.

5.0 PATENT RIGHTS AND ROYALTIES

5.1 Royalties and fees for patent covering materials, articles, apparatus, devices, equipment or processes used in the works shall be deemed to have been included in the contract price. The contractor shall satisfy all demands that may be made at any time for such royalties or fees and he alone shall be liable for any damages or claims for patent infringements and shall keep the owner indemnified in that regard. The contractor shall, at his own cost and expense, defend all suits or proceedings that may be instituted for alleged infringement of any patent involved in the works, and, in case of an award of damages, the contractor shall pay for such award. In the event of any suit or other proceedings instituted against the owner, the same shall be defended at the cost and expense of the contractor who shall also satisfy/comply and decree, order or award made against the owner. But it shall be understood that no such machine, plant, work, material or thing has been used by the owner for any purpose or any manner other than that for which they have been furnished and installed by the contractor and specified under these specifications. Final payment to the contractor by the owner will

not be made while any such suit or claim remains unsettled. In the event any apparatus or equipment, or any matter thereof furnished by the contractor, is in such suit or proceedings held to constitute infringement, and its use is enjoined, the contractor shall, at his option and at his own expense, either procure for the owner, the right to continue use of said apparatus, equipment or part thereof, replace it with non-infringing apparatus or equipment or modify it, so it becomes non-infringing.

6.0 TIME - THE ESSENCE OF CONTRACT

6.1 The date of commencement shall be reckoned from the expiry of 30 days from the issue of letter of acceptance and submission of Performance Security or seven days after handing over the site for the first activity as per PERT network chart, whichever is later. The PERT/BAR chart both for works as well as supply is to be mutually agreed and finalized within 30 days of issue of LOA. The site may be handed over in full or part. The contractor shall give notice 30 days in advance prior to the completion of first activity for handing over the site required for Subsequent activity and this shall be provided as per the Critical/PERT network programme.

6.2 The contractor shall submit a detailed PERT network within the time frame agreed above consisting of adequate number of activities covering various key phases of the works such as design, procurement, manufacturing, shipment and field erection activities within fifteen (15) days after the date of acceptance of tender. This network shall also indicate the interface facilities to be provided by the owner and the dates by which such facilities are needed. Contractor shall discuss the network so submitted with the owner and the agreed network which may be in the form as submitted or in revised form in line with the outcome of discussions and shall form part of the contract to be signed within sixty (60) days from the date of letter of acceptance of notice of award of contract. During the performance of contract, if in the opinion of the engineer proper progress is not maintained suitable changes shall be made in the contractor's operations to ensure proper progress.

6.3 The above PERT network shall be reviewed and periodic review reports shall be submitted by the contractor as directed by the engineer.

6.4 Subsequent to the award of the contract, the contractor shall make available to the engineer, a detailed manufacturing programme, in line with the agreed contract network. Such manufacturing programme shall be reviewed, updated and submitted to the Engineer, once every two month thereafter.

7.0 CONTRACT PRICE

7.1 The lump sum prices quoted by the contractor in his bid with additions and deletions as may be agreed before signing of the contract, for the entire scope of the work including furnishing and erection of equipment covered under the specifications and documents and shall be treated as the contract price.

8.0 CHANGED QUANTITY

8.1 The owner reserves the right to vary the quantities of items or groups of items to be ordered as specified in the accompanying technical specifications, as may be necessary, during the execution of the contract, but such variations unless otherwise specified in the accompanying technical specifications shall be limited to plus or minus twenty percent (20%) of the original quantity ordered.

9.0 DEDUCTIONS FROM CONTRACT PRICE

9.1 All costs, damages or expenses which the owner may have paid, for which under the contract the contractor is liable, will be claimed by the owner. All such claims shall be billed by the owner to the contractor regularly as and when they fall due. Such bills shall be supported by appropriate and certified vouchers or explanations, to enable the contractor to properly identify such claims. Such claims shall be paid by the contractor within fifteen (15) days of the receipt of the corresponding bills and if not paid by the contractor within the said period, the owner may then deduct the amount, from

any moneys due or becoming due by him to the contractor under the contract or may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.

10.0 CONTRACT PRICE ADJUSTMENT

10.1 All adjustments in the contract price shall be computed in accordance with the conditions and formulae prescribed in the relevant clauses of 'Additional Terms and Conditions of Contract', the accompanying technical specifications and further satisfying the requirements specified herein.

10.2 The contract price stated in the contract agreement is the base price. A certain fixed percentage of the base price as indicated in the technical specifications shall not be subject to any price adjustment. The balance percentage viz. the cost portion shall only be subject to price adjustment.

10.3 Price adjustment shall be applicable to the cost portion, only if changes in the cost of labour and materials (either increases or decreases) occur during the contract period, directly affecting the cost portion.

10.4 Variations in the cost of materials shall be determined by comparing published material indices as on the last date of submission of bid (inclusive of price part) or the revised price bid, whichever is later, with the same indices published during the manufacture at the respective cut off periods for material as specified in clause 2.0 of Additional Terms and Conditions of Contract. Variations in the cost of labour shall be determined by comparing the wages as per the Minimum Wages Act/ Rules of the State or Central Government, whichever is more, applicable to the place of work as on the last date of submission of bid (inclusive of price part) or the revised price bid, whichever is later, with the same wages as per the Minimum Wages Act/ Rules of the State or Central Government, whichever is more, during the work/manufacture applicable to the place of work/manufacture at the respective cut off periods for labour as specified in clause 2.0 of Additional Terms and Conditions of Contract of this volume.

10.5 The total computed variation in the contract price shall be restricted to a limiting percentage as specified in clause 2.5 of Additional Terms and Conditions of Contract of this volume.

10.6 The price adjustment for the erection shall be made on the value of erection work done as indicated in each billing.

10.7 Every three months after the award of contract, and a month prior to shipment of equipment (in the case of ex-factory price component of contract price), and every month after establishing his site office (in the case of erection) the contractor shall submit to the engineer a written notice of the changes, if any, that have occurred in the specified material and labour indices during the previous reporting period containing the effective date of such change, the amount of change, the amount of contract price adjustment and documentary evidence to substantiate the price adjustment.

10.8 The contract price adjustment provisions detailed above, shall only be applicable if so specified in the Additional Terms and Conditions of Contract.

11.0 PACKING, FORWARDING AND SHIPMENT

11.1 The contractor, wherever applicable, shall after proper painting, pack and crate all equipment in such a manner as to protect them from deterioration and damage during rail and road transportation to the site and storage at the site till the time of erection. The contractor shall be held responsible for all damages due to improper packing.

11.2 The contractor shall notify the owner of the date of each shipment from his works, and the expected date of arrival at the site for the information of the owner.

11.3 The contractor shall also give all shipping information concerning the weight, size and content of each packing including any other information the owner may require.

11.4 The following documents shall be sent by registered post to the owner within 3 days from the date of shipment, to enable the owner to make progressive payments to the contractor: the payment shall be made only after receipt and acceptance of material at site in good condition.

Application for payment in the standard format of the owner (3 copies),

Invoice (6 copies),

Packing list (6 copies),

Pre-dispatch clearance certificate, if any (3 copies),

Test certificate, wherever applicable (3 copies),

11.5 The contractor shall prepare detailed packing list of all packages and containers, bundles and loose material forming each and every consignment dispatched to site. The contractor shall further be responsible for making all necessary arrangements for loading, unloading and other handling right from his works up to the site and also till the equipment is erected, tested and commissioned. He shall be solely responsible for proper storage and safe custody of all equipment.

12.0 DEMURRAGE, WHARFAGE, ETC.

12.1 All demurrage, wharfage and other expenses incurred due to delayed clearance of the material or any other reason shall be to the account of the contractor.

13.0 INSURANCE

13.1 The contractor shall arrange, secure and maintain insurance as may be necessary and for all such amounts to protect his interests and the interests of the owner, against all risks as detailed herein in the joint names of the Owner and the Contractor with the condition that payments against all claims shall be payable by insurers to the owner as elaborated at clause 13.5. All premiums and other charges of the said insurance policies shall be paid by the contractor. The form and the limit of such insurance, as defined herein together with the under-writer thereof in each case shall be acceptable to the owner. However, irrespective of such acceptance, the responsibility to maintain adequate insurance coverage on comprehensive all risks basis at all time during the period of contract shall be that of the contractor alone. The contractor's failure in this regard shall not relieve him of any of his contractual responsibilities and obligations.

13.2 Any loss of damage to the equipment, during handling, transporting, storage and erection, till such time the plant is taken over by the owner, shall be to the account of the contractor. The contractor shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/or replacement of the portion of the works damaged or lost. The transfer of title shall not in any way relieve the contractor of the above responsibilities during the period of the contract. The contractor shall provide the owner with a copy of all insurance policies and documents taken out by him in pursuance of the contract. Such copies of document shall be submitted to the owner immediately after such insurance coverage. The contractor shall also inform the owner in writing at least sixty (60) days in advance, regarding the expiry, cancellation and/or change in any of such documents and ensure revalidation/renewal, etc. as may be necessary well in time.

13.3 The risk that are to be covered under the insurance shall include, but not be limited to, the loss or damage in transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, etc. The scope of such insurance shall cover the entire value of the works from time to time.

13.4 All costs on account of insurance liabilities covered under the contract will be on contractor's account and will be included in contract price. However, the owner may from time to time, during the pendency of the contract, ask the contractor in writing to limit the insurance coverage risks and in such

a case, the parties to the contract will agree for a mutual settlement for reduction in contract price to the extent of reduced premium amounts.

13.5 All insurance claims, payable by the insurers, shall be paid to the Owner which shall be released to the contractor in installments as may be certified by the Engineer-in-charge for the purpose of rebuilding or replacement or repair of the works and/or goods destroyed or damaged for which payment was received from the insurers.

13.6 The clause entitled insurance under the section erection terms and conditions of contract of this volume, covers the additional insurance requirements for the portion of the works to be performed at the site of work.

14.0 LIABILITY FOR ACCIDENTS AND DAMAGES

14.1 Under the contract, the contractor shall be responsible for loss or damage to the plant until the plant is taken over in accordance with clause entitled 'Taking Over' in section technical terms and conditions of contract of this volume .

15.0 LIQUIDATED DAMAGES FOR DELAY IN COMPLETION

15.1 If the contractor fails to maintain the required progress in terms of the agreed time and progress chart or to complete the work and clear the site on or before the date of completion of contract or extended date of completion, he shall without prejudice to any other right or remedy available under the law to the company on account of such breach, pay as compensation/ Liquidated Damages @ half percent (1/2%) of the contract price per week of delay. The aggregate of such compensation/ compensations shall not exceed 10 (ten) percent of the total value as shown in the contract.

This will also apply to items or group of items for which separate period of completion has been specified. The amount of compensation may be adjusted or setoff against any sum payable to the contractor under this or any other contract with the company.

15.1.1 The company, if satisfied, that the works can be completed by the contractor within a reasonable time after the specified time of completion, may allow further extension of time at its discretion with or without the levy of L.D. In the event of extension granted being with L.D, the company will be entitled without prejudice to any other right or remedy available in that behalf, to recover from the contractor as agreed damages equivalent to half percent of the contract value of the works for each week or part of the week subject to a ceiling of 10% of the contract price.

15.1.2 The company, if not satisfied that the works can be completed by the contractor, and in the event of failure on the part of the contractor to complete work within further extension of time allowed as aforesaid, shall be entitled, without prejudice to any other right, or remedy available in that behalf, to rescind the contract.

15.1.3 The company, if not satisfied with the progress of the contract and in the event of failure of the contractor to recoup the delays in the mutually agreed time frame, shall be entitled to terminate the contract.

15.1.4 In the event of such termination of the contract as described in clauses 15.1.2 or 15.1.3 or both, the company, shall be entitled to recover L.D. upto ten percent (10%) of the contract value and forfeit the security deposit made by the contractor besides getting the work completed by other means at the risk and cost of the contractor.

15.2 The company may waive the payment of compensation, depending upon merit of the case, on request received from the contractor if the entire work is completed within the date as specified in the contract or as validly extended without stipulating any penalty.

16.0 CONTRACTOR'S DEFAULT

16.1 If the contractor shall neglect to execute the works with the diligence and expedition or shall refuse or neglect to comply with any reasonable orders given to him, in writing by the engineer in connection with the works or shall contravene the provisions of the contract, the owner may give notice in writing to the contractor to make good the failure, neglect or contravention complained of. Should the contractor fail to comply with the notice within thirty (30) days from the date of service thereof, then and in such case the owner shall be at liberty to employ other workmen and forthwith execute such part of the works as the contractor may have neglected to do or if the owner shall think fit, it shall be lawful for him, without prejudice to any other right he may have under the contract, to take the works wholly or in part thereof and in that event the owner shall have free use of all contractor's equipment that may have been at the time on the site in connection with the works without being responsible to the contractor for fair wear and tear thereof and to the exclusion of any right of the contractor over the same, and the owner shall be entitled to retain and apply any balance which may otherwise be due on the contract by him to the contractor, or such part thereof as may be necessary, the payment of the cost of executing the said part of the works or of completing the works as the case may be. If the cost of completing the works or executing a part thereof as aforesaid shall exceed the balance due to the contractor, the contractor shall pay such excess. Such payment of excess amount shall be independent of the liquidated damages for delay which the contractor shall have to pay if the completion of works is delayed.

16.2 In addition, such action by the owner as aforesaid shall not relieve the contractor of his liability to pay liquidated damages for delay in completion of works as defined in clause 15.0 of this section.

16.3 The termination of the contract under this clause shall not entitle the contractor to reduce the value of the performance bank guarantee nor the time thereof. The performance guarantee shall be valid for the full value and for the full period of the contract including guarantee period.

16.4 The bidding documents will clearly state that, if the contractor fails to complete the work and the order is cancelled, the amount due to him on account of work executed by him, if payable, shall be paid to him only after due recoveries as per the provisions of the contract and that too after alternative arrangements to complete the work has been made.

17.0 FORCE MAJEURE

17.1 Force majeure is herein defined as any cause which is beyond the control of the contractor or the owner as the case may be which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affect the performance of the contract, such as:

(a) natural phenomena, including but not limited to floods, draughts, earthquakes and epidemics:

(b) acts of any government, including but not limited to war, declared or undeclared, priorities, quarantines, embargoes,

Provided either party shall within fifteen (15) days from the occurrence of such a cause notify the other in writing of such causes.

17.2 (a) The successful bidder/ contractor will advise, in the event of his having resort to this clause by a registered letter duly certified by the local chamber of commerce or statutory authorities, the beginning and end of the clause of delay, within fifteen days of the occurrence and cessation of such Force Majeure condition. In the event of delay lasting over two months, if arising out of Force Majeure, the contract may be terminated at the discretion of the company.

(b) For delays arising out of Force Majeure, the bidder/ contractor will not claim extension in completion date for a period exceeding the period of delay attributable to the causes of Force Majeure and neither company nor the bidder shall be liable to pay extra costs (like increase in rates, remobilisation advance, idle charges for labour and machinery etc.) Provided it is mutually established that the Force Majeure conditions did actually exist.

(c) If any of the Force Majeure conditions exists in the place of operation of the bidder even at the time of submission of bid he will categorically specify them in his bid and state whether they have been taken into consideration in their quotations.

17.3 The contractor or the owner shall not be liable for delays in performing his obligations resulting from any force majeure cause as referred to and/or defined above. The date of completion will, subject to hereinafter provided, be extended by a reasonable time even though such cause may occur after contractor's performance of his obligations has been delayed for other causes.

18.0 DELAYS BY OWNER OR HIS AUTHORISED AGENT

18.1 In case the contractor's performance is delayed due to any act of omission on the part of the owner or his authorised agents, then the contractor shall be given due extension of time for the completion of the works, to the extent such omission on the part of the owner has caused delay in the contractor's performance of his work. Regarding reasonableness or otherwise of the extension of time, the decision of the engineer shall be final.

19.0 EXTENSION OF DATE OF COMPLETION

19.1 On happening of any events causing delay as stated hereinafter, the contractor shall intimate immediately in writing the Engineer-in-charge :

- a. due to any reasons defined as Force Majeure.
- d. non-availability of stores which are the responsibility of the owner to supply
- e. non-availability or breakdown of tools and plant to be made available or made available by the owner
- f. delay on the part of the contractors or tradesmen engaged by the owner not forming part of the contract, holding up further progress of the work
- g. non-availability of working drawings/work programme in time, which are to be made available by the company during progress of the work
- h. any other causes which, at the sole discretion of the company is beyond the control of the contractor.

19.2 A "Hindrance Register" shall be maintained by both the Company and the Contractor at site to record the various hindrances, as mentioned above, encountered during the course of execution.

19.3 The contractor may request the company in writing for extension of time within 14 days of happening of such event causing delay stating also, if practicable, the period for which extension is desired. The company may, considering the eligibility of the request, give a fair and reasonable extension of time for completion of the work. Such extension shall be communicated to the contractor in writing by the company through the Engineer-in-charge within 1 month of the date of receipt of such request. The contractor shall however use his best efforts to prevent or make good the delay by putting his endeavors constantly as may be reasonably required of him to the satisfaction of the Engineer-in-charge.

19.4 Provisional extension of time may also be granted by the Engineer -In-charge during the course of execution, on written request for extension of time within 15 (fifteen) days of happening of such events as stated above, reserving the company's right to impose/ waive liquidated damages at the time of granting final extension of time as per contract agreement.

19.5 When the period fixed for the completion of the contract is about to expire, the question of extension of the contract may be considered at the instance of the Contractor or the Company or the both. The extension will have to be by party's agreement, expressed or implied.

19.6 In case the Contractor does not apply for grant of extension of time within 15 (fifteen) days of hindrance occurring in execution of the work and the Company wants to continue with the work beyond the stipulated date of completion for reason of the work having been hindered, the Engineer-in-charge at his sole discretion can grant provisional extension of time even in the absence of application from the Contractor. Such extension of time granted by the Engineer-in-charge is valid

provided the Contractor accepts the same either expressly or implied by his actions before and subsequent to the date of completion. Such extension of time shall be without prejudice to Company's right to levy compensation under the relevant clause of contract.

20.0 TERMINATION, SUSPENSION, CANCELLATION & FORECLOSURE OF CONTRACT

20.1 The owner shall, in addition to other remedial steps to be taken as provided in the conditions of contract, be entitled to cancel the contract in full or in part, if the contractor

a makes default in proceeding with the works with due diligence and continues to do so even after a notice in writing from the Engineer-in-charge, then on the expiry of the period as specified in the notice

or

b. commits default/breach in complying with any of the terms and conditions of the contract and does not remedy it or fails to take effective steps for the remedy to the satisfaction of the Engineer-in-charge, then on the expiry of the period as may be specified by the Engineer-in-charge in a notice in writing

or

c. fails to complete the work or items of work with individual dates of completion, on or before the date/dates of completion or as extended by the company, then on the expiry of the period as may be specified by the Engineer-in-charge in a notice in writing

or

d. shall offer or give or agree to give any person in the service of the company or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for act/acts of favour in relation to the obtaining or execution of this or any other contract for the company.

or

e. Shall try to obtain a contract with the company by way of of ring tendering or other non-bonafide method of competitive tendering.

or

f. transfers, sublets, assigns the entire work or any portion there of without the prior approval in writing from the Engineer-in-charge. The Engineer-in-charge may by giving a written notice, cancel the whole contract or portion of it in default.

20.2 The owner shall in such an event give fifteen (15) days notice in writing to the contractor of his decision to do so.

20.3 The contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all orders and contracts to the extent they are related to the work terminated and terms satisfactory to the owner, stop all further sub-contracting or purchasing activity related to the work terminated, and assist the owner in maintenance, protection, and disposition of the works acquired under the contract by the owner.

20.4 The contract shall stand terminated under the following circumstances unless the owner is satisfied that the legal representatives of the individual contractor or of the proprietor of the proprietary concern and in the case of partnership the surviving partners, are capable of carrying out and completing the contract and the owner shall in any way not be liable to payment of any compensation to the estate of deceased contractor and/or to the surviving partners of the contractor's firm on account of the termination of the contract.:

a. If the contractor being an individual in the case of proprietary concern or in the case of a partnership firm any of its partners is declared insolvent under the provisions of insolvency act for the time being in force, or makes any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors amounting to proceedings for liquidation or composition under any insolvency act.

b. In the case of the contractor being a company, its affairs are under liquidation either by a resolution passed by the company or by an order of court, not being a voluntary liquidation

proceedings for the purpose of amalgamation or reorganisation, or a receiver or manager is appointed by the court on the application by the debenture holders of the company, if any.

c. If the contractor shall suffer an execution being levied on his/their goods, estates and allow it to be continued for a period of 21 days.

d. On the death of the contractor being a proprietary concern or of any of the partners in the case of a partnership concern and the company is not satisfied that the legal representative of the deceased proprietor or the other surviving partners of the partnership concern are capable of carrying out and completing the contract. The decision of the company in this respect shall be final and binding which is to be intimated in writing to the legal representative or to the partnership concern.

20.5 If the contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the contractor is a partnership concern and one of the partners dies, then unless the owner is satisfied that the legal representatives of the individual contractor or of the proprietor of the proprietary concern and in the case of partnership the surviving partners, are capable of carrying out and completing the contract the owner shall be entitled to cancel the contract as to its incomplete part without being in any way liable to payment of any compensation to the estate of deceased contractor and/or to the surviving partners of the contractor's firm on account of the cancellation of the contract. The decision of the owner that the legal representatives of the deceased contractor or surviving partners of the contractor's firm cannot carry out and complete the contract shall be final and binding on the parties. In the event of such cancellation the owner shall not hold the estate of the deceased contractor and/or the surviving partners of the estate of the deceased contractor and/or the surviving partners of the contractor's firm liable to damages for not completing the contract.

20.6 On cancellation of the contract or on termination of the contract, the Engineer-in-charge shall have powers

a. to take possession of the site and any materials, constructional plant, implements, stores, etc. thereon.

b. In such an event, the contractor shall be liable for loss/damage suffered by the employer because of action under this clause and to compensate for this loss or damage, the employer shall be entitled to recover higher of the following:

i) Forfeiture of security deposit comprising of performance guarantee and retention money and additional performance security, if any, at the disposal of the employer.

Or

ii) 20% of value of incomplete work (Contract Value minus already executed value of the work).

The amount to be recovered from the contractor as determined above, shall, without prejudice to any other right or remedy available to the employer as per law or as per agreement, will be recovered from any money due to the contractor on any account or under any other contract and in the event of any shortfall, the contractor shall be liable to pay the same within 30 days. In case of failure to pay the same the amount shall be debt payable.

In the event of above course being adopted by the Engineer-in-charge, the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased materials, equipment or entered into agreement or made advances on any account or with a view to the execution of work or performance of the contract. And in case action is taken under any of provision aforesaid, the contractor shall not be entitled to recover or to 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 value payable in respect thereof and he shall only be entitled to be paid the value so certified.

The need for determination of the amount of recovery of any extra cost/expenditure or of any loss/damage suffered by the company shall not however arise in the case of termination of the contract for death/demise of the contractor.

20.7 Suspension of work - The company shall have power to suspend the progress of the work or any part thereof and the Engineer-in-charge may direct the contractor in writing to suspend the work, for such period and in such manner as may be specified therein, on account of any default on the part of the contractor, or for proper execution of the work for reasons other than any default on the part of the contractor, or on ground of safety of the work or part thereof. In the event of suspension for reason other than any default on the part of the contractor, extension of time shall be allowed by the company equal to the period of such suspension. Any necessary and demonstrable costs incurred by the contractor as a result of such suspension of the works will be paid by the owner, provided such costs are substantiated to the satisfaction of the engineer. The owner shall not be responsible for any liabilities if suspension or delay is due to some default on the part of the contractor or his sub-contractor.

The work shall, throughout the stipulated period of contract, be carried out with all due diligence on the part of the contractor. In the event of termination or suspension of the contract, on account of default on the part of the contractor, as narrated hereinbefore, the security deposit and other dues of this work or any other work done under this company shall be forfeited and brought under the absolute disposal of the company provided, that the amount so forfeited shall not exceed 10% of the contract value.

20.8 Foreclosure of contract in full or in part - If at any time after acceptance of the tender, the company decides to abandon or reduce the scope of the work for any reason whatsoever the company, through its Engineer-in-charge, shall give notice in writing to that effect to the contractor. In the event of abandonment/reduction in the scope of work, the company shall be liable

- a. to pay the contractor at the contract rates full amount for works executed and measured at site upto the date of such abandonment/reduction in the work.
- b. to pay reasonable amount assessed and certified by the Engineer-in-charge of the expenditure incurred, if any, by the contractor on preliminary works at site. e.g. temporary access roads, temporary construction for labour and staff quarters, office accommodation, storage of materials, water storage tanks and supply for the work including supply to labour/staff quarters, office, etc.
- c. to pay for the materials brought to site or to be delivered at site, which the contractor is legally liable to pay, for the purpose of consumption in works carried out or were to be carried out but for the foreclosure, including the cost of purchase and transportation and cost of delivery of such materials. The materials to be taken over by the company should be in good condition and the company may allow at its discretion the contractor to retain the materials in full or part if so desired by him and to be transported by the contractor from site to his place.
- d. to take back the materials issued by the company but remaining unused, if any, in the work on the date of abandonment/reduction in the work, at the original issued price less allowance for any deterioration or damage caused while in custody of the contractor
- e. to pay for the transportation of tools and plants of the contractor from site to contractor's place or to any other destination, whichever is less.

The contractor shall, if required by the Engineer-in-charge, furnish to him books of accounts, papers, relevant documents as may be necessary to enable the Engineer-in-charge to assess the amount payable in terms of para 20.8 (b), (c) and (e) above, the contractor shall not have any claim for compensation whatsoever either for abandonment or for reduction in the scope of work, other than those as specified above.

21.0 NO WAIVER OF RIGHTS

Neither the inspection by the owner or the engineer or any of their officials, employees or agents nor any order by the owner or the engineer for payment of money or any payment for or acceptance of, the whole or any part of the works by the owner or the engineer, nor any extension of time, nor any possession taken by the engineer shall operate as a waiver of any provision of the contract, or of any power herein reserved to the owner, or any right to damages herein provided, nor

shall any waiver of any breach in the contract be held to be a waiver of any other or subsequent breach.

22.0 CERTIFICATE NOT TO AFFECT RIGHT OF OWNER AND LIABILITY OF CONTRACTOR

No interim payment certificate of the engineer, nor any sum paid on account, by the owner, nor any extension of time for execution of the works granted by the engineer shall affect or prejudice the rights of the owner against the contractor or relieve the contractor of his obligations for the due performance of the contract, or be interpreted as approval of the works done or of the equipment furnished and no certificate shall create liability for the owner to pay for alterations, amendments, variations or additional works not ordered, in writing, by the engineer or discharge the liability of the contractor for the payment of damages whether due, ascertained, or certified or not, or any sum against the payment of which he is bound to indemnify the owner, nor shall any such certificate nor the acceptance by him of any sum paid on account or otherwise affect or prejudice the rights of the contractor against the owner.

23.0 GRAFTS AND COMMISSIONS ETC.

Any graft, commission, gift or advantage given, promised or offered by or on behalf of the contractor or his partner, agent, officers, director, employee or servant or any one of his or their behalf in relation to the obtaining or to the execution of this or any other contract with the owner, shall, in addition to any criminal liability which it may incur, subject the contractor to the cancellation of this and all other contracts and also to payment of any loss or damage to the owner resulting from any cancellation. The owner shall then be entitled to deduct the amount so payable from any moneys otherwise due to the contractor under the contract.

24.0 LANGUAGE AND MEASURES

All documents pertaining to the contract including specifications, schedules notices, correspondence, operating and maintenance instructions, drawings or any other writing shall be written in English language. The metric system of measurement shall be used exclusively in the contract.

25.0 RELEASE OF INFORMATION

The contractor shall not communicate or use in advertising, publicity, sales releases or in any other medium photographs or other reproduction of the works under this contract, or descriptions of the site, dimensions, quantity, quality or other information, concerning the works unless prior written permission has been obtained from the owner.

26.0 CONSTRUCTION OF THE CONTRACT

26.1 Where the owner hands over his equipment to the contractor for executing, then the contractor shall at the time of taking delivery of the equipment/ despatch documents be required to execute an indemnity bond in favour of the owner in the form acceptable to the owner for keeping the equipment in safe custody and to utilise the same exclusively for the purposes of the said contract.

26.2 The contract shall in all respects be construed and governed accordingly to Indian Laws.

26.3 It is clearly understood that the total consideration for the contract (s) has been broken up into various components only for the convenience of payment of advance under the contract (s) and for the measurement of deviations or modifications under the contract (s).

27.0 COMPLETION OF CONTRACT

Unless otherwise terminated under the provisions of any other relevant clause, this contract shall be deemed to have been completed at the expiration of the guarantee period as provided for under the clause entitled 'Guarantee' in this section.

28.0 ENFORCEMENT OF TERMS

The failure of either party to enforce at any time of the provisions of this contract or any rights in respect thereto or to exercise any option herein provided, shall in no way be construed to be a waiver of such provisions, rights or options or in any way to affect the validity of the contract. The exercise by either party of any of its rights herein shall not preclude or prejudice either party from exercising the same or any other right it may have hereunder.

29.0 ENGINEER'S DECISION

29.1 In respect of all matters which are left to the decision of the engineer including the granting or with holding of the certificates, the engineer shall, if required to do so by the contractor give in writing a decision thereon.

29.2 If in the opinion of the contractor, a decision made by the engineer is not in accordance with the meaning and intent of the contract, the contractor may file with the engineer within fifteen (15) days after receipt of the decision, a written objection to the decision. Failure to file an objection within the allotted time will be considered as acceptance of the engineer's decision and the decision shall become final and binding.

29.3 The engineer's decision and the filing of the written objection thereto shall be a condition precedent to the right to any legal proceedings. It is the intent of the agreement that there shall be no delay in the execution of the works and the decision of the engineer as rendered shall be promptly observed.

30.0 CO-OPERATION WITH OTHER CONTRACTORS AND CONSULTING ENGINEERS

The contractor shall agree to co-operate with the owner's other contractors and consulting engineers and freely exchange with them such technical information as is necessary to obtain the most efficient and economical design and to avoid unnecessary duplication of efforts. The engineer shall be provided with three copies of all correspondence addressed by the contractor to other sub-contractors and consulting engineers in respect of such exchange of technical information,

31.0 TRAINING OF OWNER'S PERSONNEL

31.1 The contractor shall undertake to train free of cost, engineering personnel selected and sent by the owner at the works of the contractor unless otherwise specified in the technical specifications. The period and the nature of training for the individual personnel shall be agreed upon mutually between the contractor and the owner. These engineering personnel shall be given special training in the shops, where the equipment will be manufactured and/or their collaborator's works and where possible, in any other plant where equipment manufactured by the contractor or his collaborator is under installation or test, to enable those personnel to become familiar with the equipment being furnished by the contractor.

31.2 All traveling and living expenses for the engineering personnel to be trained during the total period of training will be borne by the owner. These engineering personnel while undergoing training shall be responsible to the contractor for discipline.

31.3 In the event of the owner, for any reason, failing to avail of the training facilities, he shall not be entitled for any rebate whatsoever on this account.

32.0 POWER TO VARY OR OMIT WORK

32.1 No alterations, amendments, omissions, suspensions or variations of the works (hereinafter referred to as 'Variation') under the contract as detailed in the contract documents, shall be made by the contractor except as directed in writing by the engineer, but the engineer shall have full power subject to the provision hereinafter contained from time to time during the execution of the contract, by notice in writing, to instruct the contractor to make such variation without prejudice to the contract. The contractor shall carry out such variation and be bound by the same conditions as far as applicable as though the said variation occurred in the contract documents. If any suggested variation would, in the opinion of the contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the contract, he shall notify the engineer there of in writing and the engineer shall decide forthwith, whether or not the same shall be carried out and if the engineer confirm his instructions, contractor's obligations and guarantees shall be modified to such an extent as may be mutually agreed. Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the contract price as the case may be.

32.2 In the event of the engineer requiring any variation, such reasonable and proper notice shall be given to the contractor to enable him to work his arrangements accordingly, and in cases where goods or materials are already prepared or any design, drawings or pattern made or work done requires to be altered, a reasonable and agreed sum in respect there of shall be paid to the contractor.

32.3 In any case in which the contractor has received instructions from the engineer as to the requirement of carrying out the altered or additional substituted work which either then or later on, will in the opinion of the contractor, involve a claim for additional payments, the contractor shall immediately and in no case later than thirty (30) days, after receipt of the instructions aforesaid and before carrying out the instructions, advise the engineer to that effect. But the engineer shall not become liable for the payment of any charges in respect of any such variations, unless the instructions for the performance of the same shall be confirmed in writing by the engineer.

32.4 If any variation in the works, results in reduction of contract price, the parties shall, agree, in writing, so to the extent of any change in the price, before in contractor proceeds with the change.

32.5 In all the above cases, in the event of a disagreement as to the reasonableness of the said sum, the decision of the engineer shall prevail.

32.6 Notwithstanding anything stated above in this clause, the engineer shall have the full power to instruct the contractor, in writing, during the execution of the contract, to vary to quantities of the items or groups of items. The contractor shall carry out such variations and be bound by the same conditions, as though the said variations occurred in the contract documents. However, the contract price shall be adjusted at the rates and the prices provided for the original quantities in the contract.

33.0 GUARANTEE/ DEFECT LIABILITY

33.1 The contractor shall warrant that the equipment will be new and in accordance with the contract documents and be free from defects in material, design, manufacture and workmanship for a period of forty-eight (48) calendar months commencing immediately upon the satisfactory completion of the trial operations. The contractor's liability shall be limited to the replacement of any defective parts in the equipment of his own manufacture or those of his sub-contractor (s)/ sub-vendor (s) or replacement of the complete equipment, under normal use and arising solely from faulty design, manufacture, materials, and/or workmanship provided always that such defective parts/ equipment are repairable at the site/ replacing the equipment as a whole without hampering the operation of the plant. Such replaced defective parts/ old equipment shall be returned to the contractor unless otherwise arranged. No repairs or replacements shall

be carried out by the engineer in charge of the employer during the 48 calendar months, as the plant is under the supervision of the contractor's supervisory engineers/staff.

33.2 The operation of the plant will be done departmentally by the respective subsidiary companies or by the EPC contractor, as per provisions of tender document. However, in both cases the successful EPC contractor shall be responsible for maintaining the plant during 48 calendar months including repair, replacement of the spare parts, components, equipment etc. free of cost.

33.3 If the facilities or any part thereof cannot be used by reason of such defect and/or making good such defect, 48 calendar months (i.e. four years of Defect liability period (DLP) including maintenance of plant by contractor or four years of Operation & Maintenance of plant by contractor, as per the provisions of tender document) of any 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 aforesaid reasons.

33.4 In case of failure of any equipment/system in during the initial period of 48 calendar months (i.e. four years of Defect liability period (DLP) including maintenance of plant by contractor or four years of DLP including Operation & Maintenance of plant by contractor, as per the provisions of tender document) the EPC contractor shall repair/replace the equipment/system etc. at his own cost.

All the equipment should be guaranteed for a minimum of 90% availability of plant during defect liability period from the date of commissioning calculated on quarterly basis.

The following formula may be adopted to calculate percentage availability.

$$\frac{\text{Total Shift Hours} - \text{Breakdown Hours} - \text{Maintenance Hours}}{\text{Total Shift Hours}} \times 100$$

Total shift hours=8×No. of shifts operated in 3 or 12 months as elaborated (quarterly/annual basis) including those on scheduled holidays.

In the event that equipment fails to achieve the availability herein provided, measured over each quarter, contractor shall be liable for and pay to the employer, as penalty, a sum equal to as indicated hereunder to be adjusted against running bill/performance guarantee:

In the event that equipment fails to achieve the availability herein provided, measured over each quarter, contractor shall be liable for and pay to the employer, as penalty, a sum equal to as indicated hereunder to be adjusted against running bill/performance guarantee:

- a. 0.25% of contract price [excluding GST and GST (Compensation to State) Cess] for reduction in every percentage or part thereof from guaranteed availability for first 10% (i.e. from 90% to 80%), calculated on quarterly basis.
- b. In case the availability falls below 80%, 10% of contract price [excluding GST and GST (Compensation to State) Cess] shall be deducted as penalty calculated on annual basis.

However, the total penalty on account of failure in guaranteed availability shall not exceed 10% of contract price [excluding GST and GST (Compensation to State) Cess].

34.0 REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS

34.1 If during the progress of the works the engineer shall decide and inform in writing to the contractor, that the contractor has manufactured any plant or part of the plant unsound or imperfect or has furnished any plant inferior than the quality specified, the contractor on receiving details of such defects or deficiencies shall at his own expense within seven (7) days of his receiving the notice, or otherwise, within such time as may be reasonably necessary for making it good, proceed to alter, re-

construct or remove such work and furnish fresh equipment upto the standards of the specifications. In case the contractor fails to do so, the engineer may on giving the contractor seven (7) days' notice in writing of his intentions to do so, proceed to remove the portion of the works so complained of and, at the cost of the contractor, perform all such work or furnish all such equipment provided that nothing in this clause shall be deemed to deprive the owner of or affect any rights under the contract which the owner may otherwise have in respect of such defects and deficiencies.

34.2 The contractor's full and extreme liability under this clause shall be satisfied by the payments to the owner of the extra cost, of such replacement procured, including erection, as provided for in the contract, such extra cost being the ascertained difference between the price paid by the owner for such replacements and the contract price portion for such defective plant and repayments of any sum paid by the owner to the contractor in respect of such defective plant. Should the owner not so replace the defective plant, the contractor's extreme liability under this clause shall be limited to repayment of all sums paid by the owner under the contract for such defective plant.

35.0 DEFENCE OF SUITS

If any action in court is brought against the owner or engineer or an officer or agent of the owner for the failure or neglect on the part of the contractor to perform any acts, matters, covenants or things under the contract, or for damage or injury caused by the alleged omission or negligence on the part of the contractor, his agents, representatives or his sub-contractors, workmen, suppliers or employees, the contractor shall in all such cases indemnify and keep the owner, and the engineer and/or his representative, harmless from all losses, damages, expenses or decrees arising of such action.

36.0 LIMITATIONS OF LIABILITIES

Except in cases of criminal negligence or wilful misconduct,

- i) Notwithstanding anything herein to the contrary, no party shall be liable for any indirect, special, punitive, consequential or exemplary damages, whether foreseeable or not, arising out of or in relation to this contract, loss of goodwill or profits, lost business however characterized, any / or from any other remote cause whatsoever.
- ii) The contractor shall not be liable to the Owner for any losses, claims, damages, costs or expenses whatsoever arising out of or in connection with this contract in excess of the contract value of the work which caused such losses, claims, damages, costs or expenses.
- iii) However, the limitation of liability of contractor indicated above shall not be apply to liquidated damages.

37.0 MARGINAL NOTES

The marginal notes to any clause of the contract shall not affect or control the construction of such clause.

38.0 TAXES, PERMITS & LICENCES

The contractor shall be liable and pay all- Indian taxes, [other than Goods and Services Tax(GST) and GST (Compensation to State) Cess if applicable] duties, levies, royalties, whether local, municipal, provincial or central, lawfully assessed against the owner or the contractor in pursuance of the contract. In addition, the contractor shall be responsible for payment of all Indian duties, levies and taxes lawfully assessed against the contractor for his personal income and property only. This clause shall be read in conjunction with clause 12.3 of Instruction to Bidders.

The contractor, along with his bills, shall submit proper documents in the name of the Company (CCL) to enable the Company(CCL) to claim Input Tax Credit under the applicable laws. The invoice shall be in compliance with the relevant rules.

CCL is entitled to avail Input Tax Credit on account of: CGST, SGST/UTGST, IGST and GST (Compensation to State) Cess, as applicable for indigenous product/ imported products. Hence

set off allowed against CGST, SGST/UTGST, IGST and GST (Compensation to State) Cess as per relevant rules/act. Contractor shall submit relevant document as desired by CCL at the time of supply, along with the bills/invoice as per relevant rules for enabling CCL to claim Input tax credit benefit.

39.0 PROGRESS REPORTS AND PHOTOGRAPHS

During the various stages of the works in the pursuance of the contract, the contractor shall at his own cost submit periodic progress reports as may be reasonably required by the engineer with such materials as charts, net-works, photographs, test certificates, etc. such progress report shall be in the form and size as may be required by the engineer and shall be submitted in at least three (3) copies.

40.0 LONG TERM AVAILABILITY OF SPARES

40.1 The contractor shall guarantee the long term availability of spares to the owner for the full life of the equipments 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 owner at least twelve (12) months 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-contractor. Further, in case of discontinuance of manufacture of any spares by the contractor or his sub-contractors the contractor will provide the owner two years in advance, with full manufacturing drawings, material specifications and technical information required by the owner for the purpose of manufacture of such items.

40.2 Further, in case of discontinuance of supply of spares by the contractor or his sub-contractors the contractor will provide the owner with full information for replacement of such spares with other equivalent makes, if so required by the owner.

40.3 The contractor shall provide the owner with a "directory" of his sub-contractors giving the addresses and other particulars of his sub-contractors. The owner, if he so desires, shall have the right to procure the spares directly from sub-contractors.

40.4 **Notwithstanding anything stated elsewhere in the bid documents, the prices of all spares which may be procured to cover long term requirements beyond the forty eight (48) calendar months, will be generally in accordance with the mutually agreed prices.**

40.5 The contractor will indicate in advance the delivery period of the items of spares, which the owner may procure in accordance with the sub-clause 40.4. In case of emergency requirements of spares, the contractor would make every effort to expedite the manufacture and delivery of such spares on the basis of mutually agreed time schedule.

40.6 The procedure specified in clause 40.4 and 40.5 shall apply for future procurement of items included in stand by spare list, mandatory spares lists, optional spares list and special tools, plants and equipment list, if any, specified in the bid documents.

40.7 The Contractor shall indemnify the owner for the availability of long time spares as per the terms and conditions laid down above in clause 40.1 to clause 40.6.

40.8 **In case of equipment/ system (including manufactured domestic and overseas) the availability of spare parts for additional sixty (60) calendar months after forty-eight (48) calendar months (i.e. four years of Defect liability period (DLP) including maintenance of plant by contractor or four years of Operation & Maintenance of plant by contractor, as per the provisions of tender document) shall have to be guaranteed by the contractor. In this regard, the contractor will have to provide, an undertaking from the respective OEMs regarding supply of spare parts and maintenance support as and when required during the said period, before signing of contract agreement and it should be made a part of contract agreement.**

41.0 PAYMENT

41.1 The payment to the contractor for the performance of the works under the contract will be made by the owner as per the guidelines and conditions specified herein. All payment made during the contract shall be on account payments only. The final payment will be made on completion of all the works and on fulfillment by the contractor of all his liabilities under the contract.

41.2 CURRENCY OF PAYMENT

All payments under the contract shall be in Indian Rupees only.

41.3 DUE DATES FOR PAYMENT

Owner will make progressive payment as and when the payment is due as per the terms of payment set forth in the accompanying technical specifications. Payment will become due and payable by the owner within thirty (30) days from the date of receipt of contractor's bill/invoice/debit note by the owner, provided the documents submitted are complete in all respects.

41.4 PAYMENT SCHEDULE

The contractor shall prepare and submit to the engineer for approval, a break-up of the contract price. This contract price break-up shall be interlinked with the agreed detailed PERT network of the contractor setting forth his starting and completion dates for the various key phases of works prepared as per condition of this section. While preparing the PERT network, the supply of P&M Equipment shall be linked to construction of respective Civil and Structural Works. Any payment under the contract shall be made only after the contractor's price break-up is approved by the engineer. The aggregate sum of the contractor's price break-up shall be equal to the lump sum contract price.

41.5 INTERIM PAYMENTS

41.5.1 The contractor shall submit running bill for the payment in the prescribed proforma of the owner to be supplied in due course at the time of payment.

41.5.2 Each such running bill shall state the amount claimed and shall set forth in detail, in the order of the payment schedule, particulars of the works including the works executed at site and of the equipment shipped/brought on to the site pursuant to the contract up to the date mentioned in the bill and for the period covered since the last preceding certificate, if any.

41.5.3 Every interim payment claim shall indicate the contract value of the works executed up to the date mentioned in the running bill, provided that no sum shall be included in any running bill in respect of the works that, according to the decision of the engineer, does not comply with the contract, or has been performed, at the date of certificate prematurely.

41.6 TERMS OF PAYMENTS

41.6.1 Payment: Since the total job is on turn-key basis, any payment to the Contractor before the final payment shall be treated as provisional payment towards the total contract value.

The Contractor may at intervals of not less than one month submit claims/ bills for payment on account of work done after proper scrutiny and certification of the same by the Employer. The progressive payment shall be made in respect of the following:

- a) Design engineering
- b) Civil construction including foundation and buildings
- c) Structural fabrication and erection
- d) Supply of equipment
- e) Machinery Erection
- f) Trial Run and commissioning

All such payments shall be made by the Employer online / through Account Payee Cheque within a month from the date of the submission of claims/bills. Payment will also be governed by Clauses of 3.0 of General Terms & Conditions of Contract. Any sum due from the Contractor shall be deducted from the first or next subsequent on account of payments as the case may be, in general the following procedure of payment shall be followed:

41.6.1.1 Design and Engineering.

- a) 90 % payment on completion of approval of system, mechanical, electrical, civil, structural design, drawings etc. as per contract on pro-rata basis.
- b) 5 % payment on Preliminary acceptance of the works after start-up and trial operation as per clause 14.1/14.2 of General Technical Conditions.
- c) 5% on issue of final acceptance certificate of the works after performance and guarantee test as per clause 14.3 of General Technical Conditions.

41.6.1.2 Civil/Structural Works:

- a) 95 % payment on progress of work completed, duly measured and certified by the engineer.
- c) 5 % on issue of final acceptance certificate of the works after performance and guarantee test as per General Technical Conditions.

41.6.1.3 Supply of Equipment:

- a) 90 % payment on receipt of the equipment conforming to stipulated specifications and quality in good condition at site to be certified by the site engineer.
- b) 5% on preliminary acceptance of the works after start-up and trial operation as per General Technical Conditions.
- c) 5% on issue of final acceptance certificate of the works after performance and guarantee test as per clause 14.3 of General Technical Conditions.

Note: The supply of equipment should commensurate with mutually agreed BAR/PERT chart.

41.6.1.4 Installation & Commissioning:

- a) 90% progress payment based on the installation and commissioning of plant and equipment duly certified by site engineer.
- b) 5% payment on preliminary acceptance of the works after start-up and trial operation as per General Technical Conditions.
- c) 5% on issue of final acceptance certificate of the works after performance and guarantee test as per General Technical Conditions.

41.6.1.5 Final Bill:

As soon as possible after completion of the works to the satisfaction of the Employer the Contractor shall forward a certified final bill. It shall be accompanied by all relevant vouchers, such as royalty clearance certificate (if any) from appropriate authorities, submission of copies of working drawings, technical documents as required documents showing therein all additions and alternations etc. in the process of execution, completion certificate for embedded and covered up works, plant handing over certificate etc. as applicable. The Contractor shall be paid full and final payment only after deduction of amounts paid against on account bill and any other amount due etc. payable by Contractor.

In cases where the Preliminary Acceptance Test (start-up & trial operation) and Final Acceptance Test (Performance Guarantee Test) is not completed for reasons not attributable to the contractor, the payment which is to be released after Preliminary Acceptance & Final Acceptance certificate will be released against equivalent amount of Bank Guarantee with validity upto actual completion (Initial BG validity should for 1(one) year and to be extended till actual completion of respective tests from time to time) of respective tests.

42.0 SETTLEMENT OF DISPUTES.

It is incumbent upon the contractor to avoid litigation and disputes during the course of execution. However, if such disputes take place between the contractor and the department, effort shall be made first to settle the disputes at the company level.

The contractor should make request in writing to the Engineer-in-charge for settlement of such disputes/ claims within 30 (thirty) days of arising of the cause of dispute/ claim failing which no disputes/ claims of the contractor shall be entertained by the company.

Effort shall be made to resolve the dispute in two stages

In first stage dispute shall be referred to Area GM or GM/HoD(C). If difference still persist the dispute shall be referred to a committee constituted by the owner. The committee shall have one member of the rank of Director of the company who shall be chairman of the committee.

If differences still persist, the settlement of the dispute shall be resolved in the following manner: Disputes relating to the commercial contracts with Central Public Sector Enterprises / Govt. Departments (except Railways, Income Tax, Customs & Excise)/ State Public Sector Enterprises shall be referred by either party for Arbitration to the PMA (Permanent Machinery of Arbitration) in the department of Public Enterprises.

In case of parties other than Govt. Agencies, the redressal of the dispute may be sought through Arbitration (THE ARBITRATION AND CONCILIATION ACT, 1996 as amended by AMENDMENT ACT of 2015).

42A. SETTLEMENT OF DISPUTES THROUGH ARBITRATION

If the parties fail to resolve the disputes/differences by in house mechanism, then, depending on the position of the case, either the employer/owner or the contractor shall give notice to other party to refer the matter to arbitration instead of directly approaching Court. The contractor shall, however, be entitled to invoke arbitration clause only after exhausting the remedy available under the clause 42.

In case of parties other than Govt. agencies, the redressal of disputes/differences shall be sought through Sole Arbitration as under.

Sole Arbitration:

In the event of any question, dispute or difference arising under these terms & conditions or any condition contained in this contract or interpretation of the terms of, or in connection with this Contract (except as to any matter the decision of which is specially provided for by these conditions), the same shall be referred to the sole arbitration of a person, appointed to be the arbitrator by the Competent Authority of CIL / CMD of Subsidiary Company (as the case may be). The award of the arbitrator shall be final and binding on the parties of this Contract.

(a) In the event of the Arbitrator dying, neglecting or refusing to act or resigning or being unable to act for any reason, or his/her award being set aside by the court for any reason, it shall be lawful for the Competent Authority of CIL / CMD of Subsidiary Company (as the case may be) to appoint another arbitrator in place of the outgoing arbitrator in the manner aforesaid.

(b) It is further a term of this contract that no person other than the person appointed by the Competent Authority of CIL /CMD of Subsidiary Company (as the case may be) as aforesaid should act as arbitrator and that, if for any reason that is not possible, the matter is not to be referred to Arbitration at all.

Subject as aforesaid, Arbitration and Conciliation Act, 1996 as amended by Amendment Act of 2015, and the rules thereunder and any statutory modification thereof for the time being in force shall be deemed to apply to the Arbitration proceedings under this clause.

The venue of arbitration shall be the place from which the contract is issued or such other place as the Competent Authority of CIL/ CMD of Subsidiary Company (as the case may be) at his discretion may determine.

Applicable Law: The contracts shall be interpreted in accordance with the laws of the Union of India.

Contracts with Partnership firm/Joint Venture/ Consortium:

The Partnership firm /Joint Venture/Consortium is required to submit written consent of all the partners to above arbitration clause at the time of submission of bid.

43. The company reserves the right to deduct/withhold any amount towards taxes, levies, etc. and to deal with such amount in terms of the provisions of the Statute or in terms of the direction of any Statutory authority and the company shall only provide with certificate towards such deduction and shall not be responsible for any reason whatsoever.

44. E-way Bill : The e-way bill required in connection with supply of goods or services, if any, shall be arranged by the contractor/supplier. However, the e-way bill will be arranged by CCL if provisions of the relevant Act and the rules made there under specifically states that the e-way bill is required to be issued by recipient of goods.

45. In the event of recovery of any claim towards LD Charges, Penalty, fee, fine or any other charges (except EMD) from the contractor/supplier, the same will be recovered along with the applicable GST and the amount shall be adjusted with the payment to be made to the contractor/supplier against their bill/invoice or any other dues.

46.0 DISCREPANCIES IN CONTRACT DOCUMENTS & ADJUSTMENTS THEREOF

46.1. In the event of varying or conflicting provision in any of the document(s) forming part of the contract, the Accepting Authority's decision/clarification shall hold good with regard to the intention of the document or contract as the case may be.

46.2. Any error in description, quantity or rate in Bill of Quantities or any omission there from, shall not vitiate the contract or release the contractor from discharging his obligations under the contract including execution of work according to the Drawings and Specifications forming part of the particular contract document.

ADDITIONAL TERMS & CONDITIONS OF CONTRACT

The following additional terms & conditions are also acceptable to the company. The tenderers are requested not to quote any additional conditions in their tender .

1. MOBILISATION ADVANCE :

i) A maximum of 10% of the total contract value of work will be paid as mobilization advance subject to submission of Bank Guarantee for 110% advance amount.

ii) Mobilisation Advance against survey, soil investigation, design & engineering shall be paid in two equal installments - one after signing of the agreement and the second after the system design drawings have been completed and detailed design work is to be taken up by the contractor.

iii) Mobilisation Advance against supply of equipments shall be released only after the contractor has finalized their vendors/suppliers for the specific equipment and the amount of advance shall be proportionate to the value of equipment for which vendors/suppliers have been finalized vis-à-vis the total value of equipments offered in the contract limited to 10% of the contract value.

iv) Mobilisation Advance against works contract for site activities shall be paid in two equal installments. First installment shall be paid after the contractor has opened their site office and having finalised their subcontractors. The second installment shall be paid for taking procurement action of construction materials like reinforcing steel and structural steel by the contractor.

v) The mobilisation advance shall be recovered from the bills of the contractor from the second running on account bills onward @ 20% of the advance amount paid.

However, the full amount of mobilization advance with interest will be recovered maximum within 12 (twelve) months from the date of commencement of work or one half of the stipulated period of completion (excluding operation & maintenance period), whichever is less.

vi) The value of Bank Guarantee may be reduced to the extent such advance is recovered by the company subject to the conditions that the value of Bank Guarantee amount at any time is more than the recoverable outstanding advance. Bank Guarantee shall be irrevocable and from a Nationalised Bank /Scheduled Bank.

vii) Interest on mobilisation advance will be charged at the rate of CIL's borrowing rate under cash credit arrangement on the last date of bid submission and to be compounded quarterly.

(viii). Mobilization advance will be given in instalments and subsequent instalments will be released after getting satisfactory Utilization Certificate from the contractor for the earlier instalments.

(ix). Part 'Bank Guarantee' (BGs) against the Mobilisation Advance shall be taken in as many numbers as the proposed recovery instalments and shall be equivalent to 110% of the amount of each instalment.

(x). In case of "Machinery and Equipment advance", insurance and hypothecation to the employer shall be ensured.

2.0 PRICE VARIATION CLAUSE :

2.1 The contract price shall remain firm without any price variation due to escalation for the portions of survey, geo-engineering investigations, design and engineering and supply of equipments, plant and machineries as envisaged in the scope of work and the price agreed thereon as per the contract except the statutory increase/decrease in taxes and duties such as GST, GST(Compensation to State) Cess etc.

If the contract is to be extended beyond the stipulated period for completion of the work due to fault on the part of the contractor escalation on prices should not be allowed further if not provided otherwise in the accepted contract.

2.2 For the portions of civil and structural works and erection and commissioning works of the plant & machineries, the price variation due to escalation shall be allowed to the extent as detailed hereinafter

2.2.1 If the prices of materials (not being materials supplied at fixed issue rates by the company) and wages of labour, required for execution of the work, increase, the contractor shall be compensated for such increase as per provisions detailed below :

a) The amount of the contract shall accordingly be varied, subject to the condition that such compensation for variation in prices shall be available only for the work done during the stipulated period of the contract as per the work programme agreed including such period for which the contract is validly extended under the provisions of the contract without any penal action.

b) The base date for working out such price variation shall be as on the last date of submission of bid (inclusive of price part) or the revised price bid (inclusive of revised offer if any), whichever is later.

c) The compensation of Price variation shall be worked out at quarterly intervals and shall be with respect to the cost of work done during the previous three months . The first such payment shall be made at the end of three months after the month (Excluding) in which the tender was accepted and thereafter at three months' interval.

2.2.1.1 PRICE VARIATION FOR LABOUR:

The amount paid to the contractor for the work done shall be adjusted for increase or decrease in the cost of labour and the cost shall be calculated quarterly in accordance with the following formula:

$$V L = W \times \frac{A}{100} \times \frac{L - L_0}{L_0}$$

Where :

V L = Variation in labour cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

W = Value of work done during the period under reckoning to which the price variation relates as indicated in clause no. 2.3 of the 'ADDITIONAL TERMS & CONDITIONS OF CONTRACT'.

A = Component of labour expressed as percentage of the total value of work adopted from Table-1
 Lo= Minimum wages for unskilled workers payable as per the Minimum Wages Act / Rules of the State or Central Government, whichever is more, applicable to the place of work as on the last date stipulated for receipt of the Price bids or Revised Price bids whichever is later.
 L = Revised minimum wages of unskilled workers corresponding to Lo during the period to which the escalation relates.

2.2.1.2 Price Variation on Materials :

The amount to be paid to the contractor for the work done shall be adjusted for increase or decrease in the cost of materials and the cost shall be calculated quarterly in accordance with the following formula:

$$V_m = W \times \frac{B}{100} \times \frac{M - M_o}{M_o}$$

Where :

V_m = Variation in material cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

W = Value of work done during the period under reckoning to which the price variation relates as indicated in clause no. 2.3 of the 'ADDITIONAL TERMS & CONDITIONS OF CONTRACT'.

B = Component of material expressed as percentage of the total value of work adopted from Table-1

M = Average All India Wholesale Price Index for all commodities for the period to which price variation relates as published by the RBI Bulletin, Ministry of Industry & Commerce, Govt. Of India.

M_o = All India Wholesale Price Index for all commodities as published by the RBI Bulletin, Ministry of Industry & Commerce, Govt. Of India, relating to the last date on which the price bids or revised price bids whichever is later were stipulated to be received.

2.2.1.3 PRICE VARIATION ON POL :

The amount to be paid to the contractor for the work done shall be adjusted for increase or decrease in the cost of POL and the cost shall be calculated quarterly in accordance with the following formula:

$$V_f = W \times \frac{C}{100} \times \frac{F - F_o}{F_o}$$

Where :

V_f = Variation in the cost of fuel, oil & lubricants increase or decrease in the amount in rupees to be paid or recovered.

W = Value of work done during the period under reckoning to which the price variation relates as indicated in clause no. 2.3 of the 'ADDITIONAL TERMS & CONDITIONS OF CONTRACT'.

C = Component of POL expressed as percentage of total value of work adopted from Table-1

F = Average Index Number for Wholesale Price for the group of fuel, power, light and lubricants as published by Economic Advisor, Ministry of Industry, Govt. Of India prevalent on the last date of receipt of price bids whichever is later.

2.3 WHILE CALCULATING THE VALUE OF "W" THE FOLLOWING MAY BE NOTED. :

The cost on which the escalation/price variation shall be payable shall be reckoned as 85% of the cost of work as per the bills to which escalation relates , and from this amount the value of materials supplied or services rendered at the prescribed charges under the relevant provisions of the contract , and proposed to recovered in the particular bill , shall be deducted before the amount of compensation for escalation/price variation is worked out. Further the cost shall not include any work for which payment is made at prevailing market rates.

2.4 In the event the price of materials and/ or wages of labour required for execution of the work decreases, there shall be downward adjustment of the work so that such price of materials and/or wages of labour shall be deductible from the cost of work under this contract and in this regard the formulae hereinbefore stated under this clause shall mutatis /mutandis apply.

For all other works not listed above , the component of labour , material and POL of the total cost of work shall be as specifically indicated in the tender document.

The price variation clause as stated above will be applied for extended time frame of a contract by following the principles as under

i) Normally, if and when it is understood that a contract is not going to be completed within the scheduled time period, the contract is kept operative by extending the time of completion provisionally. During this provisional extended period the operation of the Price Variation Clause will remain suspended.

ii) If and when it is decided at the end of the successful completion of the work that the delay was due to causes not attributable to the contractor, then the Price Variation Clause will be revived and applied as if the scheduled date of completion has been shifted to the approved extended date.

iii) If it is decided at the end of successful completion of the work that the delay was due to the fault of the contractor then the Price Variation Clause will not be revived and no payment will be made to the contractor on this account. Additionally the Clause related to Compensation for delay will be applied.

iv) In some cases the total delay may be partially due to causes not attributable to the contractor and partially due to his fault. It may be difficult to exactly quantify the total delay proportionately in such cases. The Price Variation Clause under such condition will be made operative for the entire extended time period by freezing the relevant indices on the date of the scheduled date of completion as originally fixed in the contract/ agreement. At the same time the Clause related to the compensation for delay will also be applied.

Table - 1

Value of A , B & C in the Price variation formula in the 'Additional Terms and Conditions of Contract :

Sl. No.	Particulars	A (Labour component)	B (Material component)	C (POL component)
1	Sewage Treatment Plant (STP)	10	90	Nil

2.5 CEILING ON PRICE VARIATION DUE TO ESCALATION

There shall be a ceiling on price variation due to escalation covered under clauses mentioned hereinbefore on the whole contract, limited to 10% of the 'Contract Price' only. ['Contract Price' means the total awarded cost excluding GST and GST (Compensation to State) Cess].

2.6 VARIATION IN THE TAXES, DUTIES, LEVIES ETC.

Other statutory variation due to increase in taxes, duties, levies etc. by Govt. (Central or State or Local) as on the last date of submission of bid, with the taxes, duties, levies etc. during the manufacture/works/supply, as the case may be, shall be born by the owner. Similarly decrease in taxes, duties, levies etc. shall be returned/deducted to/by the owner.

SPECIAL TERMS AND CONDITIONS

1. Additions to Payment Terms

This work is broadly divided in three part viz.

Part-1. Sewerage pipeline network,

Part- 2. Sewage Treatment Plant,

Part-3. Operation and maintenance for four years.

Both the works as mentioned at Part-1 & Part-2 above should be started simultaneously. While making payment for Part-2 i.e. Sewage Treatment Plant specifically, 80% payment of progressive billing at any stage will be released and balance 20% will be kept withheld, which will be subsequently released after successful completion of Part- 1 i.e. Sewerage pipeline network.

2. SPECIAL TERMS AND CONDITIONS W.R.T ELECTRICAL CONSUMPTION

The contractor shall submit to the Engineer I/C within thirty (30) days from the date of acceptance of the award letter, his electrical power requirements, if any, to allow the planning of the temporary electrical distribution by the Engineer I/C.

- The contractor shall be provided with supply of electricity for the purposes of the *contract, only at one point in the project site. In extreme emergency. it. more supply points are required due to non-feasibility of power supply from single point at another work place. the requirement to be evaluated by Engineer 1/C for the work & PE(E&M) of the mine and approval of General Manager of the Area in writing to be taken, specifying the reason for providing more than 01 (One) supply point.
- The contractor shall 'make his own further distribution arrangement. All temporary wiring must comply with local regulations and will be subject to engineer's inspection and approval before connection to supply.
- Power supply for labour colonies (if any) shall also be provided at one point.
- The contractor shall he charged for the power supplied at work site and labour colonies as per the rate of respective Supply point of Distribution agency from where power is being received by the contractor.
- Engineer I/C of the work and PE(E&M) of the project is responsible for proper & timely meter reading. monthly bill raising against energy consumed and deduction from the bills of contractor on monthly basis
- The electricity reading may be calculated in the following way:

Total monthly bill amount as raised by Distribution Agency (A)	Total KVAH consumed by the Area (B)	Unit rate (C)= (A)/(B)	Total KVAH consumed by the contractor as per the energy meter reading (D)	Total Electricity charges of the contractor for the month (E) = 1.05*(C)*(D)

- The total electricity charges of the contractor for the month also includes 5% internal distribution loss charges / administrative charges.
- The derived rate will cover all the charges including electricity duty. Also. GST is to be charged at the applicable rate.
- At the point of metering, the contractor has to bear the cost for installation of energy meter, AB Switches, Changeover Switches etc. as and when required to maintain electrical safety.
- It is the responsibility of contractor to ensure maintenance of all the electrical equipment, as mentioned above. Breakdown of any equipment (As stated above) must be repaired/ rectified/ replaced by the contractor immediately, but not-later than 30 days. If not repaired within the stipulated period, Engineer-in-Charge & PE(E&M) of the project will ensure that the repairing/ rectification/ replacement is done through them and the resultant cost is deducted from the bill of the contractor.

GENERAL TECHNICAL CONDITIONS

1. **GENERAL**

This part covers technical conditions pursuant to the contract and will form an integral part of the contract. The following provisions shall supplement all the detailed technical specifications and requirements brought out in the accompanying technical specifications. The contractor's proposal shall be based on the use of equipment and materials complying fully with the requirements, specified herein.

2. **LIMIT OF CONTRACT**

Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the technical specifications unless included in the list of exclusions. All similar standard components/parts of similar standard equipment provided, shall be inter-changeable with one another.

3. **EQUIPMENT PERFORMANCE GUARANTEE**

- 3.1. The performance tests of the equipment under the scope of the contract are detailed in the technical specifications. These guarantees shall supplement the general performance guarantee provisions covered under general terms & conditions of contract in clause entitled "Guarantee".
- 3.2. Liquidated damages for not meeting performance guarantee during the performance and guarantee tests shall be assessed and recovered from the contractor, as detailed in the General Technical Conditions. Such liquidated damages shall be without any limitation whatsoever and shall be in addition to damages, if any payable under any other clauses of conditions of contract.

4. **ENGINEERING DATA**

- 4.1 The furnishing of engineering data by the contractor shall be in accordance with the schedule for each set of equipment as specified in the technical specifications. The review of these data by the engineer will cover only general conformance of the data to the specifications and documents, interfaces with the equipment provided under the specifications, external connections and of the dimensions which might affect plant layout. This review by the engineer may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and/or approval by the engineer shall not be construed by the contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.
- 4.2 All engineering data submitted by the contractor after final process including review and approval by the engineer shall form part of the contract documents and the entire works covered under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the engineer in writing.

5. DRAWING

- 5.1 All drawings submitted by the contractor including those submitted at the time of bid shall be sufficiently detailed to indicate the type, size, arrangement, weight of each component, break-up for packing and shipment, the external-connections, fixing arrangements required, the dimensions required for installation and inter-connections with other equipment and materials, clearances and spaces required between various portions of equipment and any other information specifically requested in the specifications.
- 5.2 Each drawing submitted by the contractor shall be clearly marked with the name of the owner, the unit designation, the specifications title, the specification number and the name of the project. If standard catalogue pages are submitted the applicable items shall be indicated therein. All titles, notings, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.
- 5.3 The owner may use a 35 mm microfilm system in processing drawings. All drawings shall be suitable for microfilming. Drawings which are not suitable for microfilming will not be accepted. A copy of each drawings reviewed will be returned to the contractor as stipulated herein. The owner may also accept and use floppies/ disks for computer based drawings.
 - 5.3.1 Copies of drawings returned to the contractor will be in the form of a print with the owner's marking, or a print made from a microfilm of the marked up drawing or in the form of aperture cards if the contractor has facilities to process such cards or print made from floppies for computer based drawings..
- 5.4 The drawings submitted by the contractor shall be reviewed by the engineer as far as practicable within four (4) weeks and shall be modified by the contractor if any modifications and/or corrections are required by the engineer. The contractor shall incorporate such modifications and/or corrections and submit the final drawings for approval. Any delay arising out of failure by the contractor to rectify the drawings in good time shall not alter the contract completion date.
- 5.5 Approval by the Nodal Officer or his Nominee: the Contractor shall submit specifications and drawings showing the proposed Temporary Works to the Nodal Officer/Engineer-in-charge or his Nominee, who is to approve them if they comply with the specifications and drawings. The Contractor shall be responsible for design of Temporary Works. The Nodal Officer/Engineer-in-charge or nominee's approval shall not alter the contractor's responsibility for design of the Temporary Works.
- 5.6 The drawings sent for approval to the engineer shall be in quintuplicate. One print of such drawings will be returned to the contractor by the engineer marked approved/approved with corrections. The contractor shall thereupon furnish the owner with nine prints and one reproducible original of the drawings after incorporating all corrections.
- 5.7 Further work by the contractor shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the engineer, if so required.
- 5.8 All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawings shall be at the contractor's risk. The contractor may make may changes in the design which are necessary to make the equipment conform, to the provisions and intent of the contract and such changes will again be subject to approval by the engineer. Approval of contractor's drawings or work by the engineer shall not relieve the contractor of any of his responsibilities and liabilities under the contract.
- 5.9 Drawings shall include all installation and detailed piping drawings wherever applicable. All piping 100 mm and larger shall be routed in detail and smaller pipe shall be shown

schematically or by isometric drawings. All drawings shall be fully corrected to agree with actual as built construction.

- 5.10 Operating and Maintenance Manual: If “as built” drawings and/or operating and Maintenance Manuals are required the contract shall supply them by the dates stated in the contract data.

If the Contractor does not supply the drawings and/or Manuals by the dates stated in the contract data, or they do not receive the Nodal Officer or his Nominee’s approval, the Nodal Officer or his Nominee shall withhold the amount stated in the contract data from payments due to the contractor.

6. INSTRUCTION MANUALS

- 6.1 The contractor shall submit to the engineer, preliminary instruction manuals for all the equipment, covered under the contract within the time agreed upon between the owner & the contractor. The final instruction manuals complete in all respects shall be submitted by the contractor thirty (30) days before the first shipment of the equipment. The instruction manuals shall contain full details and drawings of all the equipment furnished, the erection procedures, testing procedures, operation and maintenance procedures of the equipment. These instruction manuals shall be submitted in the form of one (1) reproducible original and three (03) copies.
- 6.2 If after the commissioning and initial operation of the plant, the instruction manuals require any modifications/ additions/changes, the same shall be incorporated and the updated final instruction manuals in the form of one (1) reproducible original and three (03) copies shall be submitted by the contractor to the owner.
- 6.3 The contractor shall furnish to the owner, three (03) sets of spare parts catalogue.

7. FIRST FILL OF CONSUMABLE, OILS AND LUBRICANTS

All the first fill of consumable such as oils, lubricants and essential chemicals etc., which will be required to put the equipment covered under the scope of the specifications, into successful trial operation, shall be furnished by the contractor unless specifically excluded under the exclusions in the specifications and other documents.

8. MANUFACTURING SCHEDULE

The contractor shall submit to the engineer his manufacture and delivery schedules for all equipment within thirty (30) days from the date of the letter of acceptance of tender. Such schedules shall be in line with the detailed net-work for all phases of the work of the contractor. Such schedules shall be reviewed, up-dated and submitted to the engineer, once every two (2) months thereafter, by the contractor. Schedule shall also include the materials and equipment purchased from outside suppliers.

9. REFERENCE STANDARDS

- 9.1 The codes and/or standards referred to in these specifications shall govern, in all cases wherever such references are made. In case of a conflict between such codes and/or standards and the specifications, the latter shall govern. Such codes and/or standards referred to shall mean the latest revisions, amendments/changes adopted and published

by the relevant agencies. In case of any further conflict in this matter, the same shall be referred to the engineer whose decision shall be final and binding.

9.2 Other internationally acceptable standards which ensure equal or higher performance than those specified shall also be accepted.

10. DESIGN IMPROVEMENT

10.1 The engineer or the contractor may propose changes in the specification of the equipment or quality thereof and if the parties agree upon any such changes the specification shall be modified accordingly.

10.2 If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the contractor proceeds with the change. Following such agreement the provision thereof, shall be deemed to have been amended accordingly.

11. QUALITY ASSURANCE

11.1 Quality Assurance Programme

To ensure that the equipment and services under the scope of this contract whether manufactured or performed within the contractor's works or at his sub-contractor's premises or at the owner's site or at any other place of work are in accordance with the specifications, the contractor shall adopt suitable quality assurance programme to control such activities at all points necessary. Such programme shall be outlined by the contractor and shall be finally accepted by the engineer after discussions before the issue of letter of acceptance of tender. A quality assurance programme of the contractor shall generally cover the following :

- a. his organisation structure for the management and implementation of the proposed quality assurance programme:
- b. documentation control system:
- c. qualification data for bidder's key personnel:
- d. the procedure for purchase of materials, parts components and selection of sub-contractor's services including vendor analysis, source inspection, incoming raw-material inspection, verification of materials purchased etc.:
- e. system for shop manufacturing and site erection control including process control and fabrication and assembly controls:
- f. control of non-conforming items and system for corrective actions:
- g. inspection and test procedure both for manufacture and field activities:
- h. control of calibration and testing of measuring and testing equipment:
- i. system for indication and appraisal of inspection status:
- j. system for quality audits:
- k. system for authorising release of manufactured product to the owner:
- l. system for maintenance of records:
- m. system for handling storage and delivery: and

- n. a quality plan detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of equipment furnished and each work at different stages executed at work site

11.2 Quality Assurance Documents

The contractor shall be required to submit the following Quality Assurance Documents within three weeks after dispatch of the equipment:

- i. All non-destructive examination procedures stress relief and weld repair procedure actually used during fabrication.
- ii. Welder and welding operator qualification certificates.
- iii. Welder identification list, listing welders and welding operator's qualification procedure and welding identification symbols.
- iv. Material mill test reports on components as specified by the specification.
- v. The inspection plan with verification, inspection plan check points, verification sketches, if used, and methods used to verify that the inspection and testing points in the inspection plan were performed satisfactorily.
- vi. Sketches and drawings used for indicating the method of traceability of the radiographs to the location on the equipment.
- vii. All non-destructive examination result reports including radiography interpretation reports.
- viii. Stress relief time temperature charts.
- ix. Factory test results for testing required as per applicable codes and standard referred in the specifications.
- x. The engineer or his duly authorised representative reserves the right to carry out quality audit and quality surveillance of the systems and procedures of the contractor/his vendor's quality management and control activities.

12. **ENGINEER'S SUPERVISION**

12.1 To eliminate delays and avoid disputes and litigation it is agreed between the parties to the contract that all matters and questions shall be referred to the engineer and his decision shall be final.

12.2 The work shall be performed under the direction and supervision of the engineer. The scope of the duties of the engineer, pursuant to the contract, will include but not be limited to the following:

- a. interpretation of all the terms and conditions of these documents and specification.
- b. review and interpretation of all the contractor's drawings, engineering data etc.
- c. witness or authorise his representative to witness tests and trials either at the manufacturer's works or at site, or at any place where work is performed under the contract.
- d. inspect, accept or reject any equipment, material and work under the contract.
- e. issue certificate of acceptance and/or progressive payment and final payment certificates.
- f. review and suggest modifications and improvements in completion schedules from time to time.
- g. supervise the quality assurance programme implementation at all stages of the works.

- h. to receive and endorse the despatch documents enabling the contractor to clear the consignments.

13. INSPECTION, TESTING AND INSPECTION CERTIFICATE

- 13.1.** The engineer, his duly authorized representative and/or outside inspection agency acting on behalf of the owner shall have at all reasonable times access to the contractor's premises or works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the works during its manufacture or erection and if part of the works is being manufactured or assembled at other premises or works, the contractor shall obtain for the engineer and for his duly authorized representative permission to inspect as if the works were manufactured or assembled on the contractor's own premises or works.
- 13.2.** The contractor shall give the Engineer/Inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the contractor's account except for the expenses of the Inspector. The Engineer/Inspector, unless 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 contractor may proceed with the 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 tests in triplicate.
- 13.3.** The Engineer or Inspector shall within fifteen (15) days from the date of inspection as defined herein give notice in writing to the contractor, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the contract. The contractor shall give due consideration to such objections and shall either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Engineer/Inspector giving reasons therein, that no modifications are necessary to comply with the contract.
- 13.4.** When the factory tests have been completed at the contractor's or sub-contractor's works, the Engineer/Inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Engineer/Inspector, the certificate shall be issued within fifteen (15) days of the receipt of the contractor's test certificate by the Engineer/Inspector. Failure of the Engineer/Inspector to issue such a certificate shall not prevent the contractor from proceeding with the works. The completion of these tests or the issue of the certificate shall not bind the owner to accept the equipment should it, on further tests after erection, be found not to comply with the contract.
- 13.5.** In all cases where the contract provides for tests whether at the premises or works of the contractor or of any sub-contractor, the contractor, except where otherwise specified, shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Engineer/Inspector or his authorised representative to carry out effectively such

tests of the equipment in accordance with the contract and shall given facilities to the Engineer/Inspector or to his authorized representative to accomplish testing.

- 13.6. The inspection by Engineer and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the contractor in respect of the agreed quality assurance programme forming a part of the contract.

14. **TEST**

14.1 Start up

- 14.1.1 On completion of erection of the equipment and before start-up, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Engineer and the contractor for correctness and completeness of installation and acceptability of start-up, leading to initial pre-commissioning tests at site. The list of pre-commissioning tests to be performed shall be as mutually agreed and included in the contractor's quality assurance programme.
- 14.1.2 The contractor's commissioning/start-up engineers specifically identified as far as possible shall be responsible for carrying out all the pre-commissioning tests. On completion of inspection, checking and after the pre-commissioning tests are satisfactorily over, the complete equipment shall be placed on initial operation during which period the complete equipment shall be operated integral with sub-systems and supporting equipment as a complete plant referred hereinafter as plant.

14.2 **Trial Operation**

- 14.2.1 The **Treatment Plant** shall then be on trial operation during which period all necessary adjustments shall be made while operating over the full load-range enabling the **Treatment Plant** to be made ready for performance and guarantee tests.
- 14.2.2 The duration of trial operation of the complete equipment shall be fourteen (14) days out of which at least seventy two (72) hours shall be continuous operation on full load or any other duration as may be agreed to, between the engineer and the contractor. The trial operation shall be considered successful, provided that each item of the equipment can operate continuously at the specified operating characteristics, for the period of trial operation.
- 14.2.3 For the period of trial operation, the time of operation with any load shall be counted. Minor interruptions not exceeding four (4) hours at a time, caused during the continuous operation shall not affect the total duration of trial operation. However, if in the opinion of the engineer, the interruption is long, the trial operation shall be prolonged for the period of interruption.
- 14.2.4 A trial operation report comprising of observations and recordings of various parameters to be measured in respect of the above trial operation shall be prepared by the contractor. This report, besides recording the details of the various observations during trial run, shall also include the dates of start and finish of the trial operations and shall be signed by the representatives of both the parties. The report shall have sheets, recording all the details of interruptions occurred, adjustments made and any minor repairs done during the trial operation. Based on the observations, necessary modifications/ repairs to the plant shall be carried out by the contractor to the full satisfaction of the engineer to enable the later to accord permission to carry out performance and guarantee tests on the plant. However, minor defects which do not endanger the safe operation of the equipment, shall not be considered as reasons for withholding the aforesaid permission.

14.3 Performance and guarantee test

- 14.3.1 The final test as to the performance and guarantees shall be conducted at site, by the owner. Such tests will be commenced within a period of two (2) months after successful completion of trial operations. Any extension of time beyond the above two (2) months shall be mutually agreed upon.
- 14.3.2 These tests shall be binding on both the parties of the contract to determine compliance of the equipment with the performance guarantees.
- 14.3.3 The available instrumentation and control equipment will be used during such tests and the engineer will calibrate, all such measuring equipment and devices as far as practicable. However, un-measurable parameters shall be taken into account in a reasonable manner by the engineer, for the equipment of these tests. The tests will be conducted at the specified load points and as near the specified cycle condition as practicable. The engineer will apply proper corrections in calculation, to take into account conditions which do not correspond to the specified conditions.
- 14.3.4 Any special equipment, tools and tackles required for the successful completion of the performance and guarantee tests shall be provided by the contractor, free of cost.
- 14.3.5 The guaranteed performance figures of the equipment shall be proved by the contractor during these performance and guarantee tests. Should the results of these tests show any decrease from the guaranteed values, the contractor shall modify the equipment as required to enable it to meet the guarantees. In such case, performance and guarantee tests shall be repeated within one month, from the date the equipment is ready for re-tests and all cost for modifications including labour, materials and the cost of additional testing to prove that the equipment meets the guarantees, shall be borne by the contractor. Duration of performance guarantee tests will be of one month of which 6 (six) days continuous on load operation is the minimum requirement and in case it fails , the process of performance guarantee tests will be repeated.
- 14.3.6 The specific tests to be conducted on equipment has been brought out in the technical specifications.
- 14.3.7 Performance and guarantee test shall make allowance for instrumentation errors as may be decided by the engineer-in-charge.

14.4 TEST CODES

The provisions outlined in the ASME performance test codes or other international and Indian approved equivalents shall generally be used as a guide for all the above test procedures unless otherwise specified in the technical specifications.

15. PACKING

15.1. 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. While packing all the materials, the limitation from the point of view of availability of railway wagon sizes in India should be taken into account. The contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing.

16. PROTECTION

All coated surfaces shall be protected against abrasions, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device. All ends of all valves and piping

and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage. The parts which are likely to get rusted, due to exposure to weather, should also be properly treated and protected in a suitable manner.

17. **PRESERVATIVE SHOP COATING**

17.1. All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall before hand be treated and protected for the life of the equipment. All surfaces shall be thoroughly cleaned of all mill scale, oxide and other coatings and prepared in the shop. The surfaces that are to be finish painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. Transformers and other electrical equipment, if included shall be shop finished with one or more coats of primer and two coats of high grade resistance enamel. The finished colours shall be as per manufacturer's standards, to be selected and specified by the engineering at a later date.

17.2. Shop primer for all steel surfaces which will be exposed to operating temperature below 95oC shall be selected by the contractor, after obtaining specific approval of the engineer regarding the quality of primer proposed to be applied. Special high temperature primer shall be used on surfaces exposed to temperatures higher than 95oC and such primers shall also be subject to the approval of the engineer.

17.3. All other steel surfaces which are not to be painted shall be coated with suitable dust preventive compound subject to the approval of the engineer

18. **PROTECTIVE GUARDS**

Suitable guards shall be provided for protection of personnel on all exposed rotating and/or moving machine parts. All such guards with necessary spares and accessories shall be designed for easy installation and removal for maintenance purposes.

19. **DESIGN CO-ORDINATION**

The contractor shall be responsible for the selection and design of appropriate equipment to provide the best co-ordinate performance of the entire system. The basic design requirements are detailed out in Technical Specifications. The design of various components, sub-assemblies and assemblies shall be so done, so that it facilitates easy field assembly and maintenance. All the rotating components shall be so selected that the natural frequency of the complete unit is not critical at or close to the operating range of the unit.

20. **DESIGN CO-ORDINATION MEETING**

The contractor will be called upon to attend design co-ordination meetings with the engineer, other contractors and the consultants of the owner during the period of contract. The contractor shall attend such meetings at his own cost as and when required and fully co-operate with such persons and agencies involved during those discussions.

21. **TOOLS AND TACKLES**

The contractor shall supply with the equipment one complete set of all special tools and tackles for the erection, assembly, dis-assembly and maintenance of the equipment. However, these tools and tackles shall be separately packed and brought on to site.

22. **NOISE LEVEL**

The equivalent 'A' weighted sound level measured at a distance of 1.5 metres above floor level in elevation and one metre horizontally from the base of any equipment furnished and installed under these specifications, expressed in decibels to a reference of 0.0002 microbar, shall not exceed 85 dBA.

23. **TAKING OVER**

Upon successful completion of all the tests to be performed at site on equipment furnished and erected by the contractor, the engineer shall issue to the contractor a taking over certificate as a proof of the final acceptance of the equipment. Such certificate shall not unreasonably be withheld nor will be engineer delay the issuance thereof, on account of minor omissions or defects which do not affect the commercial operation and/or cause any serious risk to the equipment. Such certificate shall not relieve the contractor of any of his obligations which otherwise survive, by the terms and conditions of the contract after issuance of such certificate.

24. **INDIAN STANDARDS**

Normally Indian Standards as published by BUREAU OF INDIAN STANDARDS shall be followed. Wherever relevant Indian Standard is not published by the BIS, International Standards or American Standard or German Standard or British Standard, as decided by the Engineer in consultations with the Consultants employed by the Owner, shall be followed.

25. **WELDING**

If the manufacturer has special requirements relating to the welding procedures for welds at the terminals of the equipment to be procured by the owner under separate specifications, the requirements shall be submitted to the engineer in advance of commencement of erection work.

26. **LUBRICATION**

Equipment shall be lubricated by systems designed for continuous operation. Lubricant level indicators shall be furnished and marked to indicate proper levels under both stand-still and operating conditions.

27. **EQUIPMENT BASES**

A cast iron or welded steel base plate shall be provided for all rotating equipment which is to be installed on a concrete/structural steel base unless otherwise agreed to by the engineer. Each base plate shall support the unit and its drive assembly, shall be of a neat design with pads for anchoring the units, shall have a raised lip all around, and shall have threaded drain connections.

28. NAME PLATES AND LABELS

- 28.1 Each main and auxiliary items of Treatment Plant or its co related accessories is to have permanently attached to it in a conspicuous position a rating plate of non corrosive material upon which is to be engraved the manufacturer's name, equipment, type or serial number, together with details of the loading conditions under which the item of plant in question have been designed to operate, and such diagram plates as may be required by the engineer.
- 28.2 Each item of Treatment Plant or its co related accessories is to be provided with a nameplate or label designating the service of the particular equipment. The inscriptions are to be approved by the engineer or shall be as detailed in the appropriate sections of the technical specifications.
- 28.3 Such nameplates or labels are to be of white non-hygroscopic material with engraved black lettering or, alternatively, in the case of indoor circuit breakers, starters etc. of transparent plastic material with suitably coloured lettering engraved on the back.
- 28.4 Items of Treatment Plant or its co related accessories such as valves, which are subject to handling, are to be provided with an engraved chromium plated nameplate or label with engraving filled with enamel.
- 28.5 All such name plates, instruction plates, lubrication charts etc. shall be bilingual with Hindi inscription first, followed by English. Alternatively two separate plates one with Hindi and the other with English inscriptions may be provided.

29. COLOUR CODE FOR PIPE SERVICES

All pipe services wherever applicable are to be painted in accordance with the owner's standard colour scheme, by the contractor.

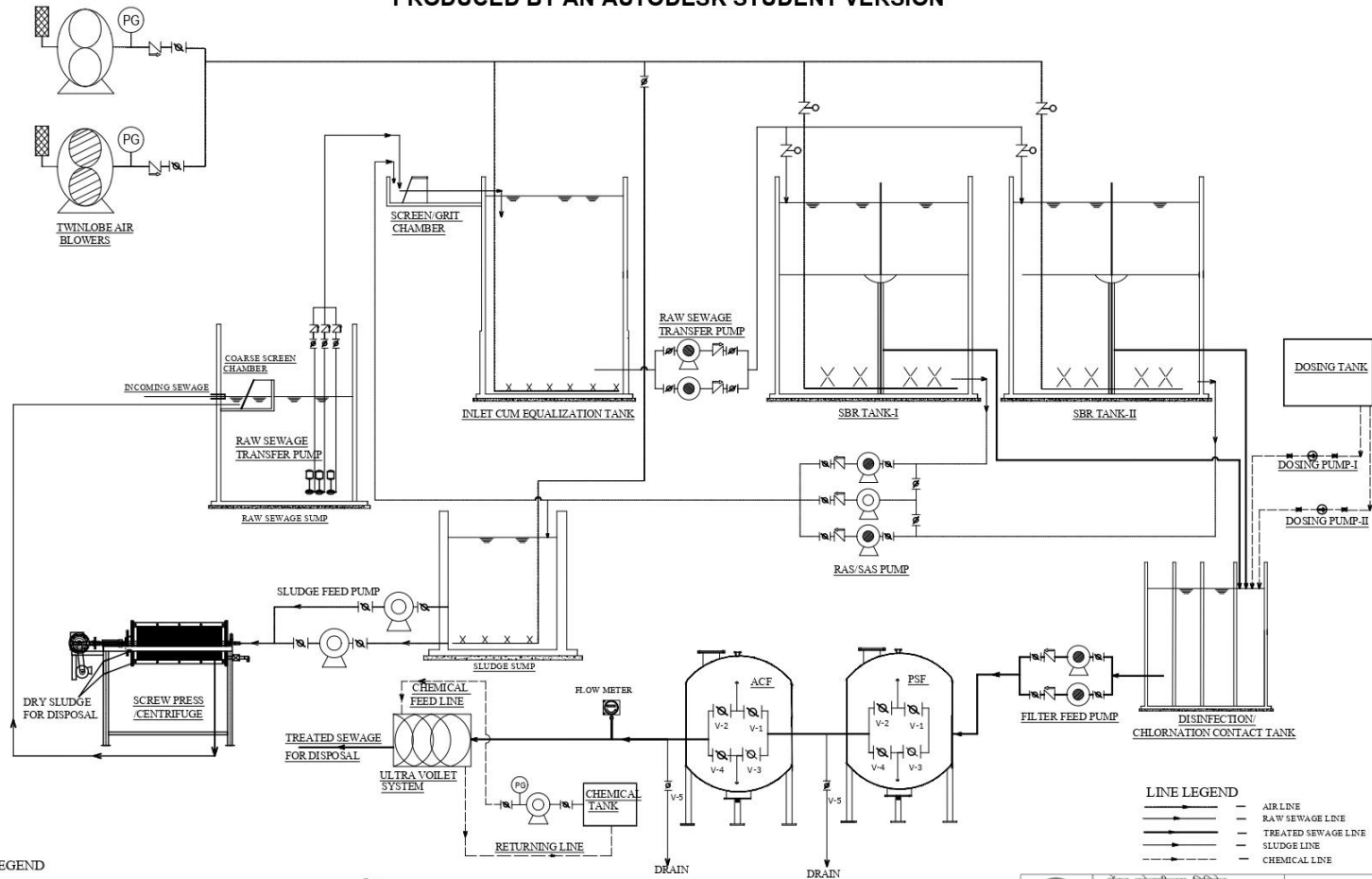
30. SERVICE BY THE OWNER

- 30.1 The following services shall be provided by the owner :
 - i. Construction/ drinking water at one point within 100 metres of the work site, charges to be decided by the company.
 - ii. Auxiliary power for construction at one point within 100 metres of the work site, charges to be decided by the company.
- 30.2 In the event of the contractor requiring these services at parameters other than those specified above, for any systems, equipment, instrument etc. he shall make the necessary arrangements himself.

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- LEGEND**
- SUBMERSIBLE PUMP WORKING
 - SUBMERSIBLE PUMP STAND BY
 - CENTRIFUGAL PUMP WORKING
 - CENTRIFUGAL PUMP STAND BY
 - BUTTERFLY VALVE
 - MOTOR
 - MOTORIZED VALVE
 - SLUDGE VALVE
 - NON RETURN VALVE
 - AIR BLOWER WORKING
 - AIR BLOWER STAND BY
 - FLOW METER
 - PRESSURE GAUGE
 - GATE

- NOTES:-**
- ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED.
 - ALL LEVELS ARE BASED ON N.G.LVL 100.00
 - WALL THICKNESSES SHOWN IN DRAWING ARE INDICATIVE AND IT SHALL BE AS PER STRUCTURAL DESIGN.
 - LOCATION OF UNIT MAY CHANGE TO SUITE SITE CONDISION

- LINE LEGEND**
- AIR LINE
 - RAW SEWAGE LINE
 - TREATED SEWAGE LINE
 - SLUDGE LINE
 - CHEMICAL LINE

	सेंट्रल कोलफील्ड्स लिमिटेड (कोल इंडिया की स्वतंत्र इकाई) दरभंगा हाउस सं. 834 029	
	CENTRAL COALFIELDS LIMITED (A Subsidiary of Coal India Limited) CIVIL ENGINEERING DEPARTMENT DARBHANGA HOUSE, RANCHI 834 029	
	Project: SEWERAGE TREATMENT PLANT	
	Title: Process Flow Diagram Drg. No.: STP PFD 01 Released for Tendering Process	
		Sheet 1 Scale: NTS

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Scope of Work and General/Technical Specifications

- 1.0 **GENERAL :**
- 1.1 The scope of work will be in general but not limited to Site survey , Planning , Design, Detailed Engineering civil, mechanical, electrical, instrumentation, raw/treated sewage carrying pipeline network, construction of whole STP system including incoming pipeline network and providing all machineries and equipment, construction of a proper pucca shed and boundary wall for STP , testing, trial runs, commissioning and guaranteeing including operation, maintenance (including spares, consumables) of STP of capacity as mentioned in NIT and as per detailed technical specifications and data sheet. The scope also includes geotechnical survey of plot to derive soil bearing capacity, strata classification and details of water table etc and also the geotechnical survey, planning, designing laying and construction of sewage pipeline network with chambers , pumping stations etc. from inside of each residential / community/ office buildings existing in the colony to STP. Any dismantling work needed and subsequent rebuilding/repair work will have to be done by the contractor at his own cost . The design of the proposed STP is based on the Cyclic Activated Sludge Process (SBR Technology), well established process for treatment of domestic sewage. The tenderers are to adopt the same nomenclature used for various treatment units in their design report as used in the tender documents.
- 1.2 The contractor will execute the STP of required capacity on Sequential Batch Reactor (SBR) technology including planning and designing of all elements, supply & installation of all electro-mechanical components, design of all civil works, commissioning, sewage networking, start-up and 04 (Four) years Operation and maintenance . Construction of boundary wall with gate, a pucca shed with proper finish over treatment plant and landscaping in the premises of STP shall also form the part of the scope of STP Contract. .
- 1.3 The contractor shall bear responsibility for attaining proper characteristics of the final sewage effluent as per standard norms .It will make any addition/alterations to the equipment or plant without any extra cost , if the effluent fails to meet the required standard characteristics .
- 1.4 Bidder has to collect the required data like soil investigation report, bore log data, topography, NGL, HFL and Discharge level of the final treated effluent etc at his own expenses . Drawings enclosed in this tender are indicative only. Bidder has to submit the actual hydraulic drawings, plant layout, piping & instrumentation diagram based on technically & commercially viable option based on the Cyclic Activated Sludge Process (SBR technology) for biological treatment of sewage. *Alternative process proposals will not be accepted.*
- 1.5 The bidder is advised to depute a suitable representative to visit and examine the site of work and its surroundings for fully understanding of the job and ascertain the difficulties that may be encountered during execution of the works and for obtaining for himself, on his own responsibility, all information that may be necessary for preparing the bid and entering into the Contract. The cost of visiting the site shall be entirely at bidder's own expense. The bidder and

any of its personnel will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection.

- 1.6 **LOCATION OF PLANT:** The location of sewage treatment plant to be constructed shall be decided jointly by the Engineer-In-Charge and the contractor on the basis of geotechnical survey and contour map and technical feasibility on non-coal bearing land free from all encumbrances and in absolute possession of CCL.

2.0 **SCOPE OF WORK :**

General :

The Scope of Work in general includes but not limited to the following Units/ works :

- 1.Site survey of the colony and likely STP. Preparation of site plan, contour plan etc.
- 2.Geo technical investigation of the site, soil for proper planning and structural design of structures.
3. Planning , designing and construction of raw sewage pipeline network inside the colony . The sewage has to be collected from toilet, bathroom and kitchen of each habitat / quarters/ community buildings / offices existing in the colony . For this purpose , all possible arrangement will have to be made . The pipeline network will include waste water pipe of suitable material/quality/size , sanitary chambers of different sizes, intermittent pumping stations with all fittings , if required etc.. Necessary dismantling work of any old existing work has to be done along with proper rebuilding/repair works which will be included in this contract and no extra payment will be made on this account. The pipeline work will have to be done up to STP.
4. Planning , design , construction of various units of STP for proper sewage treatment to attain desired effluent characteristics for its safe disposal . The various units covered under it are as follows ;
 - a.Primary treatment Units comprising Inlet Chamber, Coarse Bar Screen, Oil and Grease chamber , Raw sewage collection sump , Equalization tank with required pumping arrangement.
 - b. Biological Treatment Units based on Cyclic Activated Sludge Process (Sequential Batch Reactor (SBR)) technology.
 - c. Disinfection (Chlorination) Units comprising Chlorination Tank and chlorine dosing pump of suitable capacity/ arrangement.
 - d. Pressure Sand Filter and Activated Carbon Filter with proper pumping arrangement
 - e. Ultra violet system for disinfection
 - f. Sludge sump with pumping arrangement
 - g. Sludge Dewatering Units comprising of centrifuge system.

h. Administrative Building including PLC (Programmable Logic Controller)/SCADA (Supervisory Control and Data Acquisition) cum MCC & Control Building with required proper furniture with suitable capacity and attached toilet.

i. Pucca Shed with proper internal finish over treatment units , 2.1 mt. height masonry was with RCC pillars around the STP with proper size main gate. Construction of approach road to plant from nearby road , foundations for machineries etc. all complete.

j. Required Landscaping & leveling, horticultural work in STP campus.

k. Any other allied works required for successful completion and operation of the STP.

- 2.1 Work under this contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required together with shop drawings and required details for the complete Sewage Treatment Plant, completely in accordance with the specifications and drawings enclosed with this tender generally comprising but not limited to the items mentioned in the following sections.
- 2.2 Detailed engineering and preparation of all working drawings as per design data given in the document and actual site conditions to be determined by the contractor.
- 2.3 The Contractor shall be responsible for the entire STP and adjoining areas planning and design including the pipelines, gravity lines, manholes chambers, roads etc. as per requirement, within the specified battery limits.
- 2.4 Interconnecting piping between all units, valves, gates and all other appurtenances and devices as required.
- 2.5 All mechanical equipments duly protected against corrosion.
- 2.6 All electric drives, motor control centers, power and control cables (except main incoming feeder and yard lighting).
- 2.7 All instrumentation, control cabling, panels complete in all respects.
- 2.8 All units are shown on the General Arrangement drawing. The drawing is enclosed for guidance of the contractor. The contractor shall work out detailed layout and flow scheme with levels. The contractor may suggest minor changes in the proposed flow scheme, ensuring that the basic design data conforms to as given in the contract document.
- 2.10 The bearing capacity of soil shall be ascertained after proper soil investigation for design of different structures, to know the influent quality of effluent the contractor shall conduct proper tests, as may be required for successful execution and commissioning. Contractor shall verify/check all levels and other information given in the tender/drawings. No extra payment shall be admissible for any variation in levels or other site data.

- 2.11 The defects liability period for this contract shall be 48 (Forty-Eight) months from the date of successful commissioning of the systems. Contractor shall fulfill all specified obligations during the defects liability period.
- 2.12 The comprehensive operation and maintenance period shall commence from the date of successful commissioning of the systems. During this maintenance period, the contractor shall provide all lubricants, consumables & chemicals as required. The contractor shall provide round-the-clock, all supervisory/unskilled staff. The personnel for maintenance operator and helper etc. shall be provided by tenderer at his own cost. Regular testing of the final effluent characteristics will be done by the contractor and proper record will be maintained. The contractor shall also train any operational personnel as deputed by the dept., about the method of operation and maintenance of the plant, its functioning, control and internal laboratory testing operations if required.
- 2.13 The contractor shall submit the Operation and Maintenance Manual for the plant with complete set of drawings and normal operations instructions at the time of commissioning of the plant.
- 2.14 Without restricting to the generality of the foregoing, the main elements of the Sewage Treatment Plant shall consist of:-
(Refer General Arrangement drawing enclosed with the tender document.)

i. Design & construction of all civil works, to consist of:-

(Note : The size/no./ capacity of each unit shall be as per the standard design)

- 1.Raw sewage collection pipeline with suitable size RCC /masonry chambers/manholes
- 2.Intermittent pump house , if needed,
3. Raw sewage collection sump
4. Oil and Grease Chamber , if required
5. Screen/Grit Chamber
6. Equalization tank
- 7.Aeration tank (SBR Technology)
- 8.Disinfection tank with chemical dosing tank
9. Sludge Sump tank
10. Plant office Room with proper furniture
11. Pucca shed over entire plant with proper inside finish
12. All Equipment Foundations
13. 2.1 mt height masonry with RCC pillar boundary wall with gate
- 15 . Required Landscaping, levelling, horticulture works inside STP campus.
- 15.Approach road to plant from nearby road
- 16.Any other allied work required

2.14.2 Mechanical Equipment

Design, supply, erection, commissioning and testing of all mechanical equipment, as discussed in the proceeding sections, generally comprising of:

(Note : The size/ no./ capacity of each unit/equipment will be as per standard design)

- a) Bar Screen with frame and scrapper
- b) Raw Sewage Sump Pump for intermittent pumping stations and for transfer to equalization tank

- c) Air blowers with motor .
- d) Air diffuser and distribution assembly.
- e) Mech. arrangements for SBR Tank
- f) Sewage transfer pump from equalization tank to SBR tank,
- g) RAS/WAS Pump
- h) Pressure sand filter with pumps,
- i) Activated Carbon Filter
- j) Screw Press/Solid bowl Centrifuge for Sludge handling arrangements
- k) All Pipe-line and valves
- l) Electrical panel, cable etc
- m) Ultra violet system of disinfection tank with chemical dosing tank
- n) Chlorine dosing pump
- o) Any other equipment required for proper functioning of STP or as per dept.'s requirements.

2.14.3 **Electrical Equipment**

Design, Supply, Erection, Commissioning and Testing of all Electrical equipment generally comprising of:

(Note : The size/no.s/capacity of each unit/equipment shall be as per standard design)

- a) Electric motors for all equipments as required.
- b) Automation Panel and accessories for Auto On/off control of Entire STP
- c) Electrical cables from M.C.C panel to all electric motors and units.
- d) Electric earthing stations as per I.E.E. rules.
- e) Proper internal and external lighting around the STP , Ceiling fan etc. with proper wiring .

2.14.4 **Piping Work**

Laying of all piping work , valves, gates etc. as per detailed designs and generally for:

- a) All above mentioned civil structure and tanks.
- b) For the interconnection of the various equipments, sludge sump, pump house and control room.
- c) All interconnecting piping between various units bypass etc.
- d) Effluent piping within limits as shown on the drawings.
- e) All Piping required for providing STP is completed and tested.

2.14.5 **Instrumentation and automation Equipment**

Design, supply, erection, commissioning and testing of all Instrumentation & PLC software (SCADA) to Control the entire plant including all the pumps and blowers. All the limit switches, probes and control cabling shall be inclusive of the scope of work. The automation system should be inclusive of HMI, process and operator software with dynamic flow chart displayed on monitor compatible to up to date PC, Energy Management.

2.14.6 **Sewarage pipeline Network :**

Survey, Designing, laying / construction of sewerage pipeline network for carrying sewage/ domestic effluent from the toilet, bathroom and kitchen inside a quarter / community or public building existing in the colony to STP on Turn-key basis. The scope of work includes providing, laying and jointing RCC pipes class NP- 2 pipes of required diameters, construction of adequate shape, size and numbers of manhole, chambers, Inspection chambers, intermittent pumping

stations if needed in RCC/Brickwork, saddle supports, PCC bedding, wherever required including all other constructions, items and accessories for smooth carriage of sewage to STP. The item includes necessary excavations in all kinds of soil/rock, proper shoring and shuttering/strutting, refilling with sand/earth, watering, interconnecting the sewer line with manholes and inspection chambers, hydraulic testing of pipes, valves, gates, accessories and cost of jointing materials. The items also includes cutting and reinstatement of roads, pavements and drains etc., (Bituminous/Cement Concrete/RCC) and other structures / other development works etc coming if any in the line of sewerage pipeline network all complete job as per detailed specifications and as directed by EIC. Approximate length of sewer line has been mentioned in BOQ/PRICE-BID which is tentative and actual length has to be ascertained as per planning and design . The entire work is to be carried out in conformity with CPWD specifications. The unit of measurement shall be Lump Sum of finished pipe line work consisting of all the works mentioned above.

2.14.6 In addition to above, the scope of the work shall include but not be limited to the following:

- Topographical and Geotechnical Survey including Subsoil Investigation for Water Table and Safe Allowable Bearing Capacity.
- Site Development including but not be limited to the following works:
- Cutting of unwanted Tress, Plants, Bushes and Shrubs etc. and removing the same form Site. However, the Employer shall arrange necessary approval for the same.
- Demolishing the existing Structures and removing the debris from Site.
- Shifting of Pipe Lines, Cables and Poles etc. if required.
- Level dressing of the undulated portion of the proposed STP site.
- Levelling and grading to improve the aesthetics and to facilitate the vehicular movement.
- Construction of temporary Labour Shelters nearby Site.
- Preparation of Process, Hydraulic, Civil, Mechanical, Piping, Electrical and Instrumentation Design and Drawings including Construction, Architectural and As- built Drawings.
- Construction of Civil Engineering Works for all the Process Units, Buildings and Plant Drains etc. as detailed in Civil Specifications. Layout shall be made in such way that all Process Units and Buildings are interconnected and can be accessed from one Point.
- Hydraulic testing of all water retaining structures after applying the epoxy painting.
- Providing Plinth Protection along the periphery of all the Process Units & Buildings shall be provided as detailed in Civil Specifications.
- Providing internal and External Plaster to Buildings as detailed in Civil Specifications.
- Providing Internal Black Anti Corrosive Bitumastic Paint and External Water Proof Cement Paint to all Process Units.
- Providing Internal Acrylic Washable Paint and External Acrylic Smooth Exterior Paint to all Buildings.
- Providing Rolling Shutters, Doors and Windows & Ventilators in all Buildings.
- Providing External Epoxy Paint to all Steels Works made of MS or GI.
- Providing S/S Hand Railing along all the Stairs and Walkways of all Process Units.
- Testing of parameters for raw and treated sewage.
- Supply, Erection, Testing & Commissioning of all the Mechanical Equipments as detailed in Mechanical Specifications.
- Supply, erection, testing & commissioning of all the Piping, Gates & Valves as detailed in Mechanical Specifications.

- Supply, Erection, Testing & Commissioning of all the Electrical Equipments as detailed in Electrical Specifications.
- Supply, Erection, Testing & Commissioning of all the Instrumentation Equipments as detailed in Electrical/Instrumentation Specifications.
- PLC(Programmable Logic Controller)/PC/SCADA (Supervisory Control and Data Acquisition) based Automation System for STP as detailed in Specifications.
- Supply, Erection, Testing & Commissioning of Safety Equipments at required locations including Safety Showers, Sand Buckets, Fire Extinguishers, Fire Alarms etc.
- Planting of Trees and Plants / Landscaping.
- Trial Run of the constructed & hydraulically tested Plant along for a period of Two(2) months and Operation & Maintenance (O & M) for 48 months after Trial Run as per Tender specifications.
- Supply of all Spares, chemicals, Tools & Tackles required during Performance Run and O&M Period.
- Repairing & reconditioning of all the Equipments in the concluding year of the Operation & Maintenance Period to such a condition that they are in running condition with regular preventive and recommended maintenance.
- Providing “on the job” training to the Employer’s personnel.
- Defects Liability Period of 12 months from the date of successful completion of Performance Run.
- Preparation and submission of As-Built Drawings and Operation & Maintenance Manuals for Mechanical, Electrical & Instrumentation Items.
- Operation and maintenance of sewage treatment plant after successfully commissioning for a period of 04 (Four) years.
- 2.1 mt. height masonry with RCC pillars boundary wall around STP land with main gate as directed /approved by Engineer – In-Charge.
- Construction of pucca approach road to STP from nearby road .
- Proper internal and external lighting of STP campus.

Any other Items which have not been specifically mentioned in specifications but are necessary for construction of the Plant as per good engineering practice, safety norms and successful operation and guaranteed performance of the entire Plant shall be deemed to be included within Scope of Work and shall be provided by the Contractor without any extra cost to the Employer.

The Bidders are advised to visit the STP site and properly assess the site situation/ condition , available site features, colony condition , site for piping work , general topography , carriage of materials to site and storage , site for labour camp etc. before quoting for the proposed STP.

NOTE : The Contractor shall ensure the technical feasibility of his Offer submitted after visiting the Site. It must be clearly understood that as the Contract is a “Turnkey Contract”, the Contractor shall design and execute every such Item(s) of Work(s) which are considered required or necessary for the satisfactory completion and functioning of the entire Plant

including Operation & Maintenance of the plant even if such Item(s) of Work(s) are not specified in the Bid documents, but are essential to complete the Plant.

3.0 DESIGN PARAMETERS, PROPOSED TREATMENT SCHEME & TECHNICAL SPECIFICATIONS :

3.1 : DESIGN BASIS

3.8.1 Inlet Parameters: -For planning and designing purpose, all the required characteristic parameters like pH, BOD/COD, TSS, O&G, TFC, Colour, Odour, Turbidity etc. of raw sewage must be properly tested and ascertained. Accordingly the design should be made to achieve the standard quality parameters of final effluent before disposal .

3.1.2 Treated effluent Quality: - The final treated effluent quality must be as per the standard guidelines . Further , the digested sludge must be stored properly and handed over to dept. time to time .

3.2 PROPOSED TREATMENT SCHEME :

3.2.1 SEWAGE TREATMENT PLANT :

Sewage Treatment plant is provided for treating domestic sewage collected from the residential colonies. This facility is installed not only for complying the legal requirement of Pollution control board, but also to ensure that the treated water is utilized for gardening and flushing activities. The treatment Process / system is designed on the principle of advance Activated Sludge process (Sequential Batch Reactor , SBR technology) with further filtration with sand and activated carbon which ensures the aerobic decomposition of organic matter in presence of active microbial growth in the aeration tank.

3.2.2 PROCESS DESIGN BASIS :

Sewage treatment plant is designed for SBR technology combined with Ultra filtration technology for enhancing final treated sewage quality.

3.2.3 Hydraulic Loading Rate :

The total Design hydraulic loading rate for the proposed sewage treatment plant is as per the information provided in the BOQ in MLD. The quantity calculation is based upon the water demand per Capita per day, assuming 80% of total water is converted to sewage. Sewage generation sources are assumed to be from human wastes from the residential colonies may be having few public/ office buildings too.

3.2.4 PROCESS

In the sewage treatment plant (S.T.P.), Activated Sludge Process (ASP) treatment is given.

The ASP units in the plant consists of

- Bar Screen Chamber
- Oil & Grease Chamber

Raw sewage collection sump

- Equalization tank with aeration
 - SBR tank with aeration
 - Dosing tank
 - Chlorination contact tank
 - Pressure sand filter
 - Activated carbon filter
- Ultra Violet system of disinfection with chemical tank
 Sludge tank with aeration
 Screw press centrifuge

3.2.5 Pre treatment system

Raw sewage generated from various sources is collected in the raw sewage sump and then transferred to Equalization Tank, after passing through a manually operated Bar Screen that screens the large, floating matter. The collected screenings are disposed off manually. In the equalization tank, sufficient retention time is provided to equalize and homogenize the variations in the flow and pollutant concentration. A Coarse Bubble Air Mixing System is provided to mix, and Keep the sewage in an aerobic condition.

3.2.6 Secondary Treatment System (Aeration Tank)

From the equalization tank, raw sewage is pumped into the SBR tank. In this tank sufficient amount of air is supplied to oxidize the organics absorbed by the bacterial biomass.

3.2.7 SBR tank

The Sequential Batch Reactor (SBR) Process shall be an advanced activated sludge process which shall utilize a Fill-and-Draw Reactor with complete-mix regime and operating in true-batch mode. The complete process shall be divided into Cycles with each Cycle is of fixed duration as required by the technology provider. All the subsequent treatment Steps – Fill/Aeration, Settling and Decanting must take place sequentially and independently without overlapping. During Fill/Aeration phase, the sewage shall be filled into SBR Basins and part of the treated sewage along with activated sludge shall be recycled with the help of Recycle Pumps. Air shall be supplied for aeration with the help of Air Blowers. During Settling phase, the Filling/Aeration shall be stopped and the mixed content shall be allowed to settle under perfect settling conditions. During Decanting phase, the supernatant shall be removed from top with the help of Decanters and excess sludge shall be wasted with the help of Waste Pumps.

3.2.8. Disinfection Tank

The effluent from SBR tank is collected in disinfection tank where it is treated with chlorine for killing germs etc..

3.2.9. Filtration :

Subsequently , the chlorinated sewage is filtered through Pressure Sand Filter and Activated Carbon Filter to remove the traces of suspended solids, organics, colour and odour present in

the treated sewage and then it is disinfected using ultra violet system of disinfection. It is then collected for either disposal or re-use .

3.2.10 Sludge Dewatering/Handling

Sludge which is collected in the sludge holding tank will be removed frequently. This sludge is therefore pumped to filter press. The filter press is a mechanical device which converts the sludge into sludge cakes. After the formation of sludge cakes the sludge has to be disposed off suitably. The filtrate water from the filter press is again recycled to equalization tank by means of a sump pump.

4. Technical Specifications and Design parameters for different units of Sewage Treatment Plant

4.1. Raw Sewage Sump and Pumps:

Sewage enters into Raw sewage sump of the Pumping Station after screening. The Raw sewage sump shall be circular/rectangular in shape and shall be designed for an average flow. The capacity of the Raw sewage sump should be kept such that the detention time in the Raw sewage sump shall be minimum 5 minutes of peak flow and the maximum detention time shall not exceed 30 minutes at average flow.

Following criteria's shall be considered to size the sump:

1. That the pump of the minimum duty/ capacity would run for at least 5 minutes considering no inflow or minimum flow.
2. The capacity of the sump is to be so kept that with any combination of inflow and pumping the operating cycle for any pump will not be less than 5 minutes and
3. The arrangement of the submersible pumps as per pump manufacturer's data i.e. spacing between pumps, minimum space between pump and wall etc.
4. The side water depth (live liquid depth) shall be minimum 1.5 meter. In addition to the above liquid depth an additional depression shall be provided to ensure adequate submergence of the pump as per the manufactures recommendations Pumping Station should have a Room adequate for installing electrical panels. Suitable arrangement should be provided for lifting of pumps.
5. The effective liquid volume shall be provided below the invert level of the Screen Channels after leaving provision for a minimum free fall of 0.3 m.

IS: 3370 and IS: 4111 (part 4) shall be followed for the design and construction of Raw sewage sump. Pumping Machinery shall be designed for required capacity average flow and a peak factor of 3. There shall be three pumps of required capacity to handle the peak flow. The pumps shall be submersible raw sewage pumps with centrifugal, non-clog type design. The speed of pump shall be 1000 rpm. The impeller should be of a non-clog design with smooth passage and solid handling capability of 100 mm size.

The pumps shall have cutting edges facing the impeller to share the floating and suspended clogging materials like fibers, plastics, etc. The pumps will have automatic coupling arrangement at discharge end for removal and a guide pipe and chain in SS 304 will be provided for removal and lowering of

pumps. Pump shall run smooth without undue noise and vibration. Noise level shall be limited to 85db at 1.86m. Vibration shall be limited as per BS 4675 Part I.

Bearing shall be easily accessible for inspection and maintenance. The bearings shall be having a minimum life of 25000 hours of working. The motor shall be squirrel cage type, suitable for three phase supply, continuous duty with class 'F' insulation. Motor shall have integral cable parts and the cable entries shall be sealed. The cables shall be leak tight with respect to liquids and firmly attached to the terminal block. The Motor shall be designed for non-overloading characteristic of quantity. The Motor HP shall be at least 10% more than required at duty point.

The critical speed of the rotor shall be at least 30% above the operating speed. Complete rotor shall be balanced dynamically. The moisture sensor of the tripping unit shall be located inside the oil chamber.

Capacity of Raw Sewage sump : To accommodate peak flow.
 Minimum Retention Time : 5 minutes minimum at peak flow
 No. of Pumps : 3 Nos (2W + 1S)
 Capacity of Pumps : 3 nos each of required capacity
 Type of pumps : Submersible type non-clog design
 Solid Passage : 50 mm max

The size of the tank shall be suitable to accommodate the number of pumps required for operation with future provisions and easy maneuverability.

COARSE SCREEN CHAMBER :

One manual Coarse Bar Screen of 20 mm opening shall be provided in the Coarse Screen Chamber. Screen Channel shall be designed for peak flow. The Coarse screen shall be made of Stainless Steel (SS) flats with 20 mm perforation.

The Bar Screen shall be fabricated from 30 mm x 5 mm stainless steel bars. RCC Platform shall be provided at the upper level to enable operation of the Screen. Suitable S/S Railing shall be provided around the entire periphery of the Platform.

Number of Units : 1 Manual
 Velocity through Screen at Average Flow (m/sec) : 0.6 maximum
 Velocity through Screen at Peak Flow (m/sec.) : 1.2 maximum
 Min Free Board : 0.5m

4.1.1 Raw Sewage Sump:

Description	Specification
Numbers	1 No.
Capacity	5minutes (retention time) at peak flow
Dimension of Tank	As per Scope
Free Board	-
Material of Construction	RCC M-30
Numbers	1
Proposed Screen Type	Coarse
Material of Construction	SS

Bar Size	30mm x 5mm
Clear Spacing	20mm
Size of Screen	As per Scope

4.1.2 RAW SEWAGE PUMPS:

Description	Specification
Qty.	3 Nos (2 Working +1 Standby)
Flow	As per Scope
Head	As per Scope
MOC	CI
Type	Non Clog Sewage submersible Pump Sets Suitable for operation of 3 phase, 415 volts, 50 Hz AC supply

4.2 FINE BAR SCREEN CHAMBER

One Mechanical (Working) with one Manual (Standby) Bar Screen shall be provided in the Fine Screen chambers. The Screen chambers shall be designed for peak flow. The clear opening for Manual Bar Screen shall be 10 mm. The Manual Bar Screens shall be of 5 mm thick Stainless Steel (SS 304) flats.

RCC Platform shall be provided at the upper level to enable operation. S/S Railing shall be provided around the entire periphery of the Platform. The entire structure is to be minimum M30 concrete and as per IS 3370 including the Platform. Platform shall be 900 mm wide and shall be provided for access from the ground level to the top of the Unit & to the Operating platform.

Total Average flow	:	AS per required capacity
Peak factor	:	3
Design Flow	:	3 times of average flow
Number of Units`	:	1(One) Mechanical Working + 1(One) Manual Standby
Velocity through Screen at Avg. Flow (m/sec.)	:	0.6 maximum
Velocity through Screen at Peak Flow (m/sec)	:	1.2 maximum
Min Free board	:	0.5 m

All other accessories, whether specified or not, but required for completeness of the Contract shall be in Contractor's scope.

Description	Specification
Numbers	1(One) Mechanical Working +1(One) Manual Standby of peak capacity
Type	Fine
Material of Construction for screen	SS
Bar Size	30mm x 5mm
Clear Spacing	10mm

Size of Screen	As per Scope
Material of Construction	RCC M-30

4.3 GRIT CHAMBER

Two Manual Grit Chamber is proposed after Fine Screen Units. The Manual Grit Chamber shall be a rectangular tank designed for an average flow of required capacity with a peak factor of 3. RCC Platform shall be provided at the upper level to enable operation. S/S Railing shall be provided around the entire periphery of the Platform. The entire structure is to be minimum M30 concrete and as per IS 3370 including the Platform. Platform shall be 900 mm wide and shall be provided for access from the ground level to the top of the Unit & to the Operating platform.

Average Flow	:	As per required capacity
Peak Factor	:	3
Peak Flow	:	3 times of average flow
No of Units	:	2
Type	:	Manual
Size of grit particle	:	0.15 mm
Specific gravity of grit	:	2.65
Surface Overflow Rate	:	960 m ³ /m ² /day
Free Board	:	0.5 m
Side Water Depth	:	as per design requirement

All other accessories, whether specified or not, but required for completion of Contract shall form the part of Contractors scope.

Description	Specification
Numbers	2
Chamber Size	As per Scope
Material of Construction	RCC M-30

4.4 INLET CUM EQUALIZATION TANK

Equalization Tank shall be designed for minimize the variation of incoming sewage. The grade of concrete for the entire RCC construction shall be M 30.

Number of Units	:	1
Detention Period	:	min 6 hrs
Min Free Board	:	0.5 m

All other accessories, whether specified or not, but required for completion of Contract shall form the part of Contractors scope.

4.4.1 INLET CUM EQUALIZATION TANK

Description	Specification
Numbers	1
Material of Construction	RCC M-30

Tank Size	As per Scope
Volume of Tank	As per Scope
Air Grid	
Type of Air grid	Header & lateral
Air required	Minimum 10% of tank volume per hour
Material of Construction	SS

4.4.2 RAW SEWAGE PUMPS (AT EQUALIZATION TANK):

Description	Specification
Qty.	2 Nos (1 Working +1 Standby)
Flow	As per Scope
Head	As per Scope
MOC	Cast Iron
Type	Non Clog Sewage duty Pump Sets Suitable for operation of 3 phase, 415 volts, 50 Hz AC supply

4.5 SBR TANK:

The Sequential Batch Reactor (SBR) Process shall be an advanced activated sludge process which shall utilize a Fill-and-Draw Reactor with complete-mix regime and operating in true-batch mode. The complete process shall be divided into Cycles with each Cycle is of fixed duration as required by the technology provider. All the subsequent treatment Steps – Fill/Aeration, Settling and Decanting must take place sequentially and independently without overlapping. During Fill/Aeration phase, the sewage shall be filled into SBR Basins and part of the treated sewage along with activated sludge shall be recycled with the help of Recycle Pumps. Air shall be supplied for aeration with the help of Air Blowers. During Settling phase, the Filling/Aeration shall be stopped and the mixed content shall be allowed to settle under perfect settling conditions. During Decanting phase, the supernatant shall be removed from top with the help of Decanters and excess sludge shall be wasted with the help of Waste Pumps.

The Bidder shall provide the most advanced and proven SBR technology being in successful operation and meeting Standards of the Treated Sewage / Effluent Quality. The performance of the same shall be demonstrated by providing necessary Authenticated Certificates issued by the competent authority.

4.5.1 Process Design

- The biological treatment section comprising SBR Process shall be installed and equipped for required capacity average flow. However, the system shall be designed for handling peak flow capacity of 3 times of average flow.
- The complete biological process shall be divided into Cycles. Each Cycle shall be of fixed hours as mentioned below duration during which all treatment steps shall take place.
 - Fill/Aerate: shall be provided by the bidder suitable for peak flow of required capacity plant
 - Settling: shall be provided by the bidder suitable for peak flow of 3 times of average flow

- Decanting: shall be provided by the bidder suitable for peak flow of 3 times of average flow .
- Filling/Aeration, Settling and Decanting shall take place in three separate phases and Filling during Settling and Decanting shall be avoided.
- Minimum 2 Nos. of Basins with adequate volume shall be provided. In addition, 0.50 m free board shall be provided to each Basin. Maximum liquid depth of each Basin shall be restricted to 6.00 m.
- SBR Process Basins will be constructed in minimum M30 grade concrete and as per IS 3370.
- The system should be designed for maximum F/M Ratio of 0.1 – 0.18 KgBOD/Kg MLSS. Day.
- MLSS maintained in the Basin should range from 3000 to 5000 mg/l.
- The excess sludge produced shall be fully digested.
- In the SBR Basins, Filling during Settling or Decanting will not be acceptable.

4.5.2 Decanting Device

4.5.2.1 Moving Weir Arm Type Decanters

- The Moving Weir Arm Decanter shall be of SS 304 with Drive, Scum Guard, Down Comers, Collection Pipe and Bearings. The following type of Decanter assemblies are not acceptable:
 - Rope Driven Decanters.
 - GRP Products.
 - Valve Arrangement.
- There shall be Maximum one Decanter per Basin.
- Flexible Rubber Hose kind of sealing shall not be acceptable.
- Each Decanter shall be inclusive of local Control Box with manual operation selection and function buttons and communication to main PLC by RS 485 or Ethernet.

4.5.3 Aeration System

- The Aeration Facility shall be installed for required capacity of average flow.
- Only Fine Bubble Type SILICONE / EPDM Membrane Diffusers shall be acceptable with minimum Membrane Diffusers to Floor Coverage Area of 5%. Combination of aeration techniques using Aerators/Submersible Mixers etc. is not acceptable. Diffusers shall be submerged, fine bubble / fine pore, high transfer efficiency, low maintenance and non-buoyant type. Diffusers shall be panel / tubular type. In case tubular type Diffusers are used, only top half surface area of the Diffuser shall be considered for supply of air. Material of construction for entire under water system including accessories shall be of non-corrosive nature. Complete Diffuser as a unit shall be assembled at the manufacturing factory level. The grid supports shall be of adjustable type made of SS 304.
- The air blower arrangement shall be capable of handling Total Water Level and Bottom Water Level operation conditions, controlled by process sensors such as DO, Temperature and Level controls.
- The blowers for diffuser system shall be positive displacement (roots) type, and head for blowers shall be decided on the basis of S.O.R. of diffusers and maximum liquid depth in Basin duly considering the losses governing point of delivery (diffusers) and the blowers. Blowers shall be complete with motor and accessories like base frame, anti vibratory pad, silencer, non return valve, air filter etc. as per requirements. Further,

- The operation of Aeration System shall include PLC based control. The operation and speed of Air Blowers shall be adjusted using parameters like Oxygen Uptake Rate, Dissolved Oxygen and Temperature and Liquid Level in the Basin such that the DO is supplied as per demand and power utilisation for operation of Air Blowers is optimised.

4.5.4 Return Activated Sludge (RAS)/ Surplus Activated Sludge (SAS) Pumps

Dedicated Return Activated Sludge (RAS) / Surplus Activated Sludge (SAS) Pumps shall be provided for each Basin. The pump shall be of submersible / horizontal centrifugal type suitable for handling biological sludge of 0.8 – 2% solids consistency. Capacity and heads shall be decided based on SBR Process requirements.

4.5.5 Automation and Control

- PLC based Automation System with application software to control all Pumps, Blowers, Decanters, Limit switches and Probes as per Bidder's design including I/Os with 20 % Spares, Power Supplies, UPS.

- HMI Panel to comprise up-to-date standard PC, Printer, Internet Connection, Process and Operator Software with Dynamic Flow Charts, Pictures, Alarms, Historical Trends, Reports etc.

- SACDA based Automation System to monitor continuously the following in each Basin:

- Filling Volume
- Filling Quantity
- Discharge Quantity
- Decanter Speed

All other accessories, whether specified or not, but required for completeness shall form part of Contractors scope

Description	Specification
Type	Sequential Batch Operation Type
Design Flow	As per Scope
No. of Process reactor	2(In Series)
Decanter	As per Scope
MOC:	SS
Tank Size	As per Scope
MOC of Tank	RCC M-30
Air Grid	
Type of Air Grid	Header & lateral
Material of Construction	SS
AIR BLOWER:	
Nos. of Air Blowers	3 Nos (2 Working+ 1 Standby)
MOC	CI
Capacity of Blower	As per Scope
Head of Blower	As per Scope

Speed of Blower (rpm)	1000 or higher
RAS/SAS PUMPS:	
Qty.	3 Nos (2 Working + 1 Standby)
Flow	As per Scope
Head	As per Scope

4.6 DISINFECTION SYSTEM:

4.6.1. DISINFECTION / CHLORINATION CONTACT TANK:

Treated Sewage from SBR Process units will be collected in a Disinfection Tank where disinfectant will be added for disinfection at suitable dosing rate.

It is considered to use Sodium Hypochlorite / Bleaching Powder dosing for disinfection of the treated sewage.

The Disinfection Tank shall be constructed in minimum M30 grade concrete and as per IS 3370.

Design Flow : Design capacity of plant or SBR Outlet (Decant) Flow, whichever is more

Description	Specification
Numbers	1 No.
Size	As per Scope
Material of Construction	RCC M-30

4.7 FILTER FEED PUMPS:

- The Pump starts and stops through high or low level switches in the Disinfection tank. Pump should alternate after every 8 hours. There shall be dry run protection as part of the controlled scheme.
- High Alarm occurs when there is any maintenance problem or non-operation of pumps Intermediate level pump will start.
- Low Alarm will occur when there is low level and stop the pump Low – trip –. This condition occurs when there is an error in the level sensing system i.e. tripping of pumps takes place.
- Filter Backwash will occur when the differential pressure across the filter exceeds the set point. Same pumps shall carry out backwash of both filters alternately.

Description	Specification
Qty.	2 Nos(1 Working + 1 Standby)
Flow	As per Scope
Head	As per Scope
MOC	CI
Type	Centrifugal horizontal pump

4.8 PRESSURE SAND FILTER:

Description	Specification
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Nos.	2
Flow	As per Scope
Type	Vertical pressure vessel
Working Pressure	2.5 kg/cm ²
Valves	Butterfly Valves
Dia	As per Scope
HOS	As per Scope
Material of constructions	MSEP (Mild steel epoxy coated plates)

4.9 ACTIVATED CARBON FILTER:

Description	Specification
Nos.	2
Flow	As per Scope
Type	Vertical pressure vessel
Working Pressure	2.5 kg/cm ²
Valves	Butterfly Valves
Dia	As per Scope
HOS	As per Scope
Material of constructions	MSEP(Mild steel epoxy coated plates)

- a) The filtration modes like service, backwash, rinse are controlled through Butterfly Valve.
- b) Pressure Sand Filter (PSF) shall be provided followed by Activated Carbon Filter (ACF).
- c) The filters shall be vertical type in M.S.E.P construction designed for working pressure of 2.5 kg/cm² and tested for 1.5 times of system pressure.
- d) The rate of filtration shall be kept as 18 cum / hr / m² for surface loading for pressure sand filter / Activated carbon filter while backwash shall be at 1.6 times average flow.
- e) The frontal piping shall be designed for 10 bar system pressure. The Filter is equipped with a pressure gauge & set of butterfly valves for operation.
- f) A minimum 35% free board shall be left over the filter media bed. The pressure drop across filter shall be minimum.
- g) One set of frontal piping, fittings, with inlet, outlet, safety relief valves, drain, regulating and isolation valves shall be provided.

4.10 UV(ULTRA VIOLET) SYSTEM FOR DISINFECTION:

The disinfection shall be carried out by on-line UV system to ensure all pathogens are Eliminated. The UV shall be located at the outlet of Activated Carbon Filter and upstream to treated water tank. The UV shall come with it's own cleaning system.

Description	Specification
Qty.	As per Scope
Flow	As per Scope

MOC	SS
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4.11 SLUDGE SUMP:

4.11.1 SLUDGE SUMP

Sludge Sump shall be provided to collect the excess sludge from SBR Process Basins. Sludge Sump shall be constructed in minimum M30 grade concrete and as per IS 3370.

Number of Units	:	1
Free Board	:	0.5 m
Detention time	:	12 hrs

All other accessories, whether specified or not, but required for completeness shall form part of Contractors scope.

Description	Specification
Numbers	1 No.
Size	As per Scope
Material of Construction	RCC M-30

4.11.2 SLUDGE FEED PUMPS:

Sludge Pumps shall be provided to feed Sludge to Mechanical Dewatering Device. The pump shall be of screw type suitable for handling sludge of 0.8-2% solids consistency.

Type	:	Sludge duty Pump
Liquid	:	Biological Sludge of 0.8-2% solids consistency
Quantity	:	2 Nos. (1W + 1S)

All other accessories, whether specified or not, but required for complete shall form part of Contractors scope.

Description	Specification
Qty.	2 Nos (1 Working + 1 Standby)
Flow	As per Scope
MOC	CI

4.12 SCREW PRESS/CENTRIFUGE:

The Mechanical Dewatering Unit shall be Solid Bowl Centrifuge / Screw Press designed so as to give 100% trouble free operation at all times and sized as per the following guidelines.

The specification of Screw Press / Solid Bowl Centrifuge shall be :

- i. The Mechanical Dewatering Unit should be so located that the dewatered sludge can be loaded into Trolleys / Drums / Bins directly. Preferably, the Dewatering Unit shall be so located that the

dewatered sludge falls into the Trolleys / Drums / Bins without requirement of any another material handling unit.

- ii. The dewatered sludge should be truck-able & suitable for disposal by open body truck and should have a minimum solid concentration of 20% or more (measured as dry solids w/w basis).
- iv. The Concentrate should not contain more than 1000 mg/l solids.
- vi. The Dewatering Unit should be capable of being operated at lower solid feed concentration in case of maintenance.

There shall be one Centrifuge Building in framed structure construction. The first floor will house Centrifuges. The configuration shall be such that the wet cake will be discharged through single central Chute to the parked Trolleys / Drums / Bins below.

Suitable drive with V-belt arrangement and turbo coupling shall be provided along with Overload Protection Device. Centrifuge shall be with SS 304 wetted parts.

Differential speed and Bowl speed should be adjusted by changing the pulleys. Differential speed may be adjustable by use of epicyclical gear. The Bowl shall be protected with flexible connections so that vibrations are not transmitted to other equipment. The base frame shall be in epoxy painted steel construction and provided with anti-vibration pads. All steps necessary to prevent transmission of structure borne noise shall be taken.

Screw Press shall be of the following specification

Screw Press shall have a flow control tank to fix sludge flow and a water level adjuster to return the excess amount of sludge when necessary. Screw Press shall have a flocculation tank(s) to mix sludge with polymer to separate solids and liquid. Sludge feed pump and polymer feed pump shall be interlocked with the equipment. The main body of Screw Press shall have a drum being composed of accumulated rings and a screw going through inside the drum. Solids and liquid shall be separated by the pressure caused by the screw. Filtrated water shall be discharged from the first part of the drum, from the gaps between the accumulated rings. The separated solids shall be discharged from the end of the drum. Screw Press shall dewater directly thin sludge with its concentration at 0.2% at minimum., The main material of Screw Press shall be SS304.

- Number of Centrifuges : 1 Nos
- Type : Horizontal
- Operating Hours : 16 hrs per day maximum / as per requirement

Mixing arrangement of Polyelectrolyte and sludge: Online mixing

All other accessories, whether specified or not, but required for completeness shall form part of Contractors scope.

4.13 PIPING & VALVES:

All interconnecting Piping, Valves, Specials, Auxiliaries and Accessories shall be required as per process design and scope of work.

Description	Specification
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Qty	1 Lot
MOC of Pipe	GI B Class/ SS (Submerged in Water)
Make of Butterfly Valve	Sant/Intervalve/BDK/Arem/Audco/Papillion/any ISI approved make.
Make of Non Return Valve	Audco/C&R /BBVI /AIP/Sant/Intervalve/BDK/ any ISI approved make.
Make of Ball Valve	Sant/C&R/ BBVI/ Advance/Zoloto/AIP BDK/Arem/AV Valve/ any ISI approved make.

4.14 CONTROL PANEL & PLC AUTOMATION SYSTEM :

4.14.1 PLC/Control Panel:

Design, supply, erection, commissioning and testing of all Instrumentation & PLC software (SCADA) to Control the entire plant including all the pumps and blowers. All the limit switches, probes and control cabling shall be inclusive of the scope of work. The automation system should be inclusive of HMI, process and operator software with dynamic flow chart displayed on monitor compatible to up to date PC, Energy Management

LT switch gears shall be of degree of protection of IP 65 and accessories/MCCB shall be supplied & installed as per list of make. The panel shall have all bus bar, MCB and contactors with compartmental type box with provision of future extension. All other accessories, whether specified or not, but required for commissioning of the plant shall be in Contractor's scope and nothing shall be extra paid on this account. The execution should take care of I.E. Rules and other local authorities and site conditions.

4.14.2 ELECTRICAL & INSTRUMENTATION WORK :

The bidder shall provide the maximum demand load required for successful operation and maintenance of the STP. CCL shall provide the electric power connection of adequate maximum load up to panel only. Entire electrical work for successful completion of STP work is covered in the scope of the bidder. All electrical and associated accessories/items required shall be in Contractor's scope including cable termination kit and cable termination. The entire plant will be operated on 415 V, 3-Phase, 50 c/s, 4-Wire system.

The execution should take care of I.E. Rules and other local authorities and site conditions.

Contractor shall essentially provide the adequate automation required for auto operation of complete raw sewage pumping machinery, Process basins, Disinfection System and Mechanical Sludge Dewatering System and as per Instrumentation specifications.

All other accessories, whether specified or not, but required for commissioning of the plant shall be in Contractor's scope and nothing shall be extra paid on this account.

Description	Specification
Qty	1 No.
Type	3 phase 440 V Floor Mounted
MOC	Body fabricated with 2 mm M S sheet Fitted with standard switch gears.

Make of Switch Gear	L & T/Siemens/ABB/Schnider/Legrand
Make of Cable	Havells/Polycab

Battery Limit:- Battery limit

Contractor scope - shall start from Sewage network without house connection & gali chamber, including Sewage pumping Station and Sewage treatment plant upto outlet of UV system.

For Electrical – MCC panel to all equipments, PLC panel to field instruments and SCADA system excluding incoming cable upto MCC Panel.

(CAPACITY : as per STP capacity)

PREFERED LIST OF APPROVED MAKE OF ITEMS		
S.No.	Item	Make
1	Submersible pump	KSB/ Kirloskar/ Grundfos/ Aqua/ ABS/CRI/ Shakti/ Kishore/ Darling/ Zenith etc
2	SBR Feed/ Filter feed pump	Kirloskar/ KSB/Jhonson/ Grundfos/ CRI/ Shakti/ Kishore etc,
3	SBR - Decanter	ITT/Pollucon Tech Ltd/C-tech
4	Screw press/Centrifuge	Hiller/Pollucon tech ltd/ Humbolt/Alfa LAVAL
5	Blower	Usha/ TMVT/ Swam Pneumatics/ Everest/ Kay/Akash
6	Screw Pumps	UT pumps/ Roto,/PD Pump/ Ramo/ Flosys/ Tushaco
7	Level Switch / Level indicator	Levcon / Revathi / Fitzer/ S.B.Electro-mechanical/ Menilec
8	Pressure gauges	H.Guru/ Gluck.
9	Flow meter – magnetic / ultrasonic	Endress & Hauser/ Fisher Rosemount/ Flowcounte, Forbes Marshall
10	SS piping	Jindal/ Lloyds/Zenith/ Remi/ Prakash
11	HDPE pipes	Hallmark/ Vijay/ Sangir/Sriram Polymers/ Duraline/Trustlenr/NOCIL/Dutron/Reliance
12	UPVC pipes	Geroge Fisher/Astral.
13	GI pipe	TATA/Bansal/Jindal
14	PSF AND ACF	Triveni/ Pollucon Tech Ltd/ Geomiller/ Degreemond
15	Electrical control pannel / Automation panel	Pollucon Tech Ltd / C & SG/L&T Equivalent,
16	Control gear	Legrand / Siemens /L&T/ABB/ Schneider
17	Cable	Skytone / National / Ecko / Havell's / NICCO / KEI / Rallison / Asian / Universal / Polycab
18	Electric motors	Kirloskar/ABB/Siemens/Crompton
19	Butterfly valves	Intervale / Arem / BDK/ Audco / Papillion/ C&R /BBVI /AIP, Sant
20	Non return valve	Sant/C&R/ BBVI/ Advance/Zoloto/AIP/ BDK / AV Valves / AREM Engineers

- 1 Materials bearing ISI/ BIS certifications mark shall be used in the work. Where articles bearing ISI/ BIS certification mark are not available, decision of Engineer-in-charge shall be final & binding on the contractor.
- 2 In the above list of makes, if, make of any item is not mentioned, makes as per OEM with the prior approval of Engineer-In-Charge shall be used.

4.15 DESIGN CRITERIA FOR STRUCTURAL DESIGN :

1) INTRODUCTION

This document forms the engineering design basis for structural design. The content of these documents is to form the guidelines for engineering design of Structures and to provide information about other disciplines concerned.

This is technical specification summarizes the concept and relevant IS codes (Latest Revision) to be followed for buildings and water retaining structures.

2) GEO-TECHNICAL INVESTIGATION

The bidder will be responsible for the of geo-technical exploratory survey to obtain accurate information about soil condition, SBC at the site.

3) BASIC ENGINEERING DATA: DATUM AND SITE LEVELS.

Plinth height (Minimum above FGL) 0.45 m or as approved by engineer in charge.

4) DESIGN CODES AND STANDARDS :

All designs shall be based on the latest International or Indian Standard (IS) Specifications or Codes of Practice. The design standards adopted shall follow the best engineering practice in the field based on any other international standard or specialist literature subject to such standard reference or extract of such literature in the English language being supplied to and approved by the Engineer-In-Charge. In case of any variation or contradiction between the provision of the IS Standards or Code and the specifications given with the submitted tender document, the provision given in the Specification shall be followed.

5) DESIGN CONDITIONS FOR UNDERGROUND OR PARTLY UNDERGROUND LIQUID RETAINING STRUCTURES:

All underground or partly underground liquid containing structures shall be designed for the following conditions:

- (i) Liquid depth to be considered up to full height of wall and no relief due to soil pressure from the other side to be considered.
- (ii) RCC water retaining structures like storage tanks shall be leak proof and designed as un-cracked section.
- (iii) Structure empty condition (i.e., empty of liquid, any material, etc.): full earth pressure with saturation and surcharge pressure wherever applicable, to be considered.
- (iv) Partition wall between dry sump and wet sump: to be designed for full liquid depth up to full height of wall.
- (v) Partition wall between two compartments: to be designed as one compartment empty and the other full for both the directions.
- (vi) Structures shall be designed for uplift in empty conditions with no live load with the water table indicated in the geotechnical report or high flood level, whichever is maximum. No reduction factor for the uplift forces shall be considered. Use of pressure relief valves to reduce uplift pressure due to ground water table shall not be allowed.
- (vii) Walls shall be designed under operating conditions to resist earthquake forces from earth pressure mobilization and dynamic water loads.
- (viii) Underground or partially underground structures shall also be checked against stresses developed due to any combination of full and empty compartments with appropriate ground/uplift pressures from below to base slab. A minimum factor of 1.2 shall be ensured against uplift or floatation and due to other loads shall be 1.5.
- (ix) Soil bearing capacity is to be considered as per soil investigation report.

GENERAL CONDITIONS, SPECIFICATIONS FOR CIVIL/MECHANICAL AND ELECTRICAL WORKS

CIVIL WORKS

This part of the specifications covers the following:

1.1 Special conditions for Civil Works.

1.2 Specifications (Civil Works).

SPECIAL CONDITIONS FOR CIVIL WORKS:

1.1.1 SCOPE:

The scope of work for the tenderer under the contract for civil works shall include all civil construction works the excavation, foundations, building, trenches, water retaining structures including of collection chamber, screen chamber, grit channels, clarifiers aerobics/anaerobic units, digester sludge thickener, sludge pumping stations, sludge drying beds, valve chamber, manholes, power station together with laying of conduits for electric cable to different units, piping etc. Works such as access roads and boundary walls etc. are not included in this contract.

1.1.2 DESIGN AND CONSTRUCTION:

The contractor shall design and construct all civil works in accordance with the standard specifications under Clause 1.2 of this section. The contractor can offer any standard construction method, except where specific requirements are mentioned hereafter. The plant layout is already shown in the tender drawing. The contractors are free to alter the layout but they shall have to accommodate it within the specified boundaries. The shape of the various structure and elevations shall be such as to give a neat and pleasant appearance to the plant.

1.1.3 FLOOR AREA-OPENINGS:

While designing the various building units, care should be taken to provided minimum 25% of the floor areas as opening in the form of windows and ventilators (except doors) to allow sufficient natural light and ventilation. Precautions shall also be taken to provide sufficient head room while designing the clear height between the floors. All the passage, walkways, approaches etc. shall be sufficiently wide for the purpose for which they are constructed. A minimum width of one meter and twenty centimeters (1.20m) is considered necessary.

1.1.4 EXCAVATION:

The items of excavation will include all lifts, leads within limits of treatment site, dewatering shoring, wherever necessary refilling around completed structures and disposal of surplus earth, as directed.

In case, road is dug up for any purpose whatsoever the contractor shall reinstate the same at no extra cost.

1.1.5 REINFORCED CONCRETE WORKS:

The tenderer shall entirely be responsible for the detailed design of civil Engineering components of plant in keeping the duties that are required to be performed by the components. All water retaining structures shall be designed as per I.S. 3370 (Part-I to IV). All concrete used in water or liquid retaining structure shall be design mix and at least of grade M30. All surfaces of concrete shall be finished in C.M. (1:2) and for water retaining structure, inside faces shall be plastered with Cement plaster 20 mm. thick in cement mortar (1:2) added with water proofing compound. Approved Bituminous Paint shall be applied on the external surface of the structure (Below Ground Level) if material of backfill contains any harmful salt to the concrete. No extra payment shall however be done owing to above mentioned cause to the Contractor. On removal of forms the hole shall be allowed to repair. In the event of a bad surface of honeycombing, the entire portion of concrete shall be demolished and redone at no extra cost. Reinforced Concrete structure shall confirm to the following standards specifications and code of practice of India Standard Institution.

I.S.: 456- Code of practice for plain and reinforced concrete.

I.S.: 875- Code of practice for structural safety of buildings loading Standard.

I.S.: 3370 Part-I to IV- Code of practice for concrete structure for storage of liquids.

I.S.: 1893 Criteria for earthquake resistant design and structure.

All tanks for alum solution, sludge, raw treated sewage sedimentation, aeration filtration, etc. and all channels carrying raw, settled or treated sewage shall be designed as water or liquid retaining tanks, channels etc. shall be tested for water tightness before installing the equipment, media etc. Adequate free board (minimum 0.6m) shall have to be provided for all water retaining structures.

The Contractor therefore shall programme the construction activities in such a manner that the inlet pipes and all inlet and outlet arrangements with valves are ready for testing purposes to avoid delay.

All other works like excavation, filling, flooring, masonry, joining, roofing, plastering, structural steel will be generally as per relevant I.S. Codes/specified elsewhere in the tender.

1.1.6 CONSTRUCTION MATERIAL SAMPLE:

The contractor shall submit to the Engineer-in-charge or his representative samples of the materials which are intended to used in the permanent works, sufficiently before the commencement of work, so that necessary tests can be carried out for the approval of the Engineer-in-Charge or his representative before using/ordering any such material at site. Sample of the following basic materials shall be submitted from each source of supply and from each consignment/lot, if material are differing from one consignment to the other, free of cost by the contractor.

- (viii) Rubble stone/bricks
- (ii) Fine Aggregate (Sand)
- (iii) Coarse Aggregate
 - A. Size of 20 mm & below
 - B. Size of 10 mm & below
 - C. Size of 20mm to 40mm
- (iv) Gravel
- (v) Lime (Dehydrated)
- (vi) Water for construction purpose
- (vii) Cement and steel

(viii) Timber, Tiles, Sanitary and water Supply items, electrical items.

1.1.7 TEST CERTIFICATES FROM MANUFACTURERES:

The necessary test certificate for all the materials from the manufacture and/or from the supplier that test certificate given is for that particular consignment only, has to be submitted to the Engineer-in-Charge of his representative. However, in addition to the Teabove the Engineer-in-Charge or his representative may instruct the contractor to test the sample of steel from any of the consignment (or from each lot) for ascertaining the quality of steel as per specifications at the contractor's cost.

1.1.8 MATERIAL TESTING:

sting of material to be used in the permanent work or of the quality of finished items shall generally be done in the laboratory approved by the Engineer-in-Charge or his representative, and all testing charges be borne by the contractor.

1.1.9 PROVIDING MATERIAL FOR TESTING:

The contractor shall afford at his own necessary facility in providing the requisite material to undertake tests for quality of materials and workmanship and other assistance that may be required by the Engineer-in-Charge or his representative including transport of the test specimen to the laboratory referred to above.

1.1.10 MATERIAL TEST:

The following test shall normally be carried out on a routine basis:

- (i) Sieve analysis of coarse and the fine aggregate to be used for concreting and also mortar in plaster and masonry work shall be tested in accordance with I.S.: 383, I.S.: 216 and I.S.: 1542.
- (ii) Moisture content in the fine and coarse aggregate, bulkage of sand or fine aggregate shall be tested in accordance with I.S.: 2386 (Part-III).
- (iii) Determination of fine and deleterious material in the coarse and fine aggregate in accordance with I.S.: 2386 (Part-II).
- (iv) Workability test of the concrete by means of slump cone.
- (v) To determine the crushing strength, absorption and efflorescence of bricks in accordance with I.S.: 3495 (Part-I to IV).
- (vi) Water tightness for water retaining structure. The above test will be done on routine basis as per provision of ISS and explanatory notes during the construction period. Whereas other tests of materials and workmanships shall also be done if desired by the Engineer-in-Charge or his representative.

These are as follows:

- (vii) Chemical tests of aggregates (fine and course) to determine the sulphate, chlorides and other deleterious materials present in the aggregates.
- (viii) Test on steel (Mild and Tor steel) as per IS: 432 and IS: 1786 to find out the ultimate tensile strength, yield stress, percentage elongation and chemical composition etc. In addition to the above tests, any test which may, if desired by the Engineer-in-Charge or his representative be carried out from time to time as per IS Specifications.

1.1.11 SUPPLY OF MATERIALS:

All material required for the works shall be arranged by the contractor himself.

1.1.12 INSPECTION OF REINFORCEMENT AND CONCRETE:

All reinforcement shall have to be checked and recorded prior to concreting by the Engineer-in-Charge or his representative. Similarly, entire concreting work shall be done in the presence of an officer not below the rank of Assistant Engineer. The Contractor shall, therefore give a notice of at least 3 days to the Engineer-in-Charge or his representative.

1.1.13 ELEVATION AND ARCHITECTURE:

The treatment plant building shall have good aesthetical and imposing elevation and architecture. The tendering contractor shall, therefore, enclose details of the elevation of buildings along with their offer. The elevation has to be approved by the Engineer-in-Charge or his representative. R.C.C fins, windows boxes, pebble dash/rough cast plaster, grill should be proposed.

1.1.14 GENERAL TREATMENT:

The external surface of the superstructure shall be furnished with snowcem/exterior grade paint of quality and shade approved by the Engineer-in-Charge. All internal faces including ceiling shall be treated with oil bound distempers.

The roof slab shall be provided with five course water proofing treatment as specified. All the edges of Chajjas, weather sheds canopies and slab projection shall be provided with throttling or drip moulding.

1.1.15 ELECTRIC WORKS:

The schedule of price for civil works shall include provision for the cost of electric wiring installation including necessary material such as cables, conduits, triple pole and double pole switches, switch boxes, cables, laying materials socket outlet, bulb fluorescent tubes, holder, motor starters, water tight special, flood light fitting etc. The work conform to IS:732 (Code of practice for electrical wiring installation) IS: 4646 (Guide for electrical layout in residential building) Indian Electricity Act, 1910, and Indian Electricity rules-1956 suitable for 3 phase 440 volts A.C. supply and it shall comprise of the following and in general shall conform to specification set out elsewhere in this volume.

1.1.16 RECEPTION AND DISTRIBUTION OF MAIN SUPPLY:

There shall be a miniature circuit breaker mounted on a distribution metal clad, switch board panel duly wired and with push bar arrangement for proper distribution of power and lighting, supply for motors and lamination complete with motor starter of adequate rating, ammeter, voltmeter, double pole switches, cut outs, fuses etc. The starter should be of a reputed make (L&T), Cutler Hammer or equal and approved).

The item may not be included if it is already included under supply of mechanical equipment.

Wiring:

It shall conform in general to specifications set out elsewhere in this volume. It shall consist of P.V.C. insulation cables in recessed conduits complete with all accessories.

Small Wiring:

Wiring shall be carried out in a neat and systematic manner and securely fixed insulated cleats or other approved methods. The wires shall not be broken between terminal points.

Fuses and Links:

It shall conform in general to specification set out elsewhere in this volume. Fuses eeries and solid link carrier and boxes shall be made of plastic moulded insulating materials of an approved make. Ceramic material will not be accepted. All accessible line connection shall be efficiently shrouded and it shall be possible to change fuses with the circuit alive. An adequate number of spare fuses, earthing for each rating shall be supplied, fitted in clips, inside the panel.

1.1.17 LEVEL OF ILLUMINATION INSIDE ALL BUILDINGS:

It shall be 150 lux minimum; provisions of one 500 watt weatherproof flood light at the top of highest shall be extra. Similarly waterproof fitting shall be provided in each unit of the treatment plant. Outside the building suitable level of illuminations at suitable points as per national building code shall be provided.

1.1.18 LIGHT FITTING AND ACCESSORIES:

A switch shall be provided adjacent to normal entrance to any area for control light points, ceiling rose for points, 3 pin, 5 Amp. Socket outlet shall be provided in all light and fan circuit along with controlling switches. Lamp holders with brackets of approved shape and design conforming to IS: 1258 shall be provided for the illumination points, suitable space shall be provided over the circuit and sub-circuit for fan regulators.

1. Fluorescent/LED tube lights shall be provided over every treatment unit.
2. Fluorescent/LED tube lights shall also be provided under every beam, however, the general level of illumination may be kept at 150 lux minimum as specified above.
3. A good weatherproof flood light of 200 W shall be provided, over each filter bed. The wiring for such flood lights shall be with cables, through under ground conduits.
4. Suitable number of fans shall be provided in the filter control building, office-cum-laboratory, store room etc.

1.2 SPECIFICATIONS (CIVIL WORKS):

1.2.1 MATERIAL AND WORKMANSHIP:

General Requirements

The term 'materials' shall mean all materials goods and articles of every kind whether raw, processed or manufactured and equipment and plant of every kind to be supplied by the contractor for incorporating in the works.

Except as may be otherwise specified for particular part of the works the provisions of clauses in "Material and Workmanship" shall apply to materials and workmanship for any part of the works.

All materials shall be new and of the kinds and qualities described in the contract and shall be same as approved samples.

As soon as practicable after receiving the order to commence the works the contractor shall inform the Engineer-in-Charge of the name of the suppliers from whom he proposes to obtain any materials but he shall not place an order without the approval of the Engineer-in-Charge which may be withheld until samples have been submitted and satisfactorily tested. The contractor shall, thereafter keep the Engineer-in-Charge informed of orders for any delivery dates of all materials.

Materials shall be transported, handled and stored in such a manner as to prevent deterioration, damage or contamination.

Samples and Tests of Materials:

The contractor shall submit samples of such materials as may be required by the Engineer-in-Charge and shall carry out the specified tests or as directed by the Engineer-in-Charge at the site, at the suppliers premises or at a laboratory approved by the Engineer-in-Charge. Samples shall be submitted and tests carried out sufficiently early to enable further samples to be submitted and tested if required by the Engineer-in-Charge.

The contractor shall give the Engineer-in-Charge at least seven days notice in writing of the date on which any of the materials will be ready for testing or inspection at the supplier's premises or at a laboratory approved by the Engineer-in-Charge and unless the Engineer-in-Charge shall attend at the appointed place within the said seven days the test may proceed in his absence. Provided that the contractor shall in any case submit to the Engineer-in-Charge within seven days of the tests such number of certified copies (not exceeding six) of the test readings as the Engineer-in-Charge may require.

Approval by the Engineer-in-Charge as to the placing of order materials or as to samples or tests shall not prejudice any of the Engineer-in-Charge's power under the provisions of contract.

Standards:

Materials and workmanship shall comply with the relevant IS specifications. All materials used in the permanent works shall be the best quality of the kind and to the approval of the Engineer-in-Charge. All materials or workmanship shall comply with the relevant Indian Standards (with up-to-date amendments), or with requirements of any other authoritative standard approved by the Engineer-in-Charge which shall not be exceeding in the opinion of the Engineer-in-Charge than the corresponding standard quoted herein.

1.2.2 BASIC MATERIALS:

1.2.2.1 Cement:

All cement to be used in the works shall be ordinary Portland cement or Portland-pozzolana cement complying with IS: 269 and IS: 1489.

1.2.2.2 Sand for use in Masonry work and in plaster:

Sand to be used in masonry and in plaster shall conform to IS: 2116 and IS: 1542.

1.2.2.3 Sand for use in Concrete:

Sand to be used for concreting as fine aggregate shall conform to IS: 383.

1.2.2.4 Coarse Aggregate for Concrete Work:

For manufacture of Concrete (Ordinary with nominal mix controlled concrete specification by strength) the coarse aggregate shall be as obtained from the crusher stone (machine broken), broomed grit shall not be used. The coarse aggregate shall be of hard, strong and durable stone and generally comply with requirements of IS: 383. Porous absorbent coarse aggregate shall not be used. The aggregate shall be free from clay films and other adherent coatings. They shall contain no harmful material to affect adversely the strength or durability of the concrete or in the case of reinforced concrete to attack the reinforcement. Any aggregate which are not perfectly clean, shall be washed with clean fresh water to the satisfaction of the Engineer-in-Charge. The maximum quantities of deleterious materials in the aggregates, as

determined in accordance with IS: 2386 (Pt.-II) "Methods of Test for Aggregates for Concrete shall not exceed the limits given in table 1 of IS: 383. Unless otherwise stated all coarse aggregate in reinforced concrete shall be graded aggregate of 20 mm. nominal size.

1.2.2.5 Bricks:

Specification for Bricks shall be as described in specification of C.P.W.D. and IS: 1077.
All the tests shall be done in accordance with IS: 3495 (Part I to IV)

1.2.2.6 Water for Concrete or Mortar:

Water for mixing concrete or mortar and for curing must be clean and free from saline or deleterious materials and must be fit for human consumption. Such water shall generally comply with the requirements of Clause 4.3 of IS: 456.

1.2.2.7 Steel:

Structural steel shall conform to IS "Structural" steel (Standard quality) at IS: 226 "Structural Steel" (Fusion Welding Quality). Steel reinforcing bars for concrete shall be rounded bars, unless otherwise specified and shall comply with grade-I Mild Steel as per IS: 432 'Mild Steel' and Medium tensile Steel bars and "Hard Drawn Steel wire for concrete reinforcement" or comply with Tor Steel as per IS: 1786 "Cold Twisted Steel Bars for Concrete, reinforcement" or shall comply with IS: 1139 "Hot Rolled Mild Steel Medium Tensile Steel and High Yield Strength Steel Deformed Bars for Concrete Reinforcement. Fabric reinforcement for concrete shall be of square or oblong mesh of hard-drawn steel wire, electrical resistance welded and shall conform with IS: 1566 for use in reinforced concrete.

Galvanized Mild Steel binding wire shall comply with requirements of relevant specifications. The wire shall be of 18 gauge and mild, annealed quality.

1.2.2.8 Lime:

It shall contain at least 85% of calcium oxide. It shall conform to IS: 712. Lime shall be tested in accordance with IS: 6932 (Part- I to X). Field slaking of building lime with preparation of putty shall conform to IS: 1635. Lime shall be stacked in a damp proof godown and covering the lump with blanket of slaked or powdered lime.

1.2.2.9 Timber:

Specification shall be as per relevant IS specification.

1.2.2.10 Plywood:

Specification shall be as per relevant IS or other standard specification.

1.2.2.11 Paints:

Specifications shall be as per relevant IS or other standard specifications.

1.2.2.12 Building's Hardware::

Specifications shall be as per relevant I.S. or other standard specifications.

1.2.3 Site Clearance and Dressing of Site:

The work on site clearance and dressing of site shall be done according to the direction of the Engineer-in-Charge. Surface dressing shall be measured in square metres. Unless otherwise specified in the bill of quantities no separate payment shall be made for dressing within 10 metres distance in all sides of the structures. This shall be deemed to be included in the Items of contract. No payment shall be made for the clearance of site except for uprooting of big trees

and dismantling of existing structures and its removal which shall be paid separately as per provision of the Contract.

1.2.3.1 Disposal of Materials:

All requirements herein for the disposal by the Contractor of materials arising from the site clearance or from excavation are the property of the Owner and shall be disposed of or preserved and deposited as directed by the Engineer-in-Charge.

1.2.3.2 Excess Excavation to be made good:

The Contractor, at his own expenses, shall if directed, remove from the site all material resulting from excess excavation and shall make good the same with such kind of fill, materials or in such class of concrete as may be reasonably required by the Engineer-in-Charge having regard to the circumstances.

1.2.3.3 Site Clearance:

All areas of the site marked on the drawings for clearances or from which material is to be excavated or upon which filling is to be deposited shall be cleared to the extent required by the Engineer-in-Charge of all buildings, wall, gate, fences and other structures and obstructions and/or all bushes, hedges, trees, stumps, roots and other vegetations except for trees marked for preservation. Materials so cleared shall as far as suitable be reserved and stacked for further use but shall otherwise be burnt to ash or disposed off the site as directed by the Engineer-in-Charge.

1.2.3.4 Trees:

As directed by the Engineer-in-Charge, trees shall be uprooted or cut down as near to ground level as possible, branches and fallings shall be removed and burnt to ashes or disposed off the site. Useful timber shall remain the property of the Owner and shall be cut into suitable lengths and transported at the Nigam Stores (at site) as per direction of the Engineer-in-Charge.

1.2.3.5 Stumps:

Stumps and roots whether existing or remaining after tree falling shall, where directed by the Engineer-in-Charge, be grabbed out and disposed off the site. The resulting hole shall be filled with approved material deposited in 225 mm. layer and compacted to the same dry density as the adjoining soil.

1.2.3.6 Forestry Regulations:

The contractor shall familiarize himself with all local rules and regulations governing land clearance including the special requirements for forestry areas and shall carry out his work in strict compliance with all such requirements.

1.2.3.7 Demolition:

Demolition of all structure, obstructions above and below ground level shall be carried out to the extent sufficient to permit the completion of all works as indicated. Care shall be taken not to damage existing sewers, pipes, conduits, cables and rails which must be kept in service and not to be demolished. All materials from demolition are the property of the Owner; they shall be removed from the site and stacked as directed by the Engineer-in-Charge.

1.2.4 Earth Work in Excavation:

The work on earth work in excavation shall be done in accordance with specification & as desired by the E-I-C. Before the surface of any part of the site is disturbed or the works thereon are begun, the contractor shall take and record levels of any such part, in the manner specified or as agreed with the Engineer-in-Charge, in the presence of the Engineer-in-Charge, and such levels when agreed by him shall form the basis of measurement.

1.2.4.1 Blasting:

Blasting is prohibited. The Engineer-in-Charge shall have power to regulate, restrict or prohibit blasting. However, if in his opinion, it is necessary to do so; care should be taken for the safety of persons or property or to safeguard the works. No blasting shall be carried out in any part of the work without permission in writing of the Engineer-in-Charge. Such permission shall not absolve the contractor from any of his obligations, or inabilities under the contract and he shall take all necessary precaution including the use of blasting nets to avoid damage, loss or injury to persons and to public or private properties.

The contractor shall keep the Engineer-in-Charge fully informed at all the time when blasting is proposed to be carried out and of any details to Engineer-in-Charges may require concerning strength of charges and their positions. Explosive shall not be used within fifteen metres, or such greater or lesser distance as the Engineer-in-Charge may direct of concrete placed in the works, of any existing structures water main, electric cable, sewer or other services.

The contractor shall obtain the necessary licenses for the storage, transport and handling of explosives and shall provide a store suitable for explosive and shall carry out every aspect of blasting work in full conformity with the regulations of all competent authorities including the police and the Inspector of explosive Himachal Pradesh State. Only experienced and competent blasting operator possessing license from the Commissioner of Police shall be employed on blasting work. Audible and visible warning (such as the waving of red danger flags and the blowing of whistles) shall be given for the last five minutes before blasting is due to begin.

The contractor's foremen or other responsible person shall inspect the whole of the blasting area during the warning period to ensure that no one remains within or is likely to enter the danger area. All operators except those responsible for detonating the explosive shall be removed to a safe distance which in any case shall not be less than two hundred metres. If combustible fuses are used these shall be cut to length before insertion. The contractor's foreman shall compare the number of charges placed with the number of shots heard to determine whether any charge has not exposed. Under no circumstances shall the removal of an explosive charge be attempted. The hole containing the charges shall be marked and filled with water. A second hole shall be drilled some distance away, charged and fixed. The procedure shall be repeated until the foreman is satisfied that both charges have exploded. In general the size of explosive charges used shall be the smallest compatible with efficient working so as to minimize the chances of danger to person and property.

1.2.4.2 Earth Work in Excavation (General):

The whole of the excavation in foundation trenches in any materials met on site i.e. soil, gravel, rock old foundation etc. of work shall be carried out to the widths, lengths and depths indicated on the drawings or such other dimension as may be directed in writing by the Engineer-in-Charge. Excavated material shall be deposited away from the edge of excavation as directed by the Engineer-in-Charge. The contractor may carry out the excavation by the method (except

blasting of rock) he considers most suitable, subject to any stipulations contained in the contract.

1.2.4.3 Shoring:

The contractor shall provide to the satisfaction of the Engineer-in-Charge, all timbering or other approved supports and shall shore the sides of excavation in such a way as will be sufficient to secure them from falling to prevent any movement.

1.2.4.4 Dewatering:

The contractor shall provide for the purpose of excavation under water, all the necessary dewatering equipment like well point system, pumps, pipes, conduits etc. and make necessary arrangements for drainage of the pumped water from such systems and its easy disposal without affecting the site for such disposal of water to other areas. The contractor shall employ the dewatering equipment in such a way that the excavated pit should always remain dry while the excavation and concrete work upto ground floor level are going on. The dewatering process shall be carried out till the concrete in works as mentioned above has set sufficiently and as directed by the Engineer-in-Charge.

1.2.4.5 Removal of surplus earth:

The surplus excavated materials shall be removed to a distance of 200 m from the site or as directed by the Engineer-in-Charge.

1.2.5 Earthwork in filling:

Earth used for filling in trenches, sides of foundation and under floors etc. shall be free from stone, shingle or boulder not larger than 75 mm in any direction, salts, organic or other foreign matter. Normally excavated earth from same area shall be used for filling. However, if such earth contains deleterious material, saltpeter earth etc. the same shall not be used. All clods of earth shall be broken or removed.

1.2.5.1 Compaction:

The space all around the foundations, pipes and drains in trenches shall be cleared of all debris, brickbats etc. The filling shall be done in layers not exceeding 15 cm. each layer shall be compacted in such a way so as to achieve a minimum 95% of maximum laboratory dry density as obtained by Proctor Compaction equipment as per IS 2720 (Part-VIII). Each layer shall be laid only after the preceding layer is ensured about its compaction as per above and to the satisfaction of the Engineer-in-Charge. Earth shall be rammed with iron rammer where feasible and with the butt ends of crow bars where rammer can not be used.

Special care shall be taken that no damage is caused to the pipes, drains and masonry in the trenches below.

1.2.5.2 Filling under floors:

In case of filling under floor the finished level or filling shall be kept to slope: intended to be given to the floor. In case of filling with sand, the sand to be used shall be clean and free from dust, organic and foreign matters and corresponding to grading zone-IV. Sand filling shall be done in a manner similar to earth filling in plinth as specified above except that consolidation shall be done by flooding with water. The surface of the consolidated sand shall be dressed to required level and slope.

1.2.6 Cement Concrete:

1.2.6.1 General:

Cement concrete (plain or reinforced) as used in the works shall comply with the requirement of specification of the relevant IS Specifications accepted in so far as these are not altered or modified by specific stipulations as given in the specification herein.

Design of civil Engineering structures should be based on the following IS code of the latest edition including amendments as in vogue:

- i) IS 456 – Plain and reinforced work not in contact with water.
- ii) IS 3370 (Part I to IV) – Concrete structures for storage of liquids.
- iii) IS 875 – Code for practice for structural safety of building (loading standards)

1.2.6.2 Materials:

All the materials required for the manufacture of cement concrete shall comply with the relevant specifications of basic material as given above. No material other than the essential ingredient: (cement, sand, aggregate and water) shall be ordinarily used in the manufacture of concrete. No admixture (for imparting any special characteristics to the concrete) shall be used without special direction from or permission of the Engineer-in-Charge.

Tests to determine the strength of concrete as actually obtained in the works shall be as per IS 456. A record shall be kept of the time and date of placing of concrete and the approximate quantity placed (together with other relevant details) in each portion of the structure. This record shall be prepared in duplicate by the Contractor in the form and manner to be decided by the Engineer-in-Charge. The contractor shall submit a record promptly to the Engineer-in-Charge or to his representative who will accept the same after verification and retain one copy, the other copy being returned to the contractor. All field specimen of concrete shall be promptly numbered and dated. A reference of such specimen with their identification numbers shall be included in this record of concreting.

1.2.6.3 Mixing of Concrete:

The different ingredients for concrete may, for the purpose of concrete proportioning shall be measured either by weight or by volume. If the ingredients are measured by weight, due allowance must always be made for the weight of water that may be present in the sand and the coarse aggregates. If measurements are done by volume gauge boxes, corresponding to the proper quantities of coarse and fine aggregate must be used. All measurements must be carried out in such a manner that the proportions of the materials may be easily and readily checked.

As the volume of sand may vary from day-to-day and at different parts of the same day, on account of varying moisture content, frequent tests for bulking shall be carried out for the sand to be used, and the amount of bulking allowed for in the field mix so as to keep the actual content constant throughout.

Whatever may be the mode of measurement adopted cement shall always be measured by weight one bag of 50 kg. being taken as 0.0347 cubic metre. The aggregate in each batch of concrete are to be so proportioned as to contain full bags of cement. Mixing of concrete is to be done in machines to be approved by the Engineer-in-Charge. No hand mixed concrete will be allowed unless specially permitted by the Engineer-in-Charge. In case such hand mixing is

permitted by the Engineer-in-Charge, ten (10) percent extra cement shall have to be used, but the contractor shall have no claim for any extra payment on this account. Hand mixing must be done on approved platform so as to prevent the loss of any liquid, and the materials turned at least twice in the dry state and three times or more after the addition of water and until the components are well mixed and gives a concrete of uniform colour, texture and consistency throughout to the satisfaction of the Engineer-in-Charge. :

Only such quantities of concrete as are required for immediate use are to be mixed at any time. Water is to be added but not exceeding the amount as mentioned in IS 456 unless otherwise specified elsewhere to obtain proper workability so that the mixture may flow readily round all the reinforcement and into every part of the moulds. The workability shall be measured by the amount of slump. The total water content in each batch of concrete shall always be kept constant at the amount previously determined by experiments. The quantity of water to be actually added may, therefore, vary depending on the moisture contained in the aggregate.

1.2.6.4 Transporting, placing and compacting concrete:

Concrete shall be handled from the place of final deposit as rapidly as practicable by methods which will prevent the segregation or loss of the ingredients. It shall be deposited as nearly as practicable, in its final position to avoid re-handling or flowing. Unless it is specially permitted by the Engineer-in-Charge, concrete shall not be dropped freely from a height of more than two metres.

Before placing the concrete, the moulds shall be cleaned of all shavings, pieces of wood or other rubbish. When placing the concrete the fine materials must be carefully worked against the moulds so that the face of the concrete shall be left perfectly smooth and free from honey combing upon the withdrawal of the moulds. Any defects in this respect must be dealt with the contractor as directed by the Engineer-in-Charge without any extra charged thereof.

Where concrete is deposited against stonework, brickwork, or any surface likely to absorbed moisture such surface must be well watered immediately prior to deposition of concrete.

Depositing concrete under water shall not be allowed without specific permission from the Engineer-in-Charge. The methods of concreting to be adopted in such cases shall have to be previously approved by him. During placing and also immediately after deposition, the concrete shall be thoroughly compacted by ramming and spearing until it has been made to penetrate and fill all the spaces between and around the reinforcement bars, around embedded fixtures, and into the corners of form work in such a manner as to ensure a solid mass entirely free from voids.

In addition to usual ramming and spearing, the concrete shall be vibrated by mechanical vibrators. Over vibration of wet mixes shall be avoided. Vibrators shall be so operated that the vibration is evenly distributed throughout the entire mass of concrete. When immersion type of vibrators are used that shall be withdrawn gradually, particular care being taken to see that no hollow pocket is left behind in the concrete. The use of vibrators may be dispensed with only for concrete of mix leaner than 1:2:4 (one part cement, 2 parts fine aggregate and 4 parts coarse aggregate) and in case of concrete under water.

It is imperative that all concreting operations be done quickly as well as efficiently, and adequate number of labours must, therefore, be employed to ensure this.

Concrete shall be placed and compacted in its final position before setting has commenced and shall not be subsequently disturbed. Concreting shall be carried out continuously upto construction joints. Any rest pauses such as for meals, shall be subject to the approval of the Engineer-in-Charge or his representative. Even then concreting shall not be stopped entirely but carried on slowly during the rest period by engaging a small skeleton gang for the purpose.

All concreting should be so programmed as not to necessitate work at night. If for any reason concreting at night becomes imperative, the contractor shall obtain previous permission of the Engineer-in-Charge or his representative and make proper lighting arrangements to his satisfaction.

1.2.6.5 Construction Joints:

All construction Joints in slabs, beams and other horizontal members are to be formed as per relevant specifications. The positions where such construction joint may be made shall be to the approval of the Engineer-in-Charge or his representative. In case of horizontal joints, any excess water shall be removed and the surface of the concrete, while still soft, shall be swept with a stiff broom or scrapped with a tool such that some of the coarse aggregates are left projecting upwards. Moreover, if so directed by the Engineer-in-Charge or his representative, keys shall be formed for horizontal Joints, as per direction.

When fresh concrete has to be laid against an already hardened surface the laitance is to be removed by chipping so as to expose sound concrete. The chipping is to be done very carefully so as to remove the laitance but not to disturb or damage the sound concrete.

In all cases of vertical or horizontal joints the surface (from which the laitance has been already removed) shall be thoroughly cleaned. The bending surface shall then be kept wet for at least one hour before placing new concrete. Sufficient time shall be allowed for surface wetness to disappear just before placing new concrete. The surface should then be damp but slightly absorptive. Just before placing new concrete, a layer (8 to 10mm thick) of mortar composed of the same proportion of cement and sand as used in the concrete and mixed to the consistency of thick paste shall be placed on the surface.

1.2.6.6 Protection and curing of concrete:

The contractor shall adequately protect freshly laid concrete from too rapid drying due to strong sunshine, drying winds etc. and also from running of surface water and shocks. During the first ten days after deposition, the concrete shall be kept thoroughly damp by suitable means as per directions of the Engineer-in-Charge or his representative. Watering during this period required for this purpose of curing shall be continued daily (Sundays and Holidays included). The Contractor may adopt one or more of the following methods for curing and protection of concrete.

- a) By water sprays in continuous operation.
- b) By covering with Hessian or similar absorbent material or sand kept constantly wet.

- c) After thorough wetting by covering with layer of water proof fabric kept in contact with the concrete surface.

Any concrete which gives sub-standard test results, becomes severely damaged due to cracking, shows excessive honey combing and exposure of reinforcement or exhibits any fault, which in the opinion of the Engineer-in-Charge, seriously impairs its functions, may be declared defective concrete. Such concrete shall be cut out, removed from the site and replaced by fresh concrete of the specified quality at the contractor's own expenses. Alternatively, the contractor shall carry out whatever other remedy the Engineer-in-Charge may reasonably require having regard to all the circumstances.

Subject to the condition that structural safety is not impaired and architectural concept does not hamper, the tolerances in dimensions of R.C.C. members shall be as specified in the drawings by the designer. Whenever, these are not specified the permissible tolerance shall be decided by the Engineer-in-Charge, if necessary. When tolerance in dimensions is permitted, following procedure for measurements shall apply.

- a) If the actual dimension of R.C.C. members do not exceed or decrease the design dimensions of the members plus or minus tolerance limit, shall be taken for the purpose of measurement.
- b) If the actual dimensions exceed the design dimensions by more than the tolerance limit, that design dimensions only shall be measured for the purpose of payment.
- c) If the actual dimensions, decrease more than tolerance limit specified, the actual dimension of the R.C.C. shall be taken for the purpose of measurement, and payment. Expansion joints shall be provided as directed by the Engineer-in-Charge.

1.2.6.7 Water stops and joint fillers:

Where proprietary names are given in the drawings they shall be interpreted only as reference of quality and do not oblige the contractor to use the procedure specified. However, all water stops and joint fillers shall be subject to the approval of the Engineer-in-Charge and applied in accordance with the manufacturer's instructions.

Rubber water stops shall include a centre bulb and shall have a tensile strength of not less than 20.7 MN/m² and elongation at break of not less than 500%. P.V.C. water stops shall include a centre bulb and shall have tensile strength of not less than 14 MN/m² and elongation at break of not less than 300%.

Water stops shall not be exposed to direct sunlight for long periods. Before being concreted in water stops it shall be clean of all foreign material. Concrete shall be fully and carefully compacted around the water stops so that no voids or porous concrete remain. Where the concrete is reinforced adequate clearance between water stops and reinforcement shall be maintained so as to permit compaction of the concrete.

Joint fillers shall be durable, compressible and non-extruding materials. In case of roof slabs the top surfaces shall be finished even and smooth with wooden trowel before the concrete begin to set.

Immediately on removal of forms the R.C.C. work shall be examined by the Engineer-in-Charge before any defects are made good.

The work that has sagged or contains honey combing to an extent detrimental to structural safety or water tightness in case of water retaining structures or architectural concept shall be rejected.

Surface defect of a minor nature may be accepted. On acceptance of such work by the Engineer-in-Charge, the same shall be rectified as follows: surface defects which require repair when forms are removed usually consist of bulges due to movement of forms, ridges at form joints, honey combed areas, damages resulting from the stripping of forms and bolt holes. Bulges and ridges are removed by careful chipping or tooling and the surface is then rubbed with a grinding stone. Honey combed areas, bolt holes shall be rectified as per direction of the Engineer-in-Charge.

No additional payment will be made for the treat men indicated above and shall be covered by the rate quoted against the relevant items of the bill of quantities.

1.2.6.8 Testing of Concrete:

During the progress of construction, preparation of test specimens, curing and testing of concrete shall be conducted in accordance with IS: 1199 to determine whether the concrete being produced complies with the strength requirements as specified.

At least one slump test shall be carried out for every compressive strength or as directed by the Engineer-in-Charge. Cubes, 150mm x 150mm x 150mm, in size shall be made for each poured grade of concrete. This number may be increased at the discretion of the Engineer-in-Charge. Six specimens shall preferably be prepared from different batches - three being tested for 7 days and remaining three being tested for 28 days. The contractor at his own expenses shall provide all apparatus, labour and arrange test laboratory.

The concrete tested in accordance with above clause shall meet the criteria for acceptance of concrete as per IS: 456, the strength of concrete shall be average strength of three specimens tested at 28 days and conform to grade of concrete. If strengths are too low, corrective measures shall be taken at once, at the Engineer-in-Charge's direction, without waiting for the results of the 28 days tests. The methods shall be:

- a) Curing and load testing of the concrete member concerned represented by the test which failed.
- b) Replacement of any such portions of the structure. No payment for the dismantling, removing dismantled concrete, relevant form work and reinforcement shall be made. Embedded fixtures and reinforcement of adjoining structures damaged during dismantling shall be made good by the contractor at his own expenses.
- c) Extended curing of the structure of the concrete represented by the specimen.
- d) Collecting and Testing core specimen from hardened concrete. The location number and size of such specimen shall be taken as directed by the Engineer-in-Charge.
- e) Or any other test i.e. ultrasonic and rebounded hammer tests to be decided by the Engineer-in-Charge at the cost of the contractor.

1.2.6.9 Tests of Water Retaining Structures:

In addition to the tests of the concrete structure, as given in above clause, each water retaining structure shall also be tested for water tightness at full supply level as described, here under: In case of structures whose external faces are exposed, such as, elevated tanks, the requirements of the test shall be deemed to be satisfied if the external faces show no signs of leakage and remain apparently dry over the period of observation of seven days, (period for absorption after filling).

In case of tanks whose external faces are submerged and are not accessible for inspection such as underground tanks, the tanks shall be filled with water and after filling, the level of the surface of the water shall be recorded again at subsequent intervals of 24 hours over a period of seven days. The total drop in level over a period of seven days shall be taken as an indication of the water tightness of the tank. The Engineer-in-Charge shall decide on the actual permissible nature of this drop in the surface level, taking into account whether the tanks are open or closed and the corresponding effect of evaporation losses. For many purposes, however, underground tank whose top is covered may be deemed to be water tight if the total drop in the surface level over a period of seven days does not exceed 40 mm.

If the structure does not satisfy the conditions of test and daily drop in water level is increasing, the period of test may be extended for a further seven days and if specified limit is then reached structure may be considered as satisfactory.

In case of unsatisfactory test results the contractor shall ascertain the cause, make all necessary repairs and repeat the procedure of this clause until the test has been passed, all at no extra cost to the department.

1.2.6.10 Reinforcement:

The reinforcement to be used for reinforced concrete work shall comply with the requirement of clauses 3.2.2.7 herein before. The method of fabrication of reinforcement, bending, binding, placing etc. comply with the provisions of the relevant IS Code or CPWD specifications.

1.2.6.11 Form Work:

The materials required for form work and workmanship shall comply with the provision of specification of the relevant IS Code or CPWD specifications.

1.2.7 MASONRY AND BRICK WORK:

1.2.7.1 Brick Work:

The work shall be carried out as described specification of the relevant IS Codes or CPWD specifications.

1.2.7.2 Course Rubble Stone Masonry:

This work shall be carried out as described in specification of the relevant IS Codes or CPWD specifications.

1.2.8 Wood Works:

All wood work shall be done as per IS code or CPWD specifications.

1.2.9 Metal Doors, Windows and Rolling Shutters:

All doors and windows shall be manufactured with steel conforming to IS: 1033 and shall be of good workmanship including fitting and fixing of the same in accordance with IS: 1081. All steel doors, windows and ventilators shall be supplied with a shop coat of an approved protective paint like red oxide.

Rolling shutters shall be obtained from approved manufactures. These shall include necessary locking arrangement and handles. These shall be suitable for fixing in position as specified i.e. outside or inside or below lintel or between the openings. The doors shall be push and pull type and also operated with chain and crank device as required. The shutters shall consist of steel rolling shutters of 20 gauges. Interlocking steel latches of deep convex corrugations complete with pressed steel guides 60 mm x 25 mm made out 3 mm thick plate. The latch shall be machine rolled and straightened with an effective bridges depth of 16 mm and shall be interlocked together throughout their entire length and jointed together at the end with end locks. These shall be mounted on specially designed pipe shaft. Each latch section shall be a continuous single strip piece without any joints.

The springs shall be preferably of coiled type. The spring shall be manufactured from high tensile spring steel wire or strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong mild steel brackets.

The guide channels shall be of mild steel deep channel section and of rolled, pressed or built up construction. The thickness of the sheet used shall not be less than 3.0 mm minimum. The gap between the two legs of the guide channel shall be sufficient to allow the free movement of the curtain and at the same time close enough to prevent the rotting of the curtain due to wind. Each guide channel shall be provided with a minimum of three fixing cleats to the walls or columns by means of bolts and screws. Brackets shall be fixed on the lintel or under the lintel or shown withdrawal plus, screws, bolts etc. The shaft along with the spring shall then be fixed on the brackets.

The shutters shall be laid on the ground and the side guide channels shall be bound with it with ropes etc. The shutter shall then be placed in position and top fixed with pipe shaft with bolts and nuts. The side guide channels and cover frame shall then be fixed to the walls through the plate welded to the guides. Fixing shall be done accurately in workman like manner so that the operation of the shutter is easy and smooth.

1.2.10 Flooring:

The specification for all flooring work shall be as per relevant IS- Codes or CPWD specifications as mentioned below:

- a) Laying in-situ cement concrete flooring – IS 2571.
- b) Laying in-situ granolithic concrete floor lapping – IS 5491.
- c) Laying burnt clay brick flooring – IS 5764.

1.2.11 Plaster:

All plastering work (external or internal) shall be done as described in specification of the CPWD.

1.2.12 Painting and Varnishing:

Specifications for painting work shall be as per relevant IS Codes or CPWD specifications as mentioned below:

- a) Painting of ferrous metals in buildings: Part I – Pretreatment - IS 1477.
- b) Painting of ferrous metals in buildings: Part II – Painting - IS 1477.
- c) Painting of non-ferrous metals in buildings: Part I – Pretreatment - IS 2524.
- d) Painting of non-ferrous metals in buildings: Part II – Painting - IS 2524.
- e) White washing and colour washing – IS 7278.
- f) Masonry and Plaster surfaces: Part I – Operations and Workmanship – IS 2395 (Part 10).
- g) Masonry and Plaster surfaces: Part II – Schedules – IS 2395 (Part II).

In addition to above specifications for ready mixed paint shall conform to IS 102 and 103, IS 347. Enamel paint (Conforming to IS 2933) of approved brand and manufacturer and of required colour shall be used. For the under coat, the paint of the same quality but of shade to suit that of the top coat shall be used. Preparation of surface and application shall be as specified.

The paint shall conform to IS 5410 and shall be of approved brand and manufacture. The surface shall be thoroughly cleaned of mortar dropping, dirt, dust, grease, algae and other foreign matters by brushing and washing. The surface shall be thoroughly wetted with clean water before the paint is applied. If directed an anti-alkaline primer coat shall then be applied.

Cement paint shall be mixed in such quantities as can be used up within an hour of its mixing. Two parts of cement paint and one part of water shall then be added to the mix stirring thoroughly all the time to obtain a liquid mix of workable and uniform consistency. In all cases manufacturer's printed instructions shall be followed for the painting works.

The mix shall be applied on the cleaned and wetted surface/primer applied surface with brushed keeping the solution well stirred during the period of application. The second coat shall be added after the first coat has finished surface of uniform shade and tint and free of brush marks to the satisfaction of the Engineer-in-Charge.

1.2.13 Water and Damp Proofing:

Water proofing and damp proofing work shall be carried out as per relevant IS-standard-mentioned below:

- i) Application of bitumen mastic for water proofing of roofs – IS 4365.
- ii) Bitumen felts for water proofing and damp proofing (2nd revision) – IS 1322.
- iii) Bitumen mastic for tanning and damp proofing – IS 597.
- iv) Bitumen mastic for use in water proofing of roofs – IS 3037.
- v) Bitumen primer for use in water proofing and damp proofing – IS 3384.
- vi) Bitumen compounds for water proofing and caulking purposes IS – 1580.
- vii) Damp proofing using bitumen mastic – IS 7198.
- viii) Integral Cement water proofing compounds – IS 2645.
- ix) Laying damp proof treatment using felts – IS 1609.
- x) Recommendation for use polyethylene film for water proofing works – IS 7290.

1.2.14 Glass and Glazing:

This section shall cover specifications for supply and installation of all type glasses. All glasses shall be as per IS: 170 and shall be reasonably free from blisters, stain, scratches, bubbles and flaws of any kind of approved make and shall be properly cut to fit in frames and mullions. Unless otherwise shown, no glass shall be less than 4 mm thick. Glazing work shall be done as per details of workmen specialized in the trade and as per best trade practices and shall be properly cut to fit in frames and mullions.

All broken glass shall be made good by the Contractor on completion of the work. The Contractor shall order sufficient additional quantity to make this easily possible. No glazing shall be completed until all stains have been removed from the surface and all glass thoroughly washed with soap and water and polished with approved glass polisher.

All fittings and fixtures and finish hardware shall be fixed just before glazing is done. Notwithstanding anything contained herein before manufacturer's instructions regarding storing, handling, cutting, glazing, cleaning etc. shall be strictly followed.

Before cutting, measurement of all glass shall be taken at site. Glass shall be ordered slightly over size and cut at site to fit properly. Clip in metal beads shall be supplied with the sashes to be fixed with glazing at site. The work shall be done in a workman like manner as per best trade practices with approved back putty. The corners shall be mitted. All glass and Glazing shall be suitably protected until the time of handing over.

1.2.15 Finish Hardware:

This section shall cover all finish, hardware, approved latches, locks and other fittings and fixtures etc. used in wood doors. All finish hardware shall be well made, reasonably smooth and free from sharp edges and corners, flaws and other defects and shall be as per relevant Indian Standard. Unless otherwise required all finish hardware shall be in anodized aluminium except the main entrances to chemical house and filter house wherein it shall be of best quality brass.

All hardware shall be approved make or in accordance with IS Standard (if available) and shall be specifically got approved by the Engineer-in-Charge before ordering. No fittings and fixtures shall be fixed before all major work is over. While fixing correct handling of fixtures shall be ensured. All finish hardware shall be fixed by skilled carpenters experienced in this work. Work shall be done as per manufacturer's instructions and to satisfaction of the Engineer-in-Charge.

1.2.16 Miscellaneous Works:

Specification for hold fasts shall be in accordance with IS 7196. Provision of shelves shall be carried out as per CPWD specifications for miscellaneous metal works like manhole covers, frames, rings, ladders, handrails etc. shall be as per relevant IS Standards or CPWD specifications.

1.2.17 Treatment of Concrete Surfaces:

All concrete surfaces shall be reasonably smooth and true. Any fine cracks which may occur between boards and panels shall be removed and air holes filled with 1:1 mortar. Any area requiring treatment after stripping as outlined above shall afterwards be rubbed down with a carborandom stone block and washed perfectly clean. No surface treatment shall be carried out until the surface has been inspected by the Engineer-in-Charge.

1.2.18 Cement washing :

For decorative as well as water repellent washing on the external surfaces wherever specified in the drawing and schedule of finishes, snowcem or equal approved cement washing compound of desired colour is to be used.

Only fresh compounds should be used. Hard or set snowcem should not be used. The contents should be made loose by rolling and shaking the container before opening. First a paste shall be prepared by mixing two parts of compound with one part of water by volume and immediately this should be thinned by adding another one part of water to have a uniform solution of consistency of paint.

The surface should be cleaned to remove loose dust or dirt by use of a soft wire brush. The surface shall then be wetted by sprinkling with water and water shall be allowed to run off. The fresh mixed washing paint shall then be applied as per manufacturer's instructions. After a day or two a second coat of cement washing painting should be supplied on the wetted surface carefully to give a uniform and good finishing appearance.

1.2.19 Structural Steel Work:

Structural steel work shall comply with the requirements of IS: 226. Design and fabrication of steel structure shall be done in accordance with IS: 800.

1.2.20 Welding:

In all cases where welds are liable to be highly stressed and contractor shall supply to the Engineer-in-Charge before fabrication commences, detailed drawings of all welds and weld preparation are proposed. No such welding shall be carried out before the Engineer-in-Charge has signified his approval of the details proposed. No alteration shall be made to any previously approved detail of weld preparation without prior approval of the Engineer-in-Charge.

Welders shall be qualified in accordance with the requirements of appropriate section of Indian Standards. All tests if required shall be carried out in the presence of the Engineer-in-Charge. All welded components shall be stressed relieved prior to machining.

SPECIFICATIONS FOR MECHANICAL WORKS

General Requirements :

1 Material

All materials incorporated in the Work shall be the most suitable for the service conditions and duty concerned. They shall be new and of reputed make / approved quality, free from imperfections and selected for long life and minimum maintenance.

Non-destructive tests, if called for in the Specification, shall be carried out. All submerged moving parts of the Plant, or shafts and spindles or faces etc. in contact with them shall be of corrosion resistant materials. All parts in direct contact with various chemicals, shall be completely resistant to corrosion, or abrasion by these chemicals, and shall maintain their properties without aging due to the passages of time, exposure to light or any other cause. All materials shall conform to the material standards as per BIS or any equivalent standard.

2 Workmanship

Workmanship and general finish shall be of first class quality and in accordance with best workshop practice. All welds shall be as per IS, BS, ASME standards. All tolerances and clearances shall be as per good and sound engineering practices. Should the Employer's representative not consider any material acceptable, it shall be replaced.

3 Design Features

As far as practicable, all designs shall be as per latest concept and practices. The equipment shall be new, of robust design for a long reliable operating life. These shall be capable of 24 hours per day continuous operation for prolonged period in the climatic and working conditions prevailing at the site and with a minimum of maintenance. Particular attention shall be given to extra temperature and the rating of electrical and mechanical equipment, cooling systems and the choice of lubricants shall be for the temperatures as specified.

Paints used shall be the manufacturers' standard and shall be suitable for duty as described. The equipment shall be designed to provide easy access to and replacement of component parts which are subject to wear without the need to replace whole units. All parts in contact with water shall have a life from new to replacement for 10 YEARS minimum and new to repair of not less than five years.

Design features shall include the protection of equipment against damage caused by vermin, dirt, dust and dampness and to reduce risk of fire. Equipment shall operate without undue vibration. Noise reduction measures shall be adopted such that levels of 75 dB (A) at 3 meters are not exceeded. Parts shall be designed to withstand the maximum stresses under the most severe conditions of normal service. Materials shall have a high resistance to change in their properties due to the passage of time,

exposure to light, temperature and any other cause which may have a detrimental effect upon the performance or life of the Plant.

All rotating elements shall be dynamically and statically balanced.

All equipment shall have name plates specifying the makes, model, rating and other pertinent information.

4 Lubrication

The equipment shall be lubricated by long life lubricants such that working life is not less than 3000 operation hours or as recommended by equipment manufacturer.

The Contractor shall furnish a complete schedule of recommended oils and other lubricants. The number of different types of lubricants shall be kept to a minimum. The schedule and the name of the supplier of the lubricants shall be submitted to the Employer's representative for approval.

Lubricants shall be oil and grease. The Contractor shall indicate indigenously available equivalent lubricants, with complete specification. Where the lubricant is grease, preference shall be given to a pressure system which does not require frequent adjustment or recharging. Preferably, life lubricated grease packed bearings shall be used. Where more than one special grease is required, a grease gun for each special type shall be supplied and permanently labelled.

5 Name Plates

Each equipment of the Plant shall have permanently attached to it a nameplate and rating plate in a conspicuous position, Upon these shall be engraved or stamped, the manufacturers name, type and serial number of the equipment, details of the loading and duty at which the equipment has been designed to operate, and such Diagrams as may be required by the Employer's representative. All indicating and operating devices shall have securely attached to them or marked upon them designations as to their functions and proper manner of use.

6 Painting At Manufacturer's Works:

The Contractor shall be responsible for the cleaning, preparation for painting, and priming or otherwise protecting, as specified, all parts of the Plant/ Equipment at the place of manufacture prior to packing.

Parts may be cleaned but surface defects may not be filled in before testing at the manufacturer's works. Parts subject to hydraulic test shall be tested before any surface treatment. After testing, all surfaces shall be thoroughly cleaned and dried out, if necessary by washing with an approved de-watering fluid prior to surface treatment. Except where the specification provides to the contrary, all painting materials shall be applied in strict accordance with the paint manufacturer's instructions.

Steel and cast iron parts shall be sand blasted to near white cleaning before painting. Edges, sharp corners etc. shall be ground to a curve before sand blasting. A primer coat of a zinc rich epoxy resin

based coating with at least 75 microns dry film thickness is to be provided. In addition, the parts for wet duty are to be provided with an adequate number of coats of coal tar epoxy polyamine coating to a dry film thickness of 175 microns excluding primer coating.

At Site:

Immediately on arrival at the site, all items of Plant shall be examined for damage to the paint coat applied at the manufacturer's works. Any damaged portions shall be cleaned down to the bare metal, all rust removed, and the paint coat made good with similar paint.

After erection, such equipment/ items which are not finish painted shall be done so. Items that have been finish painted at the manufacturer's works shall be touched up for any damaged paint work. For finish painting, two coats of synthetic enamel conforming to IS: 2932 shall be applied. Dry film thickness of each coat shall be at least 25 microns. Painted fabricated steel work which is to be stored prior to erection shall be kept clear of the ground and shall be laid out or stacked in an orderly manner that will ensure that no water or dirt can accumulate on the surface. Suitable packing shall be laid between the stacked materials. Where cover is provided, it shall be ventilated.

7 Galvanising

Wherever galvanizing has been specified the hot dip process shall be used and electro galvanized parts, equipment shall not be permitted. The galvanized coating shall be of uniform thickness. Weight of zinc coatings for various applications shall not be less than those indicated below:

- a) Fabricated steel : 460 gms/sq. m
- b) Fasteners : 300 gms/ sq. m

Galvanising shall be carried out, after all drilling, punching, cutting, bending and welding operations have been carried out. Burrs shall be removed before galvanizing. Any site modification of galvanized parts should be covered well by zinc rich primer and aluminum paint.

8 Supports for Pipe Work & Valves

All necessary supports, saddles, slings, fixing bolts & foundation bolts shall be provided to support the pipe work. Valve and other equipment mounted in the pipe work shall be supported independently of the pipes to which they connect.

All valves to be installed in straight lines shall be installed between the flanges with a dismantling joint or SS expansion bellow at one side of the valve. The dismantling joint must allow a minimum clearance of 20 mm. The pressure rating of the dismantling joint / expansion bellow shall be same as that of the valve.

Mechanical fine Screens

General :

Mechanically operated step Screen completely made of Stainless Steel having 6 mm clear spacing between the bars shall be provided in inlet screen channel for screening out floating materials such as plastic pouches, bags, rags, floating debris, weeds, paper wastes and other floating materials from the raw sewage coming from the pumping station / gravity mains.

The screen shall include discharge chute as required to discharge the screenings on the belt/screw conveyor without employing any external mechanism / rake mechanism. The screen shall be factory assembled & movement tested at plant before dispatch to site & shall only be installed at the site in factory assembled condition thereby avoiding chances of misalignments.

Scope:

Design, Supply, Installation, Testing & Commissioning of screening equipment consisting of following:

Mechanized step screen having 6mm spacing between bars and suitable for installation at an inclination of 40 degrees in channel.

Level sensing instrument connected to control panel for automatic operation of screen mechanism and allied accessories. Local control panel installed near screen. Belt/screw conveyor to discharge the screened material of the screen to the waste bin.

Specification

Material of construction:

The fixed as well as movable bars, mechanism, support frame, fixings discharge chute shall be manufactured from stainless steel for long life in the aggressive sewage environment. No component of the screen assembly shall be made of carbon steel or any other material, which can get corroded in sewage environment.

Screen Construction

The step screen shall be a complete unit comprising of main frame with an integral mechanism containing movable bars located in between fixed bars without engagement of external mechanism / rake mechanism for pulling out the screened material ensuring minimum movement of the mechanism.

The mechanism comprising of movable bars located between fixed bars shall gradually move the screened material upward in the form of a mat and deliver on the up to the discharge chute.

The fixed as well as movable bars shall contain a series of steps to prevent the screenings from falling back into the main flow.

The mechanism shall be mechanically operated by Electro-motor or hydraulic system and shall be suitable for automatic operation controlled by a level sensor.

The screen shall operate automatically when the upstream water level of the screen increases beyond a pre-set limit and it shall stop when the upstream level decreases to a preset low level due to upward travel of screened material. The fine bar screen shall be capable of being tilted out of the sewage flow up to horizontal position for the purpose of cleaning & maintenance. The base of the screen shall be fitted with a specially profiled stainless steel plate to direct any grit that may be present towards the screen and taken out along with other screened material thus reducing the possibility of building up of grit in front of the screen.

Level Controller

The level controller shall be upstream type Ultrasonic level switch.

Electrical Motor

The motor shall be TEFC type with IP 55 protection and shall be suitable for operation on 415V + 10% and frequency of 50Hz + 5%.

Control Panel

The Control Panel shall have IP 55 protection, painted with Epoxy paint and shall be comprising of Mushroom Head Emergency stop Overload relays for motor protection MCB's, HRC Fuses and Glass Fuses Circuitry to operate the screen with level sensors. Selector Switch to operate the screen on JOG mode Shop Testing. The screen should be completely manufactured and offered for inspection at the plant of the manufacture confirming the above mentioned eligibility criteria. A screen assembled by a vendor and offered for inspection at the plant of a vendor / sub contractor shall not be accepted. The screen shall be subjected to following tests at manufacturer's premises by third party inspection and / or JDA representative(s):

Dimensional Check: The overall dimension of the screen shall be conforming to the approved drawings.

Operational Test: The complete screen including its carriage, rake, drive system and brake motor shall be mechanically operated and tested to verify interference free movement and satisfactory operation.

10 Air blowers for Oxygenation

The blowers shall be provided for providing adequate oxygen into the reactor tank for aeration. The air requirements shall be calculated for summer and winter as well as for mixing power the higher duty shall be installed. The summer sewage temperature shall be taken as 38 degrees C and that in winter at 10 degrees C.

The blowers shall be capable of developing the required total pressure at the rated capacity for continuous operation. The blowers shall be Twin lobe type. The blowers shall be provided with suction

air filter, silencer, dead weight pressure relief valve and pressure gauge and the air delivered shall be clean, dry and oil free. The blower noise level and velocity of vibration shall be within 85 dB (A) at a distance of 3m respectively. The blower shall be driven by squirrel cage induction motor.

The speed of the blowers shall be below 1500 rpm. The power rating of motor shall be at least 10% above the maximum power requirement by the blower. The blowers shall be mounted at a level necessary to avoid back low or siphoning of sewage into the blower.

Material of construction:

Casing : C I conforming to IS: 210 Gr FG 260 Rotor : Alloy steel

Shaft : Carbon steel C40/EN 24/19 Timing gear : Cast alloy steel

Pulley and gear side plates and cover : CI conforming to IS 210 Gr FG 260

Tests

1 Hydrostatic tests Twice the maximum working pressure

2 Performance test As per BS : 1571

3 Strip test Clearances with tolerance limit

4 Mechanical balancing ISO 1940 Gr. 6.3 or better

5 Visual Inspection Before painting

11 Diffused Aeration System

This comprises piping to diffusers and the diffusers.

Type of diffuser system

A fine bubble diffused aeration system shall be applied to aeration tank for oxygenation. The number of diffuser elements can be varied by the bidder depending on the manufacturer selected, subject to the condition that sufficient design calculations are attached along with it and the manufacturer is a standard one having supplied the diffusers to various waste water treatment plants of similar nature.

Diffuser Elements

The diffuser elements shall be of EPDM/PU tubular membrane type and resistant to such ingredients as hydrocarbons, oil and grease. This shall afford a high oxygen transfer rate coupled with a minimal pressure drop besides permitting simple erection onto the horizontal air manifold. They shall have self-cleaning properties while in action. The diffuser unit shall be of corrosion resistant material. The membrane diffusers shall permit connection to the air manifolds of circular or square cross section and

the entire lot of diffusers shall be capable of discharging designed flow of air at an average flow (maximum of summer and winter requirement) when installed in the said SBR tanks.

The diffuser grid shall be of fixed type. The headers onto which the diffusers are fixed shall be of standard Imported PVC/UPVC pipe sections of suitable inner bore and shape with custom fixtures of the diffuser elements as directed by the membrane manufacturers. Alternative pipe materials shall be acceptable provided the same are a mandatory part of the diffuser supplier and have been in the supplier's line of supply as original equipment. The headers shall also be procured from the equipment manufacturers who are the suppliers of the membrane diffusers. These headers shall have enough counterweight or alternative arrangement to surmount any buoyancy lift from the floor during air charging.

Air Supply Piping

The air piping from the blower to the basin header (above water) shall be of MS epoxy painted material and pressure rated for the sewage depth plus frictional losses etc. Each air header shall travel downward from the air piping by aligning itself onto the sidewall of the aeration tank and thereafter travel horizontally onto the tank floor. These shall be fixed securely to the concrete surfaces in the horizontal plane and vertical plane so that they are not clamped horizontally onto vertical sides of the walls. The clamping shall be so designed as to permit "in-situ" screw driven fittings. Breaking open concrete surfaces shall not be permitted.

12 Specifications for Epoxy Painting

Zinc rich epoxy primer and epoxy paint of approved quality shall be used for external and internal painting. No primer shall be applied without prior approval from the Employer's Representative. The max of zinc rich epoxy primer shall be prepared at work site not earlier than 15 minutes before applying the same on pipes and special surfaces. One coat of zinc rich epoxy primer of DFT 75 micron shall be applied along with two coats of epoxy paint DFT 40 micron and DFT 30 micron respectively. No thinner shall be added to ready mix paint without previous approval of the Employers' representative and the finishing coats on top of the primer coat shall only be applied after allowing the film to cure for at least 48hrs. After application of zinc rich epoxy primer the surface should be cleaned by duster and inspected. If during inspection any portion is found rusting the same shall be removed by emery paper and coated with zinc rich epoxy primer. Mixed paint should be used within 3 to 4 hrs. of mixing and fresh mixing shall be done for every new application. Every successive coat of paint shall be given only after 48 hrs. of previous coat. Before applying the next coat the surface should be properly cleaned by duster.

13 Specifications for Decanting Drive

The decanting device shall be rotating moving arm devices of Stainless Steel with top mounted gear box, drive, scum guard, down comers, collection pipe, bearings. The following type of decanter assemblies are not acceptable:

- Rope driven decanters.

- Floating decanters.
- GRP products.
- Valve-arrangement.
- The maximum design travel rate shall be 60 mm/min. with proven hydraulic discharge capacity of the decanter proportional to the selected basin area. Bidders to provide sample graphs of executed projects with such decanting speeds with decanters of min. same size (length)
- There should be Maximum 1 decanter per basin.
- The hydraulic design based on design flow rates as given above shall not exceed flow speeds of 1.3 m/s.
- Flexible rubber hose kind of decanter sealing is not acceptable.
- Each Decanter mechanism shall be inclusive of local control boxes with manual operation selection and function buttons, communication to main PLC by DH485 or Ethernet

14 Submersible Pumps for Return and Excess sludge

Return sludge pumps shall pump the return sludge from the sump to the aeration tank. Pumps shall be submersible type of non –clog design. They shall be suitable for pumping soft solids normally present in raw sewage. Raw sewage pumps with maximum 960 rpm shall be provided. In addition to this, the pumps shall be fitted with a special tearing system on the suction side for tearing soft solid material. The impeller shall be of a non- clog design with smooth passage and desired solid handling capability. Maintenance-free anti- friction bearing, deep grooved permanently greased filled ball bearings shall be provided to take care of all the axial and radial forces at any point of operation. The pump installation design shall be such as to facilitate automatic installation and removal of the pumps without having to enter into the sewage pit. The motor shall be squirrel cage type, suitable for three phase supply continuous duty with class 'F' insulation. Motor shall have integral cable parts and the cable entries shall be sealed. The cables must be leak tight with respect to liquids and firmly attached to the terminal block. The motor shall be designed for non-overloading characteristics. There shall be thermal protection against overheating of the motor winding. The pump design shall ensure that seal does not come directly in contact with the liquid being pumped as well as cooling / lubrication by oil is provided. The moisture sensor of the tripping unit shall be located inside the oil chamber.

The pump unit shall be supplied along with the special duck foot bend, flanged elbow, lifting chain with shackles, enough guide wire / pipe, sufficient tough rubber sheeted water proof cable, as well as stainless steel foundation bolts and nuts. Alternatively pump unit can be with SS wire rope guiding system and pedestal cart integrated with the discharge head.

Reverse Rotation

The pump shall be designed to operate safely in the reverse direction of rotation, due to wastewater returning through the pump.

Pump Construction

Refer Section – 2.0 Scope of Work of the tender.

Pump Bearings

Pump bearings shall be of the antifriction type. The bearings shall be able to take normal axial thrust loads due to unbalanced hydraulic loads on the impellers plus the weight of all rotating parts of the pumps. Pump bearings shall be designed with a minimum life of 40,000 hours. The bearings shall be grease lubricated for life and shall be maintenance free.

Mechanical Seals:

A double mechanical seal of approved type shall be provided to prevent pumped liquid entering into the motor winding. The seals shall be running in oil bath. The oil bath shall have moisture sensors to sense water leakage. The sensors shall be used for tripping the pump and also for alarm.

Pump Balance:

All rotating parts shall be accurately machined and shall be in rotational balance. Excessive vibration shall be sufficient cause for rejection of the equipment. The mass of the unit and its distribution shall be such that resonance at normal operating speeds is avoided. In any case the amplitude of vibration as measured at any point on the pumping unit shall not exceed the limits set forth in the latest edition of Indian Standards. At the operating speed, the ratio of relative speed to the critical speed of the unit or its components shall be less than 0.8 or more than 1.3.

Lifting chain

Each pump shall be provided with galvanized steel lifting chain of suitable capacity. One end of the chain shall be attached to the pump and the other end fixed near the upper bracket for guide rail / wire rope assembly, by means of GI D shackle. The chain shall have GI rings fixed at an interval of about 1 meter for engaging the hook of the chain pulley block.

Submersible Cable

Each pump shall be provided with submersible cables of equal length for power and control so that the pump positions can be interchanged with each other. The cable shall be terminated in a common weatherproof junction box.

Moisture Sensor

The moisture sensor shall be provided in the oil chamber to detect the failure of the mechanical seal.

Motor

The motor shall be integral part of the pump. The enclosure for motor shall be IP-68. Each phase of the motors shall be provided with thermostat. The motor winding shall be suitable for star delta/soft starter. The motor shall be designed for minimum 10 starts/stops per hour, irrespective of whether it is DOL start or otherwise. For other requirements refer subsection

VI. The motor shall operate satisfactorily at all operating levels in wet well.

Protective Coating:

The pumps shall be epoxy painted.

15 Other Sludge Pumps

These pumps shall be of screw type used for pumping sludge to centrifuge. The pumps shall be designed to operate satisfactorily without detrimental surges, vibration, noise, or dynamic imbalance. Over the required head range, the head-capacity curve of the pump shall have a continuously rising head characteristic with decreasing capacity over the whole range of total head. The pump shall have the maximum efficiency at the specified duty point. The unit shall be designed to operate safely at the maximum speed attainable in the reverse direction of rotation due to sewage returning thro the pump at times when power supply of the motor is interrupted.

All rotating parts shall be statically and dynamically balanced as per ISO standards.

A stationary coupling guard shall be provided for the coupling conforming to all relevant safety codes and regulations. Guards shall be designed for easy installation and removal. They shall be complete with necessary support accessories and fastener.

The pumping unit shall be provided with a common base plate. The base plate shall be of sufficient size and rigidity to maintain the pump and motor in proper alignment and position.

The pump design shall be as per IS 6595 and pump performance shall be as per IS 9137.

The power rating of the pump motor shall be the larger of following

115 % of power required by the pump at the duty point

110 % of maximum power required by the pump from zero discharge to the runoff point total head.

Material of Construction & Specifications

Type Screw MOC Alloy Steel

Base plate CI / MS Epoxy painted Fastener SS AISI 304.

Pump speed 960 rpm (maximum) Ball passing size 25 mm minimum Applicable code Design IS 6595

Performance IS 9137 Testing

Material test certificate Casing, Impeller, Shaft

Hydrostatic test 1.5 times shutoff head or twice the rated discharge head whichever is greater
Performance test IS 5120 and IS 9137 at full speed Mechanical balancing As per ISO 1940,
Gr. 6.3 or better

Visual inspection Pump shall be offered for visual inspection before shipment. The pump components shall not be painted before inspection Field Tests Field performance tests required for satisfactory operation

Disinfection System Shall include:

Suitable dosing pumps as approved by the Engineer In-Charge shall be established along with proper and adequate storage of sodium hypochlorite solution shall be provided.

Chlorination Room

The chlorination room shall be constructed as per requirement and approved by Engineer In-Charge.

Valves

General

Valves shall be as per internationally recognized standards. Flanges shall be machined on faces and edges to ISO 7005, IS 6392. Valves shall be flanged type. For sluice / gate valves, back seat arrangement shall be provided. Valves buried or installed in underground chambers, where access to a hand wheel would be impracticable, shall be operated by means of an extension spindle and / or keys. Valves shall be suitable for frequent operation as well as operation after long periods of idleness in either the open or closed position. The valve stem, thrust washers, screws, nuts and all other components exposed to the water shall be of a corrosion resistant grade of stainless steel. All valves parts shall be in general of the material of construction best suited for the proposed application.

Sluice Valves

The gate face rings shall be securely pegged over their full circumference. Valves of 450 mm and above shall be provided with a thrust bearing arrangement for ease of operation. They shall also have renewable channel and shoe linings. The gap between the shoe and channel shall be limited to 1.5mm. Alternatively, valve of diameter 450mm and above may be provided with a gear arrangement for ease of operation. The operation gear of all valves shall be such that they can be opened and closed by one man against an unbalanced head 15% in excess of the maximum specified rating. Valve and gearing shall be such as to permit manual operation in a reasonable time and not to exceed a required rim pull of 80N. All hand wheels shall be arranged to turn in a clockwise direction for opening and counter clockwise for closing. These directions shall be indicated on the hand wheels. All valves shall be rated for not less than PN 1.0.

All valve doors when fully closed will ensure door faces are riding on body seat ring by at least 50% of width of seat ring providing sufficient allowance for wear. Valves of diameter 450 mm and above shall be provided with a drain and air plug.

Material of Construction

Body, Bonnet, Wedge : CI conforming to IS 210 Gr FG 260

Spindle

Drain and Air Plug : IS 318 Gr LTBZ Seat Ring, Wedge Ring : SS 304

Back seat Bush : Bronze IS: 318 Gr LTB 2 Gland Packing : Graphite Asbestos Parameters

Type : Rising spindle

Nominal pressure : 2 times working pressure in pipeline Nature of operation : Horizontal / vertical

Applicable code : IS 14846

Tests: : Acceptance tests as per IS 14846

Knife Gate Valves

Knife gate valves shall be suitable for use at suction and delivery side of pumps in a sewage pumping station. The valve should be provided with gate made of stainless steel and the gate should have bevelled knife edge at the bottom to cut through and easily enter in the solids settled in the bottom and ensure positive shut-off / closure in sewage environment. The valve should be bonnet-less and suitable for face to face flange connections in between pipelines. It should be suitable for uni-directional application. The valve body should be of Cast Iron Gr. FG 260. The body shall be designed to withstand 6 bar pressure.

The valve shall be provided with replaceable type flexible sealing seals to offer drop tight shut off. The seals should be made of EPDM rubber and should be held in place by an easily removable type seal retainer ring. The seal retainer ring should be designed in a manner so that the flow of the fluid should be away from the sealing perimeter and towards the centre of the valve.

The valve housing should have integral as cast tapered lugs provided for pushing the gate towards the flexible rubber seal only at the verge of closure with a view to avoid seal wear and achieve drop tight shut off. The surface of the gate coming in contact with the seal should be polished & buffed.

The valve shall be provided with sufficient ply of stuffing seals in the in built stuffing box to seal the rear opening. The stuffing box should have internal tappers for pushing the seals on to the gate. The seals

should be of non-asbestos PTFE to reduce the friction and offer higher life. Provision shall be made to enable tighten the stuffing seals by means of a pusher arrangement to minimize the leakage through the back of the valve. Replacement of stuffing seals should be done in installed condition of the valve.

The spindle should be double start threaded and non-rising type for compact & safe operation. The gate movement area should be covered by protection shields. Gate opening indicating arrangement should be provided to find out the extent of gate opening /closing. Flange drilling suitable to mount between flanges as per IS 1538 -1993.

Body: Cast Iron FG 260 as per IS 210 Knife gate: AISI:304 Gr. ASTM A240 Retainer ring:

SS:304 ASTM A351 Gr. CF:8 Inlet Seal: EPDM

Spindle: AISI:410 Gr. ASTM A276

Spindle Nut: Cast Iron Gr. FG 200 as per IS 210 Stuffing plate: Cast Steel ASTM A216 Gr.

WCB Stuffing seal: Synthetic yarn with PTFE

Reflux Valves

Reflux valve shall possess high speed closing characteristics and be designed for minimum slam conditions while closing. External counterweights are not acceptable. Check valves shall conform to API 594 and API 598. They shall have metal to metal sealing. The pressure drop in the valve at design flow shall be limited to 0.4 mWC.

Material of construction

Body CI conforming IS 210 Gr FG 220 Plate SS AISI 316

Spring SS AISI 316 Seal SS AISI 304

Parameters

Nominal pressure Twice the pressure in pipeline Nature of operation Automatic

Closure characteristic Non slamming Applicable code API 594

Tests Acceptance tests as per API 598

Pipe Work

All pressure pipes carrying raw sewage and sludge within the pumping stations shall be DI K-9 Class. All gravity pipes carrying raw / treated sewage shall of RCC NP2 Class. The treated and chlorinated sewage should be disposed off to the adjacent stream by closed RCC NP2 pipe in case of gravity or DI

K-9 pipe in case of pumping. All Air pipes above water shall be of MS. Air Down comers to diffuser grid shall be in SS304. All sludge pipes below water shall be of SS304.

The pipe works for the plant involves procuring, supply, laying and jointing of suitable size electrically welded steel, cast iron, ductile iron, UPVC, RCC and PSCC pipes along with matching specials etc. as required. All yard piping inside the plant shall be cast iron or ductile iron. All pipe work and fittings shall be a class rating in excess of the maximum pressure attained in service including any surge pressure. The pipe work installation shall be so arranged to offer ease of dismantling and removal of pumps or major items of equipment.

CI/DI Piping above ground level shall be only flange jointed and adequately provided with structural/masonry supports. All pipe work shall be adequately supported with purpose made fittings, wherever necessary. Flange adapters and union shall be fitted in pipe work runs, wherever necessary, to permit the simple disconnection of flanges, valves and equipment. The Contractor shall be responsible for ensuring that the internal surfaces of all pipe work are thoroughly cleaned before and during erection and commissioning. Cleaning shall include removal of dirt, rust, scale and welding slag due to site welding. Before dispatch from manufacturers works, the ends of the pipe, branch pipes etc., shall be suitably removed until immediately prior to connections adjacent pipes, valves or pumps. All small-bore pipes shall be blown through with compressed air before connection is made to instruments and other equipment. No point of passage of pipes through floors or walls shall be used as a point of support, except with the approval of the Employer's representative. All underground buried mild steel piping unless found otherwise necessary, shall be protected by the application of hot coal tar enamel and fiberglass wrapping. The coating shall consist of one coal tar primer one coat, wrapping of fiberglass one more coat of enamel and the final wrap of enamel impregnated fibre glass. However, all water supply plumbing pipelines shall be of GI class B and either anchored externally with SS AISI fasteners or appropriately buried below the ground with a sand cushion of 20 cm all round. All sanitary piping shall be of UPVC class 4 suitably buried below the ground with a sand cushion of 20 cm all round. Changes in direction on the ground shall be achieved with inspection chambers of 45 cm x 45 cm and heavy-duty CI/Steel reinforced fiberglass chamber covers. The minimum size for sludge pipes shall be 100 mm diameter. The minimum delivery piping for pumps shall be 80 mm. Velocities in the delivery lines shall be

1.0 to 1.2 m/s. All sludge lines should have provisions for flushing.

C I Pipes

The C I pipes and specials their laying and jointing and their dimensions shall conform to IS 1536, IS 1538 and IS 3114 with their latest revisions. The quality of cast iron shall meet grade 15 of IS 210 and be free from flaws, air bubbles, cracks, sand holes and other defects and shall be truly cylindrical and of uniform thickness. The methods for sampling of C.I. pipes and fittings shall conform to IS 11606. Pipe work outside the buildings shall use Tyton ring joints and inside, double flanged joints. All underground pipes shall be provided with granular bedding. Thrust blocks wherever required in the opinion of the Employer's representative shall be provided in accordance with relevant specifications of the BIS Tests:

Following tests shall be carried out on the C.I. pipes:

(i) Mechanical Tests- As specified in I.S. 1536 during manufacture of the pipes.

(ii) Hydrostatic tests at works

The pipes shall be tested hydrostatically at the pressure specified in Table 1 for spigot and socket pipe and as per Table 2.0 for flanged pipes of IS 1536. The pressure shall be applied internally and shall be steadily maintained for a period of minimum 10 seconds and the pipes shall be moderately struck with a 700 gm hammer. The pipes shall withstand the pressure test and shall not show any sign of leakage, sweating, cracks or fracturing or other defects.

(iii) Testing at site

The following site tests shall be carried out after a new pipe is laid, jointed and partially backfilled.

(a) Pressure test

The pressure test at a field test pressure specified in clause 7.2.1 of IS 3114 shall be carried out. Pipes and joints shall be absolutely water tight under the test. The procedure for testing shall be as per clause 7.2.1 of IS 3114.

(b) Leakage test

The leakage test shall be conducted as per clause 7.3 of IS 3114 and the leakage should be within the specified allowance as calculated using formula given in clause 7.3.2 of IS 3114.

(c) Water required for any type of testing shall be arranged by the Contractor, at his own cost.

(d) Markings:

The following markings on the pipe shall be cast, stamped or indelibly painted-

1. Manufacturer's name or identification mark
2. The nominal diameter
3. Class reference
4. Mass of pipe
5. The I.S. Code reference
6. The year of manufacture

The marking shall be done outside the socket or towards the end of barrels of the pipe. The coating on the pipes, both internally and externally shall be provided as per clause 15.0 of IS 1536.

Galvanized Iron pipe

The procurement, supplying, laying, jointing and testing at works and site of Galvanized Iron (G.I.) pipes and fittings shall be in accordance with IS 1239 (Part I and II) and its latest revisions. The general requirements relating to the supply of mild steel tubes shall conform to IS 1387. The sulphur and phosphorus requirements in steel shall not exceed 0.05 percent each. The galvanizing of the pipes shall be as specified in IS 4736. The zinc coating shall be uniform adherent, reasonably smooth and free from imperfections. The pipes shall be galvanized before screwing. All screwed pipes and sockets shall have pipe threads conforming to the requirements of IS 554. Gauging in accordance with IS 8956.25 shall be considered as an adequate test for conformity of threads of IS 554. Screwed tubes shall have taper threads while the sockets shall have parallel threads. The specifications for G.I. pipes shall be generally in accordance with Clause 15.4 of standard specifications. The tolerances on the length of pipes shall follow clause 11.0 of IS 1239 (Part I). The fittings for G.I. pipes shall be of mild steel tubular or wrought steel fittings conforming to I.S. 1239 (PartII). The laying of G.I. pipes and fittings shall follow the relevant I S code of practice. These pipes shall be used for drinking water supply for the office and laboratory buildings. The pipes shall be painted with two coats of anticorrosive bitumen paint.

Testing of G.I. pipes

Hydrostatic test shall be carried out at works at a pressure of 5 mpa, maintained for at least 3 sec and shall not show any leakage in the pipe. The tensile strength of length or strip cut from selected tubes, when tested in accordance with IS 1894 shall be at least 320 N / mm². The elongation percentage shall be as per clause 14.1.1 of IS 1239 (Part I). The bend test shall also be carried out as per clause 14.2 of IS 1239. The G.I. pipes and fittings shall be tested at site, after they are laid and jointed as per clause 15.4.11 of standard specifications.

Ductile Iron Pipes

The DI pipes shall be centrifugally cast (spun) for Water and Sewage and confirming to IS 8329-2000. The pipes used shall be both gasket joints and flanged joints. The minimum class of pipe to be used shall be class K-9 conforming to IS 8329. In general, pipes inside the buildings and below the structures shall be jointed as double-flanged pipes and those outside the building can be either EPDM gasket in accordance with IS 5382 and manufactured by the pipe manufacturer only. The pipes shall be supplied in standard lengths of 5.5m and 6.00m length with suitably rounded chamfered ends. Any change in the stipulated lengths will be approved by the Engineer's representative. The flanged joints shall confirm to the Clause 6.2 of IS 8329. The pipe supply will also include one rubber gasket for each flange.

Inspection and Testing:

The pipes shall be subjected to following tests for acceptance:

- (i) Visual and dimensional check as per clause 13 and 15 of IS 8329.
- (ii) Mechanical tests as per clause 10 of IS 8329.
- (iii) Hydrostatic test as per clause 11 of IS 8329.
- (iv) The test reports for the rubber gaskets shall be as per acceptance tests of the IS 5382 and in accordance to clause 3.8

The sampling shall be as per the provisions of the IS 8329.

Markings

All pipes shall be marked as per clause 18 of IS 8329 and shown as below:

- (i) Manufacturer name / stamp
- (ii) Nominal diameter
- (iii) Class reference
- (iv) A white ring line showing length of insertion at spigot end.

Packing and Transport

The pipes should be preferably transported by road from the factory and stored as per the manufacturer's specifications to protect them from damage.

Specials for DI Pipes

The DI specials shall be manufactured and tested in accordance with IS 9523 or BS 4772.

The mechanical test and hydrostatic test shall confirm to clause 9 and clause 10 respectively of IS 9523. The tolerances on dimensions shall be as per IS 9523. The manufacturer of the pipes shall supply the fittings.

All the DI fittings shall be supplied with rubber rings for each socket. The rubber ring shall conform to IS 12820 and IS 5382. Flanged fittings shall be supplied with one rubber gasket per flange and the required number of nuts and bolts.

Chain Pulley Blocks

Geared Chain Pulley Blocks shall be adopted. The monorail and trolley and the chain pulley block shall be provided for lifting the blowers and submersible pumps. The trolley and chain pulley block shall be hand driven. The capacity of the trolley and the chain pulley block shall be for the maximum weight to be lifted during erection and maintenance of the equipment but should not be less than 1 tonne. The travelling trolley shall run on the lower flange of the rolled steel joist. The trolley shall have two wheels on both sides of the joist web. The trolley wheels shall be single flanged with treads machined to match the flange of the beam. The wheels shall be of carbon steel casting conforming to IS 1030. The trolley shall have an arrangement for the fixing chain pulley block and sling. Pushing the load shall move the trolley. Suitable arrangement shall be provided on the joist to prevent over travelling. The chain pulley block shall have frame housing gears load sheave, brake unit, hand chain wheel and load chain wheel shall have hooks on both sides, one fixed with traveling and other for the load. The frame shall be of welded construction.

The gears shall be of spur type incorporating high grade hardened carbon steel pinion and heat treated carbon steel wheels. The width of the gear shall be adequately sized for long life. The driving pinion shall be integrated with the driving shaft. The load hook (bottom hook) shall rotate on the ball bearing. The chain shall be electrically welded, accurately calibrated, pitched and polished. The length of the load chain shall be sufficient for taking out the blower/pumps from their location. The hand chain wheel shall be provided with roller type guarding to prevent slipping the chain. The hand chain wheel shall hang to cleat of the hook.

The braking shall be automatic, the screw and friction disc type and shall offer no resistance. The load shall be sustained in any position of lift when effort for hoisting or lowering is removed. Each chain pulley block shall be supplied with one set of 1 tonne sling with galvanized D- shackles and clamps. The slings shall be about 3 m long. The monorail shall be 'I' section. The exposed mild steel surfaces shall be enamel painted. The fasteners shall be GI or Cadmium plated. The chain pulley block shall be tested for 150% overload through a length of lift which will ensure that every part of the block mechanism and every teeth of gears come under load.

SPECIFICATIONS FOR ELECTRICAL WORKS

Following specification shall be applicable to all the electrical equipment furnished and erected under this contract. Items of work not specifically stated in this specification but which are necessary for meeting the requirement of these specifications shall be included in this scope.

The equipment offered shall comply with the relevant Indian Standards. The equipment conforming to any other approved International Standards shall meet the requirement called for or shall be superior. The electrical equipments/installations shall comply with the requirements of the following Rules/Regulations as amended upto date.

- a) The Indian Electricity Rules.
- b) The Indian Electricity Act.
- c) The Indian Electricity (Supply) Act.
- d) The Indian Factories Act.

The equipment offered shall be suitable for installations and trouble free operation in the climatic conditions prevailing within the State of Himachal Pradesh.

Where is equipment are installed outside and exposed to direct sunrays, these shall be suitable for operation at higher ambient temperature and rigorous weather conditions under which they are required to operate.

During starting of heavy equipment the voltage may drop by a maximum of 15% for period of 45-60 seconds depending upon the duty of the driving equipment. All the electrical equipment shall therefore be suitable for trouble-free and uninterrupted operation even during such time of heavy equipments.

Switch Contractor's layout drawing shall show the location of switch board to serve the plant supplied under this contract. The switch board shall not be exposed to moisture or corrosive gases.

SPECIFICATION FOR H.T. SWITCHGEARS AND ACCESSORIES:

2.1.1 GENERAL:

All equipment shall be in accordance with this specification unless otherwise stated specifically. In case of any discrepancy arising, the most stringent condition will be followed. The following site conditions shall be taken into consideration in the design of the equipment:

Maximum air temperature	: 350 C
Minimum Air temperature	: 2 ^o C
Maximum daily average air temperature	: 32.4 ^o C
Minimum daily average air temperature	: 19.8 ^o C
Maximum relative air humidity	: 95%
Average relative air humidity	: 64%
Maximum wind speed	: 150 km/hr

2.1.2 CODES AND STANDARDS:

All equipments shall conform to the requirement of the latest revisions of the following codes and standards:

- i) IS 2516 (Part I, II, III and IV) : (Re: Circuit Breaker)
- ii) IS 3427 : (Re: Metal enclosed Switchgear)
- iii) IS 2705 (Part I, II and III) : (Re: Current Transformer)
- iv) IS 3156 (Part I, II and III) : (Re: Potential Transformer)
- iv) IS 1248 & 2419 : (Re: Meters)
- v) IS 3231 : (Re: Protective Relays)
- vi) IS 375 : (Re: Auxiliary Wiring & Bus bar Marking)

Equipment equivalent to International specification shall conform to the requirement of the latest revision of the relevant standards issued by any of the following:

British Standard Institution and British Electrical Standards Association

Indian Electricity Rules & Indian Electricity Act

American Standards Association and Electric Institute

Appropriate National Standards specification of the country of manufacture

2.1.3 SPECIFIC REQUIREMENT FOR THE SWITCHGEARS:

2.1.3.1 General:

- a) The switchgear shall be indoor, metal enclosed, floor mounted draw out truck type. The layout and arrangement of the switchgear shall be provided by the tenderer. Design and construction shall be such as to allow for extension at either end.
- b) The switchgear shall be rated for a minimum fault level and insulation level called for in these specifications/drawings.
- c) The switchgear buses shall be rated for continuous current as called for in this specification. Maximum temperature rise of the bus and bus connection shall be limited to 350 C above ambient of 45^o C.
- d) Maximum temperature rise of Circuit Breaker, Instrument Transformer etc. shall be as per relevant standards.
- e) Control circuit voltage will be 230 V A/C nominal and there may be a variation upto \pm 10%.

2.1.3.2 **CONSTRUCTION:**

- a) The switchgear cubical shall have structural steel frame work enclosed on all sides and top by sheet steel, minimum 2.0 mm thick.
- b) Each cubical shall be provided with a lockable front access door and a removable back cover.
- c) The circuit breakers, bus bars, instrument transformers and cables shall be installed in separate compartments within the cubical.
- d) The panel shall be do designed that it may be possible to extend on either side if required at a future date.
- e) The compartment shall be so constructed that failure of one equipment does not affect the adjacent units. Suitable vent shall be provided to release gas pressure developed due to the operation of breaker or due to live are at the bus due to short circuits.
- f) Relays, meter switches and lamps shall be flush mounted on the hinged front door of either the cubical itself or the control cabinet built on the front portion of the cubical.
- g) All fixing bolts, screws etc. appearing on the panel shall be so arranged as to present a neat appearance. Door hinges shall be concealed type. All fasteners shall be zinc plated and passivated type.
- h) Relays and motors should be mounted at a level above 900 mm from floor level.
- i) The switchgears shall have proper vermin proof ad dust tight protection.

2.1.3.3 **BUS AND BUS TAPS**

- (a) The main bus of each switchgear section shall be of high conductivity copper/alluminium alloy grade 91 E liberally sized for specified current rating. Current density should be such that temperature rise is not more than 350 C above ambient.
- {b) Bus bar chambers between adjacent cubicles should be separated by inter-panel partition sheet.
- (c) All bus connection, joints and tapes shall be silver plated. Connections shall be as short and straight as possible.

2.1.3.6 **CABLE TERMINATION:**

- (a) All external power and control cables conforming to relevant IS shall enter the switchgear fro bottom of the panel. Sufficient space shall be provided for ease of connection and termination of cables.
- b) The termination arrangement for the power cable shall be suitable for 11 KV grade (unearthed) Standard Alluminium Conductor, paper insulated Lead Sheathed/PVCA/XLPE armoured (unarmoured for single core cables) and overall served cables in confirmation to IS: 3961 (Part-I)-1967. The termination arrangement shall be completed with suitable cable boxes, lugs and brass wiping glands. The type and size of cables shall be as per details provided in clauses 2.5.3 and 2.5.5.9 respectively.
- (c) Cable end box for H.T. cable shall be furnished complete with heat shrinkable type termination, Tubular tinned copper lugs, armoured clamps, gland plate etc.

2.1.3.7 **TROPICAL FINISH:**

All electrical equipment, accessories and wiring shall have fungus protection involving special treatment of insulation and metal against fungus, insect and corrosion. Screws shall be furnished on all ventilating louvers to prevent entrance of insects.

2.1.3.8 **PAINTING:**

- a) All surfaces shall be sand blasted, picked and ground as required to produce a smooth, clean surface free of scale, grease, rust and dents.
- b) After cleaning, the surface shall be given a phosphate coating followed by a coat of high quality red oxide or yellow chromate primer.
- c) The switchgear shall be finished with two coats of light grey (G31 of IS: 5) synthetic enamel paint.
- d) Sufficient quantity of touch up paint shall be furnished for application at site.
- e) All unpainted surfaces shall be cadmium plated.

2.1.3.10 CONTROL SWITCHES AND INDICATIONS:

For local operation of the Breaker, each cubical shall be provided with OFF-NORMAL-ON control switch spring return to NORMAL from OFF and ON position with pistol grip handle.

The key interlock where provided shall be such that the switch will be operatable only on insertion of the key. Duplicate keys shall be furnished.

Indicating light shall be furnished on the front of each cubical as follows:

Breaker OFF : Green Lamp
 Breaker ON : Red Lamp
 Spring Charged : White Lamp
 Trip Circuit Healthy : Yellow
 Relays Operation : Amber
 Space Heater ON : Blue

2.1.3.11 CURRENT TRANSFORMER:

- (a) The current transformer shall be Bar primary resin cast type mounted on stationary portion of the switchgear and shall be easily accessible for maintenance and testing purpose. The method of securing current Transformer in position shall be such that no undue strain comes on the winding/ terminals. All current transformers shall be provided with shorting terminals & links. Test terminals in C.T. circuit shall be provided so that measures for testing can be done in service position of the breaker.
- (b) The ratios and ratings of the current transformer shall be suitable to meet the requirements of connected loads."

2.1.3.12 POTENTIAL TRANSFORMER:

- (a) The potential transformer shall be drawout resin cast type.
- (b) The primary and secondary disconnects shall have pressure type contacts. When the PT's are fully drawn out, the primary terminals shall be automatically disconnected and grounded.
- (c) High voltage winding of the potential transformer shall be protected, by current limiting fuses. Low voltage fuses, sizes to prevent the harmful effect of overload, shall be installed in all ungrounded secondary leads.
- (d) The rating and accuracy class of the potential transformer shall be as per requirements.

2.1.3.13 RELAYS:

- (a) Relays shall be draw-out type, flush mounted on the front of respective cubicle. Small auxiliary relays and timers can be located within the cubicle. Relays shall be provided with hand reset 'flag indicator'.

Auxiliary Transformer Feeder:

The three (3) inverse time-over current relays with instantaneous trip attachment (51/50) for protection against Transformer overload and short circuit. Instantaneous trip setting shall be high enough to over-ride transformer switching surge.

Motor Feeder (Where provided):

- a) The motor protection relays shall be of CMT/CTMEM type (English Electric) as required and shall comprise of the following protections:
 - i) Positive sequence current (Inst.)
 - ii) Negative sequence
 - iii) Thermal over current
 - iv) Stalling
 - v) Under voltage
- b) Each bus station should be provided with time lag under voltage relay and one or two hand reset type lockout relays to trip out the outgoing motor feeders in case of sustained under voltage in the respective bus. The relays range of the under voltage relay shall be of the order of 50% to 90% of nominal voltage and the time lag shall be such as not to trip the breaker in case of transient voltage dip.

Earth Fault Protection:

Earth fault relay (51N) with inverse line characteristic shall be provided as per the scheme shown in the control schematic single line drawings.

Auxiliary Relays, Timing Relays etc.:

All auxiliary relays, timers and other general purpose relays as may be required shall be furnished. The tenderer shall clearly indicate in the offer the different relays furnished for each breaker cubicle.

Relays Rating:

Relays shall be rated for operation with 1 AMP CT secondary current and 110 VPT secondary voltages. Contract rating of relays shall suit the job requirement.

METERS:

Meters shall be robust construction and flush and front mounted on the panel with accuracy of $\pm 1\%$ of full scale. The scale range should be 150 % of the rated circuit value. The meters shall have knife edge pointer. Each meter shall have zero adjuster on the front. Dials shall be white with black numerical and letterings. Registering type KVVH and VARH meters where called for in the drawings shall be provided.

2.1.3.14 ACCESSORIES:

Accessories which are to be necessary for maintenance and operation of these breaker and auxiliaries.

2.1.4 TEST:

2.1.4.1 Routine Test:

Each switchgear shall be completely assembled, wired up, adjusted and routine tested as per the latest revision of IS: 3427 & 2516.

- a) Circuit Breakers
- b) Instrument Transformers
- c) Relays and Meters

2.1.4.2 Type Test:

The following type of tests shall be performed on a typical assembled unit if not done earlier. If it is done earlier, necessary test certificates shall be sent in copies as stipulated in this specification.

- a) Impulse Test
- b) Temperature Rise Test
- c) Short Circuit Test

2.1.4.3 The cost of such tests, if any, shall be quoted separately.

2.1.4.4 **Witnessing of test:**

Test shall be performed in presence of Engineer-in-Charge's representative if so required by the Engineer-in-Charge. The successful tenderer shall give at least 15 (fifteen) days advance notice of the date when the tests are to be carried out.

2.1.5 **DRAWINGS DATA AND MANUAL:**

2.1.5.1 The following, drawings and details shall be furnished in triplicate with the tender:

- a) General Arrangement drawings showing constructional features and space required in the front for withdrawal, power and control cable entry points etc.
- b) Type, test report on indigenously manufactured breaker.
- c) Breaker control schematic (typical).
- d) Technical leaflets on:
 - i) Relays/Meters/Switches .
 - ii) Circuit Breakers
 - iii) Instrument Transformers

2.1.5.2 The various drawings, data and manuals in triplicate shall be submitted for approval and afterwards, for final distribution. All the approved drawings, data and manual in triplicate shall be furnished to the Engineer-in-Charge. The various drawings, data and manuals to be furnished shall include:

- a) Outline dimensional drawings of the switchgear showing general arrangement and indicating the space required in the front for withdrawal power and control cable entry points etc.
- b) Cross-sections with parts list.
- c) Foundation plan and loading.
- d) Control schematics.
- e) Wiring diagram.
- f) Instruction manual of the switchgear and associated equipment such as breaker relays etc.

The manual shall clearly indicate the installation method, check-ups and tests to be carried out before commissioning of the equipment.

2.2 **GENERAL SPECIFICATIONS FOR MCC/SWITCH BOARD PANELS:**

2.2.1 **GENERAL:**

All equipment shall be in accordance with this specification unless otherwise stated specifically. The following site conditions shall be taken into consideration in the design of equipment.

Maximum air temperature	: 45 ⁰ C
Minimum Air temperature	: 4 ⁰ C
Maximum daily average air temperature	: 32.4 ⁰ C
Minimum daily average air temperature	: 19.8 ⁰ C
Maximum relative air humidity	: 95%
Average relative air humidity	: 64%

2.2.2 STANDARDS:

- 2.2.2.1** The equipment shall be designed to conform to the requirements of:
- a) IS 8623 and IEC 439: Factory Built Assemblies of switchgear and control gear.
 - b) IS 4237: General requirements for switchgear and control gear for voltages not exceeding 1000 volts.
 - c) IS 2147: Degrees of protection provided by enclosures for low voltage switchgear and control gear.
 - d) IS 375: Marking and arrangement of bus bars.
 - e) IS 3914: Code of practice for section of AC induction motor starters.

2.2.2.2 Individual equipment housed in the panel shall conform to the following IS specifications.

- a) IS 1822: AC motor starters not exceeding 1100 volts.
- b) IS 2959: AC contractors of voltage not exceeding 1000 volts.
- c) IS 4064 (Part-II) 1978: Air break switches and fuse combination units for voltages not exceeding 1000 volts (specific requirements for direct switching of individual motors.
- d) IS 694 (1977) and IS 8130 (1976): PVC insulated cables and aluminium conductors.
- e) IS 1248: Direct acting electrical indicating instruments.
- f) IS 2208 (1962) or IS 9224 (1979): Low voltage fuses.
- g) IS 2516: Alternating current circuit breakers.
- h) IS 2705: Current transformers.
- i) IS 3156: Voltage transformers.

2.2.3 CONSTRUCTION:

- 2.2.3.1** The panels shall be metal clad, totally enclosed, rigid, free standing, floor mounting, air insulated, fully dust and vermin proof design, indoor type rated for 415 ± 5%, 3 phase, 50 HZ, 4 wire supply system.
- 2.2.3.2** All bus bars, taps, risers, earth bus etc. shall be adequately designed to withstand thermal and dynamic stresses due to short circuit corresponding to a fault level of 50 KV rms symmetrical.
- 2.2.3.3** The structure shall be of rigid welded/bolted construction with hot rolled sheet steel of not less, than 2 mm thickness. All doors shall be provided with neoprene gaskets.
- 2.2.3.4** The structure shall contain horizontal bus bar running throughout the length of the panel and be readily accessible. Each vertical panel structure shall contain a vertical wire/cable way with provision for suitable cable supports. The cable compartment shall have hinged door. The back covers of the panels shall also be hinged and bolted door construction. This shall be easily detachable.
- 2.2.3.5** The structure shall be counted on a rigid base frame of folded sheet steel of minimum 3 mm thickness. This shall be painted black.
- 2.2.3.6** The switch board panels shall be designed for single front.
- 2.2.3.7** The panel shall be extendable on both sides by addition of vertical sections.
- 2.2.3.8** All cable shall enter from bottom of the panel.
- 2.2.3.9** Provision shall be made for permanently earthing the frames and other metal parts of the panel through an aluminium earth bus running throughout the length of the panel at the bottom and shall be projecting outside on either side to allow connection with external earth with G.I. strip.

2.2.4 BUS BARS:

The bus bars shall be air insulated and made of high conductivity, high strength copper aluminum complying with the requirements of grade E 91E of IS 5082.

2.2.5 FUSE SWITCHES AND ISOLATORS:

2.2.5.1 Rotary isolators upto 40 Amps shall be used for the starter modules. Above this fuse switch units shall be used. Both isolators and fuse switch units shall comply with the requirement of IS 4064: 1978 for AC 23 duty (motor duty).

2.2.5.2 Fuse switches unit with HRC Fuse links shall have a withdrawable fuse carriage for quick replacement of HRC fuse in complete safety.

2.2.5.3 All power fuses shall be of high rupturing capacity link type.

2.2.5.4 Suitable shrouding shall be provided for incoming terminals of switch fuse units to prevent accidental contacts.

2.2.6 MOTOR STARTERS:

2.2.6.1 Contactors:

Contactors shall be of electro magnetic type rated for uninterrupted duty as defined in I.S. 2959 unless otherwise specified.

(a) The main contacts shall be of silver or silver alloy.

(b) Each contactor shall be provided with minimum 2 normally open and 2 normally closed auxiliary contacts.

2.2.6.2 Thermal Overload Relays:

(a) Thermal overload relays shall be of three elements positive acting ambient temperature compensated type with adjustable setting.

(b) Thermal overload relays shall be of hand reset type as specified in the detailed requirements.

(c) Thermal relays shall have one number NO and one number NC auxiliary contacts.

(d) All thermal overload relays shall be of ambient temperature compensated type.

2.2.7 INDICATING INSTRUMENTS:

2.2.7.1 Ammeters and Voltmeters shall be of moving iron spring controlled industrial type grade 1.5.

2.2.8 INTERNAL WIRING:

2.2.8.1 Internal wiring for control circuit shall be made with 660 V grade single or multi stand copper PVC cable.

2.2.8.2 Power wiring shall be done either with copper flexible PVC insulated cables of 660 Y grade or with aluminum bus bars.

2.2.8.3 The minimum size of control wiring shall be 2.5 sq. mm copper for current circuit and 1.5 sq. mm copper for potential circuits.

2.2.9 TERMINAL BLOCKS:

2.2.9.1 Approximately 20% with minimum 6 Nos. spare terminals blocks shall be provided in each module/panel.

2.2.9.2 All spare contacts of relays and contractors shall be wired and brought upto terminal blocks.

2.2.10 POWER CABLE TERMINATIONS:

- 2.2.10.1 Gland plates of adequate size shall be provided at the bottom of cable chamber to facilitate cable entry from bottom. Compression type gland shall be included in the supply unless specifically mentioned.
- 2.2.10.2 Crimp type sockets made of aluminium shall be provided for terminating cable along with supply of panels unless specifically mentioned.
- 2.2.10.3 For entry of cables a cabling space of 646 sq cm shall be provided.

2.2.11 TESTS:

- 2.2.11.1 The design of the MCC/Switchboard panels shall have been type tested in accordance with the following section of IS 8623.
 - (a) Verification of short time current withstands and peak current withstands on main and vertical bus bars.
 - (b) Through fault withstand on power drawout contacts with HRC fuse in series.
 - (c) Through fault withstand of control drawout contacts with HRC fuses in series.
 - (d) Temperature rise tests on main bus bars, vertical risers, power contacts and control contacts.
- 2.2.11.2 Routine tests shall be conducted on each panel in accordance with IS 8623 and shall comprise.
 - (i) Inspection of panel including inspection of wiring and electrical operational tests where necessary.
 - (ii) Insulation resistance test.
 - (iii) High voltage test of bus bars, power and control wiring.
 - (iv) Any other tests and checks not mentioned above but relevant to the panel.

2.3 GENERAL SPECIFICATIONS FOR MOTOR:

2.3.1 GENERAL:

All equipment shall be in accordance with this specification unless otherwise stated specifically. In case of any discrepancy arising, the most stringent condition will be followed. The following site conditions shall be taken into consideration in the design of the equipment.

Maximum air temperature	: 45 ⁰ C
Minimum Air temperature	: 4 ⁰ C
Maximum daily average air temperature	: 32.4 ⁰ C
Minimum daily average air temperature	: 19.8 ⁰ C
Maximum relative air humidity	: 95%
Average relative air humidity	: 64%

2.3.2 STANDARDS:

The equipment to be furnished under this specification shall unless otherwise stated, "be designed, constructed and tested in accordance with the latest revisions of the following and other relevant Indian Standards, British Standards (BS).

- IS 325 : Three phase induction motors.
- IS 1231 : Dimensions of three phase foot mounted induction motors.
- IS 4029 : Guide for testing three phase induction motors.
- IS 2223 : Dimensions of flange mounted A.C. motors.
- IS 2253 : Designation for types of construction and mounting arrangement of Rotating electrical machine.
- IS 4691 : Degree of protection provided by enclosures for rotating machines.

IS 4889 : Method of determination of efficiency of rotating electrical machinery.
IS 1271: Insulating material for electrical machinery.

The equipment conforming to any other national standards which ensure equivalent quality will be acceptable. In such cases, the tenderer shall clearly indicate the standard adopted and furnish a copy of the English translation of the standard along with the tender offer. Should there be any dispute on design standard; the most stringent one shall be applicable.

The design and operational features of the equipment offered shall also comply with the provisions of latest issue of the following Acts and Statutory Regulations:

- i) Indian Electricity Act.
- ii) The Indian Electricity Rules.
- iii) The Factory Act.
- iv) Fire Insurance Regulations.

The tenderer shall wherever necessary make suitable modification/addition/alternation in the equipment to comply with the above mentioned Acts/Rules/Regulations.

Flame proof motors shall in addition, comply with the requirements laid down in IS 2148.

Increased safety motors, shall in addition, comply with the requirements laid down in IS 6381.

Wherever service conditions etc. laid down in this standard differs from those in Indian Standard Specifications, the requirements specified herein shall prevail.

2.3.3 COMPLETENESS OF SUPPLY:

All the enclosures and the drawings, schedules issued along with this specification become a part of the specification. The tenderers shall consider them in details for instruction pertaining to the work and shall be responsible for and-governed by all the requirements indicated therein.

2.3.4 SERVICE CONDITIONS:

Service Details:

The motor shall be suitable for connection to a power system where transient disturbance are very likely to occur. During the transient disturbances, voltage of the system may completely disappear and return in a short time with the motors still running and connected. Under- this condition the return of voltage may occur at such an instant that the induced e.m.f. in the motor is in phase with the applied voltage giving rise to current surges which reach a value equal to 1.5 times the starting current and also cause transient torques of large magnitudes.

2.3.5 CONSTRUCTIONAL GENERAL DESIGN FEATURES:

2.3.5.1 Enclosure:

The enclosure of motors for indoor/outdoor service shall have enclosure class IP 55.

Motors for outdoor service shall be provided with special seals for the enclosure joints, bearing housing, terminal boxes etc. so that no extra protective covering for ingress of water is required.

All motors for outdoor installation shall be provided with a rain protective hood.

All external hardware shall be zinc passivated or cadmium plated.

The enclosure shall be provided with threaded metallic plugs/felt to permit drainage of condensed water from inside.

2.3.5.2 Cooling:

All motors, shall be totally enclosed, fan cooled preferably conforming to IC 0141 as per IS 6362.

In case of CACA construction, the same shall be conforming to IC 1061 as per IS 6362.

In case of CACW construction, the same shall conform to ICW 37 A91 as per IS 6362. Wherever service conditions indicated in the specification sheet are such that corrosive agents are present in the surrounding, the following materials of construction for cooling tubes/fans shall be adopted.

Tubes for CACA motor Aluminium tubes having minimum thickness of 1.6 mm

Tubes for CACW motor Low carbon alloy steel.

Cooling fans Alluminium.

In case of CACW motors, the cooling tubes and flanges shall also be suitable for the cooling water analysis as indicated in the specification sheet. Trays shall be provided for collection of leaking water with arrangements for its drainage.

The cooling fans shall be suitable for bi-directional rotation of motors. They shall be fastened to the motor shaft by means of compensating rings or will be balanced independent of the motor. Guide key or reference points shall be supplied to prevent wrong assembly. The cooling air shall be sucked from the non-driving end.

The cooling fans for increased safety and flame-proof motors shall be made of alluminium.

2.3.5.3 Direction of Rotation:

Motors shall be suitable for both directions of rotation. In case of any design limitation, the direction of rotation shall be as indicated in the specification sheet.

In either case a plate showing the direction of rotation corresponding to the phase terminal markings shall be fitted at the driving end shield of the motor.

2.3.5.4 Motor:

The starter lamination shall be made from suitable magnetic sheet iron varnished on both sides and arranged in suitable packs, each part being separated by spacers to form ventilating ducts for circulation of air.

The slot shall be open type either coils so arranged that the coils can be easily removed for inspection and repair.

2.3.5.5 Rotor:

The rotor shall be of squirrel cage construction, unless otherwise specified. For small motors, the squirrel cage shall preferably be of pressure die-cast construction. For larger motors, the rotor bars and the¹ end rings shall be of copper or copper alloy. The bars shall be firmly wedged in slot to prevent vibration during start up/locked rotor condition. Conductor ends shall be securely fixed to the end rings using the latest brazing techniques. Retaining rings shall be provided for high speed machines for the end rings. The rotor cage shall be designed for the required starting and duty cycles.

Wherever wound rotor is specified, the windings shall be based on the same features as detailed for the starter windings under clause 2.3.5.6.

The rotor shall be dynamically balanced and shall rotate perfectly with no preferential stop points. The rotor shall be constructed such as to allow the removal or addition of material for balancing.

For H.V. motors, the rotor shaft shall be electrically and magnetically so balanced that the induced shaft voltage does not exceed 200 mV otherwise the bearings/end covers shall be suitably insulated.

2.3.5.6 Windings and insulation:

The motor coils shall be made out of insulated electrolytic grade copper conductor. Successive coils shall be connected by accessible joints, well-brazed and finished smooth to prevent damage to insulation.

The motor shall be insulated assuming the power system neutral as isolated.

All motors shall be insulated with class B or F insulation with tropical and fungindal treatments, as specified in the specification sheet.

Wherever class-F insulation is specified the windings shall be easily replaceable type and the temperature rise shall not exceed that of class-B insulation.

The winding shall be dried, properly vacuum impregnated with suitable varnish to withstand the site conditions and properly baked. At least two additional impregnations and baking shall be applied to the assembled stator coil making a total of three impregnations and baking. Finally the windings shall be applied special acid and alkali resistance paints to withstand the site condition which is generally aggressive due to the presence of various chemical flumes.

The winding shall be well-brazed and capable of withstanding thermally and mechanically the transient disturbances specified under clause 2.3.4.

Lead-in wire between the windings and the outside terminals shall be made through bushings or fiber glass insulation sleeves.

The windings shall be star connected for high voltage motors and delta connected for medium voltage motors.

2.3.5.7 Slip rings and Brushes:

Slip rings shall be located on the non-driving side. The material of construction shall be copper alloy. The Slip rings and the brush gear shall be cooled by the motor cooling fan.

For explosion proof motors, the slip rings and brush gear shall be housed in a flame-proof housing. In case this is not possible, the housing shall be pressurized type with flameproof pressure switch for interlocking with the motor. In either case, glass covers shall be provided for inspection.

The starting rheostats shall be designed for intermittent duty and rated for 5 minutes. Where speed regulation is required, the rheostats and the controllers shall be suitable for such duty and be continuously rated. Auxiliary contacts shall be provided on the controllers for connections to the motor supply controls to prevent wrong operations during starting.

2.3.5.8 Bearings:

All motors shall be provided with bearings of suitable application. The bearing must be guaranteed to ensure a smooth operation and a life not shorter than 30,000 hours.

Where external thrusts are specified, the motors shall be fitted with special roller thrust bearings capable of with-standing the specified thrust. In such cases, the guaranteed life of the bearings should not be less than 20,000 hours.

The bearing housing shall be effectively sealed against ingress of dust and water and creeping of lubricating along the shaft.

The bearing shall be suitable for both directions of rotations of the motor.

All motors shall be provided with on line grease lubrication arrangement for both DE & NDE side bearings except for motors rate-for 35 KV and less" and flange mounted M.V. motors. The arrangements shall be complete with grease nipple and drain plug located at convenient locations.

In case the shaft induced voltage is more than 200 mV the non-driving and bearing housing shall be fully insulated for 2 KV to prevent damage to motor bearings from shaft currents.

All oil lubricated bearings shall be fitted with oil level indicator and resistance temperature detection/dial type thermometer with alarm and trip contacts.

Self cooled bearing system shall be preferred.

The manufacturer shall specify the type of lubricant and the time interval of lubrication for the bearings of each motors.

The bearing temperature shall not exceed 90⁰ C for grease lubricated bearings and 70⁰ C for oil lubricated bearings.

Wherever shaft end-play has been specified, the bearing shall be capable of providing the specified end-play.

2.3.5.9 **Terminal Box:**

All the terminal boxes shall have identical degree of protection as that of the motor.

The power terminal box shall be side mounted on the right hand side of the motor as viewed from the coupling end. The design of terminal boxes shall be such that it may be possible to arrange top/bottom/side (for MV motors only) entry of cables at site.

The power terminal boxes shall be as follows:

- a) For HV motors Phase segregated type cable of withstanding the system fault level for 0.2 secs or more.
- b) For MV motors Manufacture's standard box with epoxy or SRBF moulding terminal board.

The neutral side terminal box for HV motors shall be so designed that it shall be possible to interchange the power and neutral boxes at Site.

In case of high voltage motors, all the six leads of the motors shall be taken out, three on one side and three on the other side, to separate terminal boxes. Both sides shall be suitable for power connection. However, neutral shorting link shall be provided on one side for star connection.

In case of MV motors, all the six leads of the motors shall be taken to a common terminal box. Shorting links for delta connections shall be provided in the terminal box.

The lead in wire between the terminals in the terminal box and the windings shall be as stipulated under:

For increased safety motors, the terminals shall be provided with positive locking device so that they do not work loose during normal operation.

The power terminal boxes shall have adequate clearances between the terminals and between the terminals and cable glands for proper termination of cables. Where more than one cable is required to be terminated in parallel, the spacing in the box shall be adequate for easy termination.

Separate terminal boxes shall be provided for stator leads, spare heaters, temperature detectors, current transformers, thermometer contacts, centrifugal switches etc.

All terminal boxes shall be complete with compression type cable glands, connectors etc. to receive the external cable.

The cable lugs shall be of aluminium and suitable for crimping.

The terminal box shall be preferably provided with threaded metallic plugs/felt plugs to permit drainage of condensed water.

The terminal box shall be adequate in size to allow termination of aluminium conductor cables as under:

LT Motors

Up to 7.5 HP
7.5 HP to 10 HP
11 HP to 15 HP
16 HP to 25 HP
26 HP to 35 HP.
36 HP to 50 HP
51 HP to 75 HP
76 HP to 100 HP
101 HP to 125 HP

Cable Size

PVCA 3 x 2.5 mm² (Cu)
PVCA 3 x 10 mm² (Al)
PVCA 3 x 16 mm² (Al)
PVCA 3 x 35 mm² (Al)
PVCA 3 x 50 mm² (Al)
PVCA 3 x 70 mm² (Al)
PVCA 3 x 120 mm² (Al)
PVCA 3 x 150 mm² (Al)
PVCA 3 x 185 mm² (Al)

126 HP to 150 HP	PVCA 3 x 240 mm ² (Al)
151 HP to 200 HP	PVCA 2 X 3 x 185 mm ² (Al)
3.3 KV HT motors	XLPE 3 X 240 mm² (Al)

2.3.6 PERFORMANCE:

2.3.6.1 The motor shall be capable of being started direction line, unless otherwise specified.

2.3.6.2 The starting torque of each motor shall be higher than the initial resisting torque of the driven load throughout the starting period capable of starting at a supply voltage of 80% of the rated voltage.

2.3.6.3 The starting current shall not be greater than 6 times the current when the motors are started at full voltage including tolerance unless otherwise specified.

2.3.6.4 The motors shall be suitable for the following starting cycle:

a) With the motor at ambient temperature: Two successive starts and 3rd start after 5 minutes. This sequence shall be repeated in the next hour.

b) With the motor at steady state load temperature: One immediate start and 2nd start after 5 minutes. The sequence at (a) above shall be repeated in the next hour.

2.3.6.2 Locked Rotor Condition:

The locked rotor withstand time under hot conditions at 110% of rated voltage shall be more than the starting time of the motor coupled to the load even at the lowest stipulated starting voltage by 2 seconds for motors having starting time upto 10 seconds and by 5 seconds for motors having starting time more than 10 seconds.

For increased safety motors, tE shall be determined in the presence of purchaser's representative unless test certificate from an independent testing authority is submitted for similar motors. The time tE and the locked rotor current shall be stamped on the name plate as well as indicated in the test certificates.

For deciding the time tE in all cases the temperature of the insulated stator and rotor shall not exceed the value stipulated under clause 23.6.4 Para (3).

2.3.6.3 Running:

All motors shall be continuous maximum rated (SI duty as per IS: 325) unless otherwise specified.

The motors shall be capable of delivering their rated output without exceeding the specified temperature rise under the following system voltage and frequency variation conditions, unless otherwise specified.

Voltage	± 10%
Frequency	± 5%
Combined variation	± 10%

All motors after having attained the temperature rise corresponding to the rated load shall be capable of withstanding 60% over-load for 10 seconds without injury, the voltage and frequency being maintained at the rated value.

The motor shall be suitable for running at the rated load for 5 minute duration at 80% voltage and for 1 minute duration at 70% voltage. Motors shall be designed for restart after a momentary loss of voltage with the possibility of restored supply being 100%_ out of phase with motor residual voltage, the later being 50% of the system voltage.

2.3.6.4 **Temperature Rise:**

The total temperature of the stator winding under full load running condition shall not exceed the values permissible for the specified insulation class. For increased safety motors, the total temperature shall be 10 C less than for normal motors.

For increased safety and flame proof motors, the maximum surface temperature shall not exceed the value applicable for ignition class of the hazardous gases vapour present in the installation area.

In case of starting and locked rotor condition stipulated under clause Nos. 2.3.6.4 and 2.3.6.2 respectively the maximum temperature in the rotor shall not exceed the following values:

For squirrel cage rotor	-	300 C
For wound rotor	-	As applicable to the insulation class
For increased safety motor	-	As per ignition group of the hazardous gases/vapours.

Power factor of motor at 75% of rated load shall not be below 0.85.

2.3.7 **COUPLING DETAILS:**

All vertical motors shall have rigid coupling and horizontal motor may be provided with flexible coupling.

Normally the coupling half for the motor shaft shall be supplied by the driven equipment supplier. The coupling half shall be keyed on the shaft with a tapered joint or shrunk with a straight joint. For this purpose, the motor manufacturer shall coordinate all details of the coupling system with the driven equipment manufacturer.

Wherever rigid coupling is specified, the motor shaft shall have the desired class of accuracy.

For all vertical flange mounted _motors, the limitations on shaft extension run out and perpendicularity as required by the driven supplier shall comply with the motor supplier.

Wherever end play limitations have been indicated in the specification sheet, the same shall be adhered to.

i) if the motor is to be coupled to a reciprocating pump or compressor requiring fluctuating torque, the motor supplier shall ensure that the inertia of the driving and in driven machine assembly shall be such that the variation armature current shall not exceed \pm 6% of the rated current while delivering full load.

ii) The measurement of armature current shall be done with the oscillograph in accordance with NEMA standard 1959-MG-1-8-07 or any other agreed method.

iii) The additional fly wheel, if any, shall be assembled at such a distance from the motor so as to allow easy inspection of the windings.

iv) All necessary coordination with driven equipment manufacture shall be carried out by the motor manufacturer.

i) Wherever belt drive is specified, the motor supplier shall ensure that the shaft extension and bearings are suitable for the duty specified.

ii) Unless otherwise specified, the side rails for all belt driven motors shall be supplied by the motor manufacturer.

2.3.8 **ACCESSORIES:**

The motor shall be complete with the following accessories:

2.3.8.1 **For motors of all ratings:**

- a) Foundation bolt.
- b) Lifting eye bolt.

- c) 2 Nos. earthing terminals on the outside of the motor frame preferably on motor leg or flange The minimum size of earth connection bolt shall be as below:
- | | |
|--------------|--------|
| Upto 5 HP | - M 6 |
| 5 to 20 HP | - M 8 |
| 21 to 60 HP | - M 10 |
| 61 to 100 HP | - M 12 |
| Above 100 HP | - M 16 |

HT motors:

- a) No. earthing terminals inside the cable box.
 b) Name Plate.
 c) Cable lugs/connectors for cables of specified sizes. Space heaters for motors above 50 KW.
 d) Plugs for drainage of condensed water in the motor body and terminal box.
 e) Dowel pins, wherever required.
 f)

2.3.8.2 Additional accessories, if stipulated in specification sheet, shall also be supplied along with the motor.

2.3.8.3 **SPACE HEATERS:**

Space heaters rated for 240 V AC shall be provided to keep the winding dry for all high and medium voltage motors except for motors rated below 50 KW.

The rating of the space heater shall be such that it should be able to maintain a temperature of 50 C higher than the ambient and at the same time the performance of the motor shall not be affected even if it is left 'ON' while the motor is running.

The location of the space heaters shall be such as to allow easy access for inspection, maintenance and replacement.

2.3.8.4 **OIL SUPPLY SYSTEM:**

For large sized motors, where forced oil lubrication system is foreseen, a common oil supply for the motor and the driven equipment is foreseen in the driven equipment.

However, the tenderer shall quote separate price for the complete oil system for the motors.

2.3.9 **VIBRATIONS:**

The motor vibrations measured at the bearings must not exceed the limits specified in IS: 4729, unless otherwise stipulated in the specification.

2.3.10 **PAINTING:**

Enclosure of the motor and its accessories shall be painted with two coats of antirust paint and two coats of anti-corrosive paint after suitable pre-treatment.

All motors shall be painted with epoxy paint.

Unless otherwise specified, the finishing shade shall be light grey shade No. 631 as per IS: 5.

2.3.11 **TESTING:**

All motors shall be routine tested as per relevant standards.

Additional tests, wherever specified, shall be carried out on one motor of each type and rating.

All the above mentioned tests shall be carried out in the presence of Engineer-in-Charge's representative. In addition, the motor shall be subjected to inspection at works. These inspections shall, however, not absolve the vendor from his responsibility for making good any defects which may be noticed subsequently till the guarantee is over.

2.3.12 DRAWING AND DOCUMENTS:

Drawings and documents as detailed here shall be supplied.

All drawings and documents shall have the following descriptions written boldly.

- Name of client
- Name of consultant
- Enquiry/order number
- Motor code No. and description

2.3.13 SPARES:

The spare parts as given below shall be quoted for the motor along with the tender for an initial five years period of operation and maintenance.

1. Bearing both for DE and NDE sides.
2. Bye Bolt.
3. Oil seal wherever used.

Above spare parts shall be complete with requisite hardware required for replacement.

Any other spare parts not covered but required shall be quoted along with the offer.

All spare parts shall be identical to the parts used in the motors. All the spare parts shall be properly tagged giving following details:

- a) Equipment name.
- b) Code No. of equipment.
- c) Name of spare parts.
- d) Code No. of spare parts.
- e) Purchase Order No.

The price of the item quoted above shall be taken into account for evaluation of tenders in accordance with clause 6.13 of Volume – II.

2.4.4 REQUIREMENT AND SERVICES TO BE FURNISHED UNDER THE SCOPE OF WORK OF THIS SPECIFICATION:

2.4.4.1 The transformers shall be complete with all accessories and auxiliary equipment in accordance with this specification and listed in following annexure:

Annexure A: Desired technical particulars of equipment to be furnished.

Annexure B: Accessories to be furnished with each transformer.

2.4.4.2 First filling of the oil and an excess quantity of 10% total oil in the non-returnable container.

13.0 HANDING OVER OF INSTALLATION:

13.1 The Contractor shall handover the complete installations to the Corporation in a clean, brand new and perfect working condition. Any area in which the Contractor has worked, shall be thoroughly cleaned of all debris and unwanted materials cleaned and handed over in a perfectly finished, ready to use condition.

14.0 DEVIATION & ORDERING MATERIAL

14.1 The Contractor must quote exactly as per specification bill of quantities and drawing.

14.2 The bill of quantities shall not be used as a basis for ordering materials and the Contractor shall be responsible for assessing the quantities of material to be ordered.

15.0 AS BUILT DRAWINGS

15.1 On completion of Work, the Contractor shall submit to the Engineer, a reproducible and five copies of "As Built" drawing showing:

- 1) LT Cable layout wherever required.
- 2) Single line diagram and complete electrical layout.

15.2 Contractor shall prepare operation and maintenance manual for the complete electric system under this Contract and submit the same in four sets.

16.0 MANUFACTURE TEST

The Contractor shall specifically perform all test such as routine test, type test on all equipment in the presence of CIDCO & MSEDCL officials. All cost incidental to such test shall be deemed to have been included in the specific items of that equipment and no extra charge will be payable.

GENERAL SPECIFICATION

1. INTENT OF SPECIFICATION

This specification is intended to cover the design engineering manufacturing, fabrication. Assembly, testing at Manufacturer Work/delivery properly packed for transport, transportation up to site, erection, testing and commissioning at site suitable design capacity of D.G. Set. The D.G. Set shall run with HSD oil and shall be supplied complete with all the accessories described below for safe and trouble free commercial operation, in manner accepted to CIDCO Ltd.

2. CODES & STANDARD

The design, manufacture, shop testing, erection and commissioning of compression ignition diesel Engines and accessories shall conform to the following particular standard and codes, with latest revisions in addition to the relevant standards and manufactures own standards.

4. General Conditions

- a) The quantities given in the schedule are subject to change to suit site conditions.
- b) The Manufacturer should have in house testing facilities as per IS.

5. Specifications for Installing LT cables and Control Cables

The method of installing cable shall be broadly classified into four main categories:

Laid in prepared trenches/Hume pipes

All cables laid inside the substation building shall be laid in prepared trenches. For easy identification all cables laid shall have cable marker tied to it by means of steel wire and showing the size and name of panels embossed on it.

Laid Underground

The procedure stated in technical specification shall be followed. However, before laying all precautionary procedure shall be adopted by the Contractor. Layer of sand then cables and then layer of sand again with half round RCC pipe shall be laid.

Fixed on walls etc.

If cables are to be fixed on walls, etc. then the same shall be done by using MS galvanized spacers and GI saddles using screws, etc.

Laid on cable trays

Generally cables laid on trays shall be fixed on the rungs of the trays using nylon lockable cable ties of approved make. As far as possible, cables shall not cross each other unnecessarily on tray, so that a neat and easily identifiable cable system is achieved.

INSPECTION

All cables shall be inspected by the Contractor upon receipt at site and checked for any damage during transit.

JOINT IN CABLE

The Contractor shall take care to see all the cables received at site are apportioned to various location in such a manner as to ensure maximum utilization and avoidance of jointing cables. The apportioning shall be got approved by the owner before the cables are cut to length. Straight joints are prohibited unless specifically allowed in the schedule of quantities.

EXCAVATION AND BACKFILL

All excavation and backfill including timbering, shoring and pumping required for the installation of the cables shall be carried out by the Contractor in accordance with the drawings and requirements laid down elsewhere. Trenches shall be dug true to line and grades. Backfill for trenches shall be filled in layer not exceeding 150 mm. Each layer shall be properly rammed and consolidated before laying the next layer. The Contractor shall restore all surface, roadways, sidewalks, curbs walls or other works by excavation to their original condition, satisfactory to the CIDCO. Back filling shall be done with soft earth only.

TERMINATION OF CABLES & JOINTS

- a) For termination of cables of size 16 sq.mm. and above, suitable copper cable sockets of appropriate size and capacity shall be provided at terminal ends. This condition is applicable to single PVC insulated wires of 16 sq. mm. and above also.
- b) Generally reducer/spade type sockets shall be used where grub screw/clamp type fixing arrangement is available at the terminating end. Tubular sockets shall be used where bolt and nut arrangement is available at terminating end.
- c) The cable socket shall generally be fixed to the cable cores by crimping process.
- d) Irrespective of the size of the cable and the method of termination, the core end shall be cleaned and immediately covered with an oxide inhibiting/corrosion inhibiting compound before termination.
- e) The tail end wire shall be finished in an appropriate colour by using PVC insulating tape.

ERECTION CONDITIONS OF CONTRACT

1.0 GENERAL

1.1 The following shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work of this contract to be performed at site.

1.2 The contractor upon signing of the contract shall, in addition to a project co-ordinator, nominate another responsible officer as his representative at site suitably designated for the purpose of overall responsibility and co-ordination of the works to be performed at site. Such person shall function from the site office of the contractor during the pendency of contract.

2.0 REGULATION OF LOCAL AUTHORITIES AND STATUTES

2.1 The contractor shall comply with all the rules and regulations of local authorities during the performance of his field activities. He shall also comply with the minimum wages act, 1948 and the payment of wages act (both of the Government of India and the local State Government) and the rules made thereunder in respect of any employee or workman employed or engaged by him or his sub-contractor. The contractor shall make all necessary payments of the Provident Fund for the workmen employed by him for the work as per the laws prevailing under provisions of CMPF and Allied Schemes and CMPF and Miscellaneous Provisions Act 1948 or Employees Provident Fund and Miscellaneous Provisions Act 1952 as the case may be.

2.2 All registration and statutory inspection fees, if any, in respect of his work pursuant to this contract shall be to the account of the contractor. However, any registration, statutory inspection fees lawfully payable under the provisions of the rules and regulations of the Government and any other statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the owner, shall be to the account of the owner. Should any such inspection or registration need to be arranged due to the fault of the contractor or his sub-contractor, the additional fees for such inspection and/or registration shall be borne by the contractor.

3.0 OWNER'S LIEN ON EQUIPMENT

The owner shall have lien on all equipment including those of the contractor brought to the site for the purpose of erection, testing and commissioning of the plant. The owner shall continue to hold the lien on all such equipment throughout the period of contract. No material brought to the site shall be removed from the site by the contractor and/or his sub-contractors without the prior written approval of the engineer.

4.0 INSPECTION, TESTING AND INSPECTION CERTIFICATES

The provisions of the clause entitled inspection testing and inspection certificates under section GTC shall also be applicable to the erection portion of the works. The engineer shall have the right to re-inspect any equipment though previously inspected and approved by him, at the contractor's works, before and after the same are constructed and/or erected at site. If by the above inspection, the engineer rejects any work or equipment, the contractor shall make good for such rejection either by replacement or modifications/repairs as may be necessary, to the satisfaction of the engineer. Such replacement will also include the replacement or re-execution of such of those works of other contractors and/or agencies, which might have got damaged or affected by the replacements or re-work done to the contractor's work.

5.0 ACCESS TO SITE AND WORKS ON SITE

5.1 Suitable access to and possession of the site shall be accorded to the contractor by the owner in reasonable time.

5.2 The owner shall have the necessary foundations to be provided by him ready, as per the agreed schedule for the execution of the individual phases of works.

5.3 The works so far as it is carried out on the owner's premises, shall be carried out at such time as the owner may approve and the owner shall give the contractor reasonable facilities for carrying out the works.

5.4 In the execution of the works, no persons other than the contractor or his duly appointed representative, sub-contractor and workmen, shall be allowed to do work on the site, except by the special permission, in writing of the engineer or his representative.

6.0 CONTRACTOR'S SITE OFFICE ESTABLISHMENT

The contractor shall establish a site office at the site and keep posted an authorised representative for the purpose of the contract. Any written order or instruction of the engineer or his duly authorised representative, shall be communicated to the said authorised resident representing the contractor and the same shall be deemed to have been communicated to the contractor at his legal address.

7.0 CO-OPERATION WITH OTHER CONTRACTORS

7.1 The contractor shall co-operate with all other contractors or tradesmen of the owner, who may be performing other works on behalf of the owner and the workmen who may be employed by the owner and doing work in the vicinity of the works under the contract. The contractor shall also so arrange to perform his work as to minimise, to the maximum extent possible, interference with the work of other contractors and his workmen. Any injury or damage that may be sustained in the employees of the other contractors and the owner, due to the contractor's work shall promptly be made good at his own expense. The engineer shall determine the resolution of any difference or conflict that may arise between the contractor and other contractors or between the contractor and the workmen of the owner in regard to their work. If the works of the contractor is delayed because of any acts or omissions of another contractor, the contractor shall have no claim against the owner on that account other than an extension of time for completing his works.

7.2 The engineer shall be notified promptly by the contractor of any defects in the other contractor's works that could affect the contractor's works. The engineer shall determine the corrective measures if any, required to rectify this situation after inspection of the works and such decisions by the engineer shall be binding on the contractor.

8.0 DISCIPLINE OF WORKMEN

The contractor shall adhere to the disciplinary procedure set by the engineer in respect of his employees and workmen at site. The engineer shall be at liberty to object to the presence of any representative or employees of the contractor at the site, if in the opinion of the engineer such employee has mis-conducted himself or be incompetent or negligent or otherwise undesirable and then the contractor shall remove such a person objected to and provide in his place a competent replacement.

9.0 CONTRACTOR'S FIELD OPERATION

9.1 The contractor shall keep the engineer informed in advance regarding his field activity plans and schedules for carrying out each part of the works. Any review of such plan or schedule or method of work by the engineer shall not relieve the contractor of any of his responsibilities towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the engineer or the owner or any of his representatives and no claim of the contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method of work reviewed. The contractor shall be solely responsible for the safety, adequacy and efficiency of plant and equipment and his erection methods.

9.2 The contractor shall have complete responsibility for the conditions of the work site including the safety of all persons employed by him or his sub-contractor and all the properties under his custody during the performance of the work. This requirement shall apply continuously till the completion of the contract and shall not be limited to normal working hours. The construction review by the engineer is not intended to include review of contractor's safety measures in, on or near the work-site, and their adequacy or otherwise.

10.0 PHOTOGRAPHS AND PROGRESS REPORT

10.1 The contractor shall furnish three (3) prints each to the engineer of progress photographs of the work done at site. Photographs shall be taken as and when indicated by the engineer or his representative. Photographs shall be adequate in size and number to indicate various stages of erection. Each photograph shall contain the date, the name of the contractor and the title of the photograph.

10.2 The above photographs shall accompany the monthly progress report detailing out the progress achieved on all erection activities as compared to the schedules. The report shall also indicate the reasons for the variance between the scheduled and actual progress and the action proposed for corrective measures wherever necessary.

11.0 MAN-POWER REPORT

11.1 The contractor shall submit to the engineer, on the first day of every month, a man hour schedule for the month, detailing the man hours scheduled for the month, skill wise and area-wise.

11.2 The contractor shall also submit to the engineer on the first day of every month, a man power report of the previous months detailing the number of persons scheduled to have been employed and actually employed, skill-wise and areas of employment of such labour.

12.0 PROTECTION WORK

The contractor shall have total responsibility for protecting his works till it is finally taken over by the engineer. 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.

13.0 EMPLOYMENT OF LABOUR

13.1 The contractor will be expected to employ on the work only his regular skilled employees with experience of his particular work. No female labour shall be employed after darkness no persons below the age of eighteen years shall be employed.

13.2 All traveling expenses including provisions of all necessary transport to and from site lodging allowances and other payments to contractor's employees shall be the sole responsibility of the contractor.

13.3 The hour of work on the site shall be decided by the owner and the contractor shall adhere to it. Working hours will normally be eight (8) hours per day- Monday to Saturday.

13.4 Contractor's employees shall wear identification badges while on work at site.

13.5 In case the owner becomes liable to pay any wages or dues to the labour or to any Government agency under any of the provisions of the Minimum Wages Act, Workmen compensation Act, Contract Labour Regulation Abolition Act, CMPF Act/EPF Act or any other law due to act of omission of the contractor, the owner may make such payments and shall recover the same from the contractor's bills.

14.0 FACILITIES TO BE PROVIDED BY THE OWNER

14.1 SPACE :

The contractor shall advise the owner within thirty (30) days from the date of acceptance of the letter of award, about his exact requirement of space for his office, mess-rooms storage area, pre-assembly and fabrication areas, labour colony area, toilets, etc. The above requirement shall be reviewed by the engineer and space will be allotted to the contractor for construction of his temporary structures like office, storage sheds, labour and staff colony and other utilities etc. for his own as well as his sub-contractor's use.

14.2 ELECTRICITY :

The contractor shall submit to the engineer within thirty (30) days from the date of acceptance of the award letter, his electrical power requirements, if any, to allow the planning of the temporary electrical distribution by the engineer. The contractor shall be provided with supply of electricity for the purposes of the contract, only at one point in the project site. The contractor shall make his own further distribution arrangement. All temporary wiring must comply with local regulations and will be subject to engineer's inspection and approval before connection to supply. Power supply for labour colonies shall also be provided at one point. The contractor shall be charged for the power supplied at work site and labour colonies at prevalent rate of power supplied by State Electricity Board.

14.3 WATER :

Supply of water will be made available for the construction purposes at an agreed single point within 100 metres of the work site. And further distribution will be the responsibility of the contractor. The contractor shall be charged for the water supplied at work site @ 1% of the value of civil works and shall be deducted from the contractor's running/final bills.

15.0 FACILITIES TO BE PROVIDED BY THE CONTRACTOR

15.1 Tools, tackles and scaffoldings

The contractor shall provide all the construction equipment, tools, tackles and scaffoldings required for pre-assembly, erection, testing and commissioning of the equipment covered under the contract. He shall submit a list of all such materials to the engineer before the commencement of pre-

assembly at site. These tools and tackles shall not be removed from the site without the written permission of the engineer.

15.2 Communication

The owner will extend the telephone & telex facilities, if available at site, for purposes of contract. The contractor shall be charged at actual for such facilities.

15.3 First – aid

15.3.1 The contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen working at the site. Enough number of contractor's personnel shall be trained in administering first-aid.

15.3.2 The owner will provide the contractor, in case of an emergency, the services of an ambulance for transportation to the nearest hospital.

15.4 Cleanliness

15.4.1 The contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of contract. The contractor shall employ enough number of special personnel to thoroughly clean his work area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the engineer. Materials and stores shall be so arranged to permit easy cleaning of the area in areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.

15.4.2 Similarly the labour colony, the offices and the residential areas of the contractor's employees and workmen shall be kept clean and neat to the entire satisfaction of the engineer. Proper sanitary arrangement shall be provided by the contractor, in the work areas, office and residential areas of the contractor.

16.0 LINES AND GRADES

All the works shall be performed to the lines, grades and elevations indicated on the drawings. The contractor shall be responsible to locate and layout the works. Basic horizontal and vertical control points will be established and marked by the engineer at site at suitable points. These points shall be used as datum for the works under the contract. The contractor shall inform the engineer well in advance of the times and places at which he wishes to do work in the area allotted to him, so that suitable datum points may be established and checked by the engineer to enable the contractor to proceed with his works. Any work done without being properly located may be removed and/or dismantled by the engineer at contractor's expense.

17.0 FIRE PROTECTION

17.1 The work procedures that are to be used during the erection shall be those which minimise fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the site at least once each day. Fuels, oils and volatile or flammable materials shall be stored away from the construction and equipment and materials storage areas in safe containers. Untreated canvas paper, plastic or other flammable flexible materials shall not at all be used at site for any other purpose unless otherwise specified. If any such materials are received with the

equipment at the site, the same shall be removed and replaced with acceptable material before moving into the construction area or storage.

17.2 Similarly corrugated paper fabricated cartons etc. will not be permitted in the construction area either for storage or for handling of materials. All such materials used shall be water proof and flame resistant type. All the other materials such as working drawings, plants, etc. which are combustible but are essential for the works to be executed shall be protected against combustion resulting from welding sparks, cutting flames and other similar fire sources.

17.3 All the contractor's supervisory personnel and sufficient number of workers shall be trained for fire-fighting and shall be assigned specific fire protection duties. Enough of such trained personnel must be available at the site during the entire period of the contract.

17.4 The contractor shall provide enough fire protection equipment of the types and number for the ware-houses, office, temporary structures, labour colony area etc. Access to such fire protection equipment, shall be easy and kept open at all times.

18.0 SECURITY

The contractor shall have total responsibility for all equipment and materials in his custody stored, loose, semi-assembled and/or erected by him at site. The contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss. All materials of the contractor shall enter and leave the project site only with the written permission of the engineer in the prescribed manner.

19.0 CONTRACTOR'S AREA LIMITS

The engineer will mark-out the boundary limits of access roads, parking spaces, storage and construction areas for the contractor and the contractor shall not trespass the areas not so marked out for him. The contractor shall be responsible to ensure that none of his personnel move out of the areas marked out for his operations. In case of such a need for the contractor's personnel to work out of the areas marked out for him, the same shall be done only with the written permission of the engineer.

20.0 CONTRACTOR'S CO-OPERATION WITH THE OWNER

In cases where the performance of the erection work by the contractor affects the operation of the system facilities of the owner, such erection work of the contractor shall be scheduled to be performed only in the manner stipulated by the engineer and the same shall be acceptable at all times to the contractor. The engineer may impose such restrictions on the facilities provided to the contractor such as electricity, water, etc. as he may think fit in the interest of the owner and the contractor shall strictly adhere etc. such restrictions and co-operate with the engineer. It will be the responsibility of the contractor to provide all necessary temporary instrumentation and other measuring devices required during start-up and operation of the equipment systems, which are erected by him. The contractor shall also be responsible for flushing and initial filling of all the oil and lubricants required for the equipment furnished and erected by him, so as to make such equipment ready for operation. The contractor shall be responsible for supplying such flushing oil and other lubricants unless otherwise specified elsewhere in these documents & specifications.

21.0 PRE-COMMISSIONING TRAILS AND INITIAL OPERATIONS

The pre-commissioning trials and initial operations of the equipment furnished and erected by the contractor shall be the responsibility of the contractor as detailed in relevant clauses in section GTC. The contractor shall provide, in addition, test instruments, calibrating devices, etc. and the labour required for the successful performance of these trials. It is anticipated that the above test may prolong for a long time, the contractor's workmen required for the above test shall always be present at site during such trials.

22.0 MATERIALS HANDLING AND STORAGE

22.1 All the equipment furnished under the contract and arriving at site shall be promptly received, unloaded and transported and stored in the storage spaces by the contractor.

22.2 Contractor shall be responsible for examining all the shipment and notify the engineer immediately or any damage, shortage, discrepancy, etc. for the purpose of engineer's information only. The contractor shall submit to the engineer every week a report detailing all the receipts during the week. However, the contractor shall be solely responsible for any shortages or damage in transit, handling and/or in storage and erection of the equipment at the site. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the contractor.

22.3 The contractor shall maintain an accurate and exhaustive record detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time.

22.4 All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings, etc. shall be used for unloading and/or handling of the equipment without the specific written permission of the engineer. The equipment stored shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

22.5 All electrical panels, control gear, motors and such other devices shall be properly dried by heating before they are installed and energised. Motor bearings, slip rings, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.

22.6 All the electrical equipment such as motors, generators, etc. shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and a record of such measured insulation values maintained by the contractor. Such records shall be open for inspection by the engineer.

22.7 The contractor shall ensure that all the packing materials and protection devices used for the various equipment during transit and storage are removed before the equipment are installed.

22.8 The consumable and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.

22.9 All the materials stored in the open or duty location must be covered with suitable weather-proof and flameproof covering materials wherever applicable.

22.10 If the materials belonging to the contractor are stored in areas other than those earmarked for him, the engineer will have the right to get it moved to the area earmarked for the contractor at the contractor's cost.

22.11 The contractor shall be responsible for making suitable indoor storage facilities to store all equipment which require indoor storage. Normally, all the electrical equipment such as motors, control gear, generators, exciters and consumable like electrodes, lubricants etc. shall be stored in the closed storage space. The engineer, in addition, may direct the contractor to move certain other materials which in his opinion will require indoor storage, to indoor storage areas which the contractor shall strictly comply with.

23.0 CONSTRUCTION MANAGEMENT

23.1 The field activities of the contractors working at site, will be co-ordinated by the engineer and the engineer's decision shall be final in resolving any disputes or conflicts between the contractor and other contractors and tradesmen of the owner regarding scheduling and co-ordination of work. Such decision by the engineer shall not be a cause for extra compensation or extension of time for the contractor.

23.2 The engineer shall hold weekly meetings of all the contractors working at site, at a time and a place to be designated by the engineer. The contractor shall attend such meetings and take notes of discussions during the meeting and the decisions of the engineer and shall strictly adhere to those decisions in performing his works. In addition to the above weekly meetings, the engineer may call for other meetings either with individual contractors or with selected number of contractors and in such a case the contractor, if called will also attend such meetings.

23.3 Time is the essence of the contract and the contractor shall be responsible for performance this works in accordance with the specified construction schedule. If at any time, the contractor is falling behind the schedule, he shall take necessary action to make good for such delays by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such actions in writing to the engineer, satisfying that his action will compensate for the delay. The contractor shall not be allowed any extra compensation for such action.

23.4 The engineer shall however not be responsible for provision of additional labour and/or materials or supply or any other services to the contractor except for the co-ordination work between various contractors as set out earlier.

24.0 FIELD OFFICE RECORDS

The contractor shall maintain at his site office up-to-date copies of all drawings, specifications and other contract documents and any other supplementary data complete with all the latest revisions thereto. The contractor shall also maintain in addition the continuous record of all changes to the above contract documents, drawings, specifications, supplementary data, etc. effected at the field and on completion of his total assignment under the contract shall incorporate all such changes on the drawings and other engineering data to indicate as installed condition of the equipment furnished and erected under the contract. Such drawings and engineering data shall be submitted to the engineer in required number of copies. Daily work programme with progress of the previous day and deployment of labour related to work programme and attendance of workmen deployed during the previous day shall be maintained in a register. This register shall be signed by authorised representative of the contractor which will then be checked and signed by the owner's representative. Every three months this register shall be deposited to the owner which shall then be owners property.

25.0 CONTRACTOR'S MATERIALS BROUGHT ON TO SITE

25.1 The contractor shall bring to site all equipment, parts, materials, including construction equipment, tools and tackles for the purpose of the works with intimation to the engineer. All such goods shall, from the time of their being brought vest in the owner, but may be used for the purpose of the works only and shall not on any account be removed or taken away by the contractor without the written permission of the engineer. The contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.

25.2 The owner shall have a lien on such goods for any sum or sums which may at any time be due or owing to him by the contractor, under, in respect of or by reasons of the contract. After giving a fifteen (15) days' notice in writing of his intention to do so, the owner shall be at liberty to sell and dispose of any such goods, in such manner as he shall think fit including public auction or private treaty and to apply the proceeds in or towards the satisfaction of such sum or sums due as aforesaid.

25.3 After the completion of the works, the contractor shall remove from the site under the direction of the engineer the materials such as construction equipment, erection tools and tackles, scaffolding etc. with the written permission of the engineer. If the contractor fails to remove such materials, within 15 days of issue of a notice by the engineer to do so then the engineer shall have the liberty to dispose of such materials as detailed under clause 25.2 above and credit the proceeds thereto the account of the contractor.

26.0 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY

26.1 The contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees of the owner and the employees of other contractors and sub-contractors and all public and private property including structures, buildings, other plants and equipment and utilities either above or below the ground.

26.2 The contractor will ensure provision of necessary safety equipment such as barriers, sign-boards, warning lights and alarms, etc. to provide adequate protection to persons and property. The contractor shall be responsible to give reasonable notice to the engineer and the owners of public or private property and utilities when such property and utilities are likely to get damaged or injured during the performance of his works and shall make all necessary arrangements with such owners, related to removal and/or replacement or protection of such property and utilities.

27.0 PAINTING

All exposed metal parts of the equipment including pipings, structure railing etc. wherever applicable, after installation unless otherwise surface protected, shall be first painted with at least one coat of suitable primer which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scarping or sand blasting, and the same being inspected and approved by the engineer for painting. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints. The quality of the finish paint shall be as per the standards of ISI or equivalent and to be of the colour as approved by the engineer.

28.0 INSURANCE

28.1 In addition to the conditions covered under the clause entitled insurance in general terms and conditions of contract of this volume-1, the following provisions will also apply to the portion of the works to be done beyond the contractor's own or his sub-contractor's works.

28.2 Workmen's compensation insurance

This insurance shall protect the contractor against all claims applicable under the Workmen's Compensation Act 1948 (Government of India). This policy shall also cover the contractor against claims for injury, disability disease or death of his or his sub-contractor's employees, which for any reason are not covered under the Workmen's Compensation Act 1948. The liabilities shall not be less than

Workmen's compensation	As per statutory provisions
Employer's liability	As per statutory provisions

28.3 Comprehensive Automobile Insurance

This insurance shall be in such a form to protect the contractor against all claims for injuries, disability, disease and death to members of public including the owner's men and damage to the property of others arising from the use of motor vehicles during on or off the site operations, irrespective of the ownership of such vehicles.

28.4 Comprehensive General Liability Insurance

28.4.1 This insurance shall protect the contractor against all claims arising from injuries, disabilities, disease or death of members of public or damage to property of others, due to any act or omission on the part of the contractor, his agents, his employees, his representatives and sub-contractors or from riots, strikes and civil commotion. The insurance shall also cover all the liabilities of the contractor arising out of the clause entitled defence of suits under General Terms and Conditions of contracts of this volume. 1.

28.4.2 The hazards to be covered will pertain to all the works which and areas where the contractor, his sub-contractors, his agents and his employees have to perform work pursuant to the contract.

28.5 The above are only illustrative list of insurance covers normally required and it will be the responsibility of the contractor to maintain all necessary insurance coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect, in pursuance of the contract.

29.0 UNFAVOURABLE WORKING CONDITIONS

The contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects, during inclement weather conditions, like monsoon, storms, etc. and during other unfavourable construction conditions. No field activities shall be performed by the contractor under conditions which might adversely affect quality and efficiency thereof, unless special precautions or measures are taken by the contractor in a proper and satisfactory manner in performance of such works and with concurrence of the engineer. Such unfavorable construction conditions will in no way relieve the contractor of his responsibility to perform works as per the schedule.

30.0 PROTECTION OF MONUMENTS AND REFERENCE POINTS

The contractor shall ensure that any finds such as relic, antiquity, coins, fossils, etc. which he might come across during the course of performance of his works either during excavation or elsewhere, are properly protected and handed over to the engineer. Similarly the contractor shall ensure that the bench marks, reference points, etc., which are marked out either with the help of engineer or by the engineer shall not be disturbed in any way during the performance of his works. If any work is to be performed which disturb such references, the same shall be done only after these are transferred to other suitable locations under the direction of the engineer. The contractor shall provide all necessary materials and assistance for such relocation of reference points etc.

31.0 WORK AND SAFETY REGULATIONS

31.1 The contractor shall ensure proper safety of all the workmen, materials plant and equipment belonging to him or the Company or to others, working at or near the site. The contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislation and the engineer-in-charge as he may deem necessary.

31.2 The contractor will notify well in advance to the engineer-in-charge of his intention to bring to the site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The engineer-in-charge 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-in-charge shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the owner. Nor the owner shall entertain any claim of the contractor towards additional safety provisions/conditions to be provided for constructed as per engineer-in-charge's instructions.

Further any such decision of engineer-in-charge shall not, in any way, absolve the contractor of his responsibilities, and in case, use of such a container or entry there of into the site area is forbidden by engineer-in-charge, the contractor shall use alternative methods with the approval of engineer-in-charge without any cost implication to Company or extension of work schedule.

31.3 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-in-charge. In case, any approvals are necessary from the Chief Inspector (Explosive) or any statutory authorities, the contractor shall be responsible for obtaining the same.

31.4 All equipment used in construction and erection by contractor shall meet Indian, Inter-national Standards and where such standards do not exist, the contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the contractor in accordance with manufacturer's operation manual and safety instructions and per Guidelines/Rules of the Company in this regard.

31.5 Periodical Examinations and all tests for all lifting/hoisting equipment and tackles shall be carried out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules enforced from time to time. A register of such examinations and tests shall be properly maintained by the contractor and will be promptly produced as and when desired by engineer-in-charge or by the person authorised by him.

31.6 The contract shall be fully responsible for the safe storage of his and his sub-contractors radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by contractor.

31.7 The contractor shall provide suitable safety equipment of prescribed standard to all employee and workmen according to the need, as may be directed by engineer-in-charge who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.

31.8 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the code practices/rules framed under Indian Explosives Act pertaining to handling, storage and use of the explosives.

31.9 The contractor shall provide safe working conditions to all workmen and employees at the site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings, stairs, ladders etc. shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the contractor.

31.10 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 Company to handle such fuses, wiring or electrical equipment.

31.11 Before the contractor connects any electrical appliances to any plug or socket belonging to the other contractor or owner, he shall:

- a satisfy the engineer that the appliances is in good working condition
- b inform the engineer of the maximum current rating, voltage and phases of the appliances.
- c obtain permission of the engineer detailing the sockets to which the appliances may be connected.

31.12 The engineer will not grant permission to connect until he is satisfied that:

- a the appliance is in good condition and is fitted with a suitable plug.
- b the appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

31.13 No electric cable in use by the contractor/owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

31.14 No repair work shall be carried out on any live equipment. The equipment shall be declared safe by engineer-in-charge and a permit to work shall be issued by engineer-in-charge before any repair work is carried out by the contractor. While working on electric lines/equipments whether alive or dead, suitable type and sufficient quantity of tools will have to be provided by contractor to electricians/workmen/officers.

31.15 The contractor shall employ necessary number of qualified, full time electricians/ electrical supervisors to maintain in his temporary electrical installations.

31.16 The contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen who will co-ordinate with the project safety officer. In case of work being carried out through sub-contractor's, the sub-contractor's workmen/employees will also be considered as the contractor's employees/workmen for above purpose. The name and address of a such safety officer of contractor will be promptly informed in writing to engineer-in-charge with a copy to safety officer-in charge before he starts work or immediately after any change of the incumbent is made during currency of the contract.

31.17 In case any accident occurs during the construction/erection or other associated activities undertaken by the contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the contractor to promptly inform the same to the company's engineer-in-charge in prescribed form and also to all the authorities envisaged under the applicable laws.

31.18 The engineer-in-charge shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove short comings promptly. The contractor after stopping the specific work, can, if felt necessary, appeal against the order of stoppage of work to the General Manager of the project within 3 days of such stoppage of work and decision of the project G.M in this respect shall be conclusive and binding on the contractor.

31.19 The contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para 31.18 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.

31.20 The contractor shall follow and comply with all the Company safety rules relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without demur, protest or content or reservation. In case of any inconformity between statutory requirement and the Company safety rules referred above, the later shall be binding on the contractor unless the statutory provisions are more stringent.

31.21 If the contractor fails in providing safe working environment as per the Company safety rules or continues the work even after being instructed to stop work by engineer-in-charge as provided in para 31.18 above, the contractor shall promptly pay to the Company, on demand i.e. by the owner compensation at the rate of Rs. 5,000/= per day or part there of till the instructions are complied with as so certified by engineer-in-charge. However in case of accident taking place causing injury to any individual, the provisions contained in para 31.22 shall also apply in addition to compensation mentioned in this para.

31.22 If the contractor does not take all safety precautions and/or fails to comply with the safety rules as prescribed by the Company or under the applicable laws for the safety of the equipment and plant 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 the Company employees or any other person who are at site or adjacent thereto, the contractor shall be responsible for payment of

compensation under the relevant provisions of the workmen's compensation act and rules framed thereunder or any other applicable laws as applicable from time to time.

Permanent disablement shall have same meaning as indicated in workmen's compensation act. The compensation mentioned above shall be in addition to the compensation payable to the workmen/employees under the relevant provisions of the workmen's compensation act and rules framed thereunder or any other applicable laws as applicable from time to time.

In case the owner is made to pay such compensation then the contractor is liable to reimburse the owner such amount.

32.0 CODE REQUIREMENTS

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 recognised codes and the laws and regulations of the Government of India.

33.0 FOUNDATION DRESSING AND GROUTING

33.1 The surfaces of foundations shall be dressed to bring the top surface of the foundations to the required level, prior to placement of equipment/equipment bases on the foundations.

33.2 All the equipment bases and structural steel base plates shall be grouted and finished as per these specifications unless otherwise recommended by the equipment manufacturer.

33.3 The concrete foundation surfaces shall be properly prepared by chipping, grinding as required to bring the type of such foundation to the required level, to provide the necessary roughness for bondage and to assure enough bearing strength. All laitance and surface film shall be removed and cleaned.

33.4 GROUTING MIX

The grouting mixtures shall be composed of Portland cement, sand and water. The Portland cement to be used shall conform to ISI No. 269 or equivalent, sand shall conform to ISI No.383/2386 or equivalent. The grout proportions for flat based where the grouting space does not exceed 35 mm shall be 50 Kg bag of cement to 75 Kg of sand. Only the required quantity of water shall be added so as to make the mix quaky and flowable and the mix shall not show excess water on top when it is being puddled in place. For thicker grout beds upto 65 mm, the amount of sand shall be increased to 105 Kg per bag of cement. Bases which are hollow and are to be filled full of grouting shall be filled to a level of 25 mm above the outside rim with a mortar mix in the volumetric proportions of one bag of cement and 1.5 bags sand and 1.5 part 6 mm granite gravel. An acceptable plasticiser may be added to the grout mixes in a proportion recommended by the plasticisers manufacturer. All such grouts shall be thoroughly mixed for not less than five minutes in an approved mechanical mixer and shall be used immediately after mixing.

33.5 PLACING OF GROUT

33.5.1 After the base has been prepared, its alignment and level has been checked and approved and before actually placing the grout a low dam shall be set around the base at a distance that will permit pouring and manipulation of the grout. The height of such dam shall be at least 25 mm above the bottom of the base. Suitable size and number of chains shall be introduced under the base before

placing the grout, so that such chains can be moved back and forth to push the grout into every part of the space under the base.

33.5.2 The grout shall be poured either through grout holes if provided or shall be poured at one side or at two adjacent sides giving it a pressure head to make the grout move in a solid mass under the base and out in the opposite side. Pouring shall be continued until the entire space below the base is thoroughly filled and the grout stands at least 25 mm higher all around than the bottom of the base. Enough care should be taken to avoid any air or water pockets beneath the bases.

33.6 FINISHING OF THE EDGES OF THE GROUT

The poured grout should be allowed to stand undisturbed until it is well set. Immediately thereafter, the dam shall be removed and grout which extends beyond the edges of the structural or equipment base plates shall be cut off flush and removed. The edges of the grout shall then be pointed and finished with 1:2 cement mortar pressed firmly to bond with the body of the grout and smoothed with a tool to present a smooth vertical surface. The work shall be done in a clean and scientific manner and the adjacent floor spaces, exposed edges of the foundations, and structural steel and equipment base plates shall be thoroughly cleaned of any spillage of the grout.

33.7 CHECKING OF EQUIPMENT AFTER GROUTING

After the grout is set and cured, the contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centring of rotors with respect to their sealing bores, couplings, etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during such post grouting check-up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the engineer.

34.0 SHAFT ALIGNMENTS

All the shafts of rotating equipment shall be properly aligned to those of the matching equipment to as perfect an accuracy as practicable. The equipment shall be free from excessive vibration so as to avoid over-heating of bearings or other conditions which may tend to shorten the life of the equipment. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.

35.0 DOWELING

All the motors and other equipment shall be suitably doweled after alignment of shafts with tapered machined dowels as per the direction of the engineer.

36.0 CHECK OUT OF CONTROL SYSTEMS / POWER SUPPLY

After completion of wiring, cabling furnished under separate specifications and laid and terminated by the owner, the contractor shall check out the operation of all control systems for the equipment furnished and installed under these specifications and documents. The contractor shall get the drawings pertaining to the control system, power supply etc. approved from Directorate General of Mine Safety (DGMS) or any other appropriate authority as necessary, wherever required as per the rules and regulations of the of Indian Mines Act governed by D.G.M.S.

37.0 COMMISSIONING SPARES

The contractor shall make arrangement for an adequate inventory at site of necessary commissioning spares prior to commissioning of the equipment furnished and erected so that any damage or loss during this commissioning activities necessitating the requirements of spares will not come in the way of timely completion of the works under the contract.

38.0 CABLING

38.1 All cables shall be supported by conduits or cable tray run in air or in cable channels. These shall be installed in exposed runs parallel or perpendicular to dominant surfaces with right angle turn made of symmetrical bends or fittings. When cables are run on cable trays, they shall be clamped at a minimum interval of 2000 mm or otherwise as directed by the engineer.

38.2 Each cable, whether power or control , shall be provided with a metallic or plastic of an approved type, bearing a cable reference number indicated in the cable and conduit list (prepared by the contractor), at every 5 metre run or part there of and at both ends or the cable adjacent to the terminations. Cable routing is to be done in such a way that cables are accessible for any maintenance and for easy identification.

38.3 Sharp bending and kinking of cables shall be avoided. The minimum radii for PVC insulated cables 1100 V grade shall be 15D, where D is the over all diameter of the cable. Installation of other cables like high voltage, coaxial, screened, compensating, mineral insulated shall be in accordance with the cable manufacturer's recommendations. Wherever cables cross roads and water, oil, sewage or gas lines, special care should be taken for the protection of the cables in designing the cable channels.

38.4 In each cable run some extra length shall be kept at a suitable point to enable one to two straight through joints to be made should the cable develop fault at a later date.

38.5 Control cable terminations shall be made in accordance with wiring diagrams, using identifying codes subject to engineer's approval. Multicore control cable jackets shall be removed as required to train and terminate the conductors. The cable jacket shall be left on the cable, as far as possible, to the point of the first conductor branch. The insulated conductors from which the jacket is removed shall be neatly twined in bundles and terminated. The bundles shall be firmly but not tightly tied utilising plastic or nylon ties or specially treated fungus protected cord made for this purpose. Control cable conductor insulation shall be securely and evenly cut.

38.6 The connectors for control cables shall be covered with a transparent insulating sleeve so as to prevent accidental contact with ground or adjacent terminals and shall preferably terminate Elmex terminals and washers. The insulating sleeve shall be fire resistant and shall be long enough to over-pass the conductor insulation. All control cables shall be fanned out and connection made to terminal blocks and test equipment for proper operation before cables are corded together.

SAFETY CODE.

1. 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. 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. 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, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.
4. 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. Safety means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m (30ft) in length while the width between side rails in rung ladder shall in no case be less than 20 cm (11 $\frac{1}{2}$ ") for ladder upto and including 3 m (10ft) in length. For longer ladders, this width should be increased at least $\frac{1}{4}$ " for additional 30 cm (1ft.) 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. 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.
7. 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. 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 at least 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 measures are adhered to:-
 - a) Entry for workers into the line shall not be allowed except under supervision of the Engineering Assistant 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 may 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 meters 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.
- m) 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.
- n) Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.
- o) 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.
- p) The extents 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.
- 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 readymade 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.
 - d) Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.
 - e) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.
 - f) Overall shall be worn by working painters during the whole of working period.

- g) Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.

9. 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.

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

- i).(a) 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.
 - (b) 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 departmental 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 Engineer-in-Charge of the department 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.

TECHNICAL SPECIFICATIONS

Technical Specifications to be followed :

Civil Engineering Works

Latest CPWD specification shall be adopted. These specifications cover all type of Building Works. The specifications are available as a printed document issued by CPWD and also in soft copy in .pdf format on CPWD website.

All latest version of relevant BIS Codes shall also be followed.

Roads and Bridges

Standard Specifications issued by Ministry of Road Transport & Highway may be followed. Presently MORT&H Specifications for Roads and Bridges 2013 is available. These specifications cover exhaustively various roads and bridge works.

All latest version of relevant BIS Codes shall also be followed.

Electrical Engineering Works

Latest CPWD specification shall be adopted. Presently the following are in vogue:

Part No.	Description	Year of Issue
I	Internal	2013
III	Lifts And Escalators	2003
V	Wet Riser And Sprinklers System	2006
VI	Heating, Ventilation And Air Conditioning Works	2005

All latest version of relevant BIS Codes shall also be followed.

eTender Portal User Agreement

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

A. UNDERTAKINGS TO BE FURNISHED ONLINE BY THE BIDDER

I DO HEREBY UNDERTAKE

1. That all the information being submitted by me/us is genuine, authentic, true and valid on the date of submission of tender and if any information is found to be false at any stage of tendering or contract period, I/We will be liable to the following penal actions apart from other penal actions prescribed elsewhere in the tender document.
 - a. Cancellation of my/our bid/contract (as the case may be)
 - b. Forfeiture of EMD
 - c. Punitive action as per tender document
2. That I/we accept all terms and condition of NIT, including General Terms and Condition and Special/Additional Terms and Condition as stated there in the tender document as available on the website.
3. That I/we accept the Integrity Pact as given in the tender document (if applicable).
4. That I/we, am/are giving my/our consent for e-payment and submitting/ shall submit the mandate form for e-Payment in the format as prescribed in the document in case, the work is awarded to us.
5. That I/we do authorize CIL/Subsidiary for seeking information/clarification from my Bankers having reference in this bid.
6. That I/we will upload original/certified photo/scanned of all the relevant documents as prescribed in the tender document in support of the information and data furnished by me/us online.
7. I/We confirm that I/We have not been banned or de-listed by any Govt. or Quasi Govt. agencies or PSUs. In case We are banned or delisted this information shall be specifically informed to the tender issuing authority.
8. That I/We accept all the undertakings as specified elsewhere in the tender document.
9. That this online agreement will be a part of my bid and if the work is awarded to me/us, this will be a part of our agreement with CIL/Subsidiary Company.

B. TERMS AND CONDITIONS OF E-TENDER SERVICES AGREEMENT

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You may print and download portions of material from the different areas of the website solely for your own non-commercial use provided that you agree that you shall not change or delete any copyright or proprietary materials from the site.

<https://coalindiatenders.nic.in> is an e-procurement portal of Coal India Limited/its Subsidiary.

THIS E-TENDER PORTAL AND RELATED SERVICES SUBJECT TO YOUR COMPLIANCE WITH THE USER'S TERMS AND CONDITIONS SET FORTH BELOW :

PLEASE READ THE FOLLOWING INFORMATION CAREFULLY. YOU MAY NOT COMPLETE YOUR REGISTRATION AND USE THE E-TENDER PORTAL WITHOUT AGREEING TO COMPLY WITH ALL OF THE TERMS AND CONDITIONS SET FORTH BELOW.

BY REGISTERING THE USER NAME AND PASSWORD, YOU AGREE TO ABIDE BY ALL THE TERMS AND CONDITIONS SET FORTH BELOW :

Bidder Registration, Password and Security :

Upon successful completion of Registration online, User ID and Password will be registered. You can login, only by giving valid User ID and Password and then signing with your valid Digital Signature Certificate.

The Online registration/enrollment of bidder on the portal should be done in the name of the bidder. The person whose DSC is attached to the Registered Bidder should be either the bidder himself Or, duly authorized by the Bidder.

User ID and password are strictly personal to each Authorised User and non-transferable. The User shall ensure that its Authorised Users do not divulge or disclose their user ID or password to third parties. In the event that the Authorised User comes to know that the User ID/Password has been/might have been divulged, disclosed or discovered by any third party, user or its authorized user shall immediately modify the password using "Change Password" option. CIL/subsidiary will have no responsibility or obligation in this regard.

At the time of enrollment in the e-Tendering portal of CIL/its Subsidiaries, the Bidders should ensure that the status of DSC is active on this site. The activation of newly issued DSC may take 24 hrs or more. Hence Bidders who are obtaining new DSC should register at least 24 hrs before the submission of Bid.

By registering in this portal you forthwith assume the responsibility for maintaining the confidentiality of the Password and account, and for all activities that occur under your Password or Account. You also agree to (a) immediately notify by e-mail to Application Administrator/Nodal officer, of any unauthorized use of your Password or Account or any other breach of security, and (b) ensure that you log-out from your account at the end of each session. CIL/its Subsidiaries shall not be liable for any loss or damage caused to you due to your failure to comply with the foregoing.

Registered user can modify or update some of the information in their profile as and when required at their own discretion. However some information such as "User ID" are protected against changes by Bidder after enrollment and some other information such as "Bidder Name" etc. are protected against changes by Bidder after bid submission.

Modification of software :

With consent of Project Advisory Committee, e-procurement of CIL, the Administrator of e-Tender portal, reserves the right to modify, add, delete and/or change the contents , classification and presentation of the information on the market place at any time as it may in its absolute discretion find to be expedient and without giving any notice. It is the users responsibility to refer to the terms and/or any change or addition to the same while accessing the site.

Coal India Limited reserves right to interrupt/suspend the availability of the e-Tender system without any notice to the users.

System Requirements :

It is the users responsibility to comply with the system requirements : hardware, software, Internet connectivity at user premises to access the eTender portal as mentioned in the home page in the link "Resources Required".

Under any circumstances, CIL shall not be liable to the Users for any direct/indirect loss incurred by them or damages caused to them arising out of the following:

- (a). Incorrect use of the e-Tender System, or ;
- (b). Internet Connectivity failures in respect of the equipments used by the Users or by the Internet Service Providers, or ;
- (c). Inability of the Bidder to submit their bid due to any DSC related problems, hardware, software or any other factor which are personal/ special/local to the Bidder.

Contents of Tender Information :

Tenders shall be published by the authorized Tender Inviting Authorities of the respective Tendering entities of CIL/subsidiary. In case of any clarifications arising out of the tenders, the users have to contact the respective Tender Inviting Authority.

Bid Submission Acknowledgement :

The User should complete all the processes and steps required for Bid submission. The successful Bid submission can be ascertained once acknowledgement is given by the system through Bid Submission number i.e. Bid ID, after completion of all the processes and steps. Coal India Limited is not responsible for incomplete bid submission by users. Users may also note that the incomplete bids will not be saved by the system and so the same will not be available to the Tender Inviting Authority for processing.

The acknowledgment is the only confirmation of submission of bid, which the bidder can show as a proof of participating in the tender. Other than this acknowledgement, no proof will be considered as a confirmation to the submission of a bid. If the bidder fails to produce this acknowledgement required for verification in case of dispute, his claim for submission of bid may not be considered.

Upload files :

The bidders have to ensure that the files being uploaded by them are free from all kinds of viruses and contain only the relevant information as stated by the Tender Inviting Authorities for the particular tender. It is not obligatory on the part of CIL/subsidiary to read each and every document uploaded by the Bidder. If any bidder/Company has uploaded/attached irrelevant data, bogus or fabricated certificates towards his qualification requirements to the respective tender then their User account will be liable for termination permanently or temporarily by CIL/subsidiary without any prior notice.

User Conduct :

You agree that all information, data, text, software, photographs, graphics, messages or other materials ("Content"), whether publicly posted or privately transmitted, are the sole responsibility of the person from which such Content is originated. This means that you are entirely responsible for all Content that you upload, post, email or otherwise transmit via the eTender portal.

CIL/subsidiary does not control the Content posted via the e-Tender portal and, as such, does not guarantee the accuracy, integrity or quality of such Content. Hence under no circumstances, CIL/subsidiary is liable in any manner for any Content, including, but not limited to, for any errors or omissions in any Content, or for any loss or damage of any kind incurred as a result of the use of any

Content posted, e-mailed or otherwise transmitted via the Site.

Amendments to a tender published :

You agree that the CIL/ Subsidiary companies reserves the right to re-tender /cancel a tender or extend the closing date or amend the details of tender at any time by publishing corrigendum as applicable.

Special Admonitions For International Use :

Recognizing the global nature of the Internet, you agree to comply with all local rules regarding online content and acceptable Content. Specifically, you agree to comply with all applicable laws regarding the transmission of technical data to and from India or the country in which you reside.

Links :

The Site may provide, links to other World Wide Web sites or resources. Because CIL/subsidiary has no control over such sites and resources, you acknowledge and agree that the CIL/Subsidiary is not responsible for the availability of such external sites or resources, and does not endorse and is not responsible or liable for any Content, advertising, products, or other materials on or available from such sites or resources.

You further acknowledge and agree that the CIL/subsidiary shall not be responsible or liable, directly or indirectly, for any damage or loss caused or alleged to be caused by or in connection with use of or reliance on any such Content, Goods or Services available on or through any such site or resources.

Miscellaneous :

This Agreement shall all be governed and construed in accordance with the laws of India & applicable to agreements made and to be performed in India. The e-Tender portal's failure to insist upon or enforce strict performance of any provision of this Agreement shall not be construed as a waiver of any provision or right. Neither the course of conduct between the parties nor trade practice shall act to modify any provision of this Agreement. CIL/subsidiary may assign its rights and duties under this Agreement to any party at any time without notice to you. Any rights not expressly granted herein are reserved.

Governing Law :

Terms shall be governed by, and construed in accordance with, Indian law. The parties agree that the principal civil court of the place where the registered office of Coal India/Subsidiary Company is situated shall have non-exclusive jurisdiction to entertain any dispute with Coal India/Subsidiary company. In case of dispute being with a regional Institute of CMPDIL, the principal Civil Court where the said regional Institute is situated shall be place of suing.

CIL/subsidiary reserves the right to initiate any legal action against those bidders violating all or any of the above mentioned terms & conditions of e-Tender services agreement.

Modification of terms of Agreement :

CIL/its Subsidiaries reserves the right to add to or change/modify the terms of this Agreement. Changes could be made by us after the first posting to the Site and you will be deemed to have accepted any change if you continue to access the Site after that time. CIL/its Subsidiaries reserves the right to modify, suspend/cancel, or discontinue any or all services/ make modifications and alterations in any or all of the content, at any time without prior notice.

Policy and Security :

General Policy :

CIL/its Subsidiaries is committed to protecting the privacy of our e-Tender site visitors. CIL/subsidiary does not collect any personal or business information unless you provide it to us voluntarily when conducting an online enrolment, bid submission etc. or any other transaction on the Site.

Information Collected :

When you choose to provide personal or business information to us to conduct an online transaction, we use it only for the purpose of conducting the specific online transaction that you requested. The information is also used for the purpose of vendor searches. For each online transaction, we require only a minimum amount of personal and business information required to process your transaction.

When you visit our portal to browse, read pages, or download information, we automatically collect and store only the following information:

The Internet domain and IP address from which you access our portal;

The date and time you access our portal;

The pages you visit

This information would help us to make our site more useful to visitors and to learn about the number of visitors to our site and the types of technology our visitors use.

We do not give, share, sell or transfer any personal information to a third party unless required to do so by law. If you do not want any personal or business information to be collected, please do not submit it to us ; however, without this required information we will be unable to process your online bid submission or any other online transaction. Review, update and correction of any personal or business information can be done directly on the Site.

Use of Cookies :

When you choose to enter into an online transaction, we use cookies to save the information that you input while progressing through the transaction. A cookie is a very small amount of data that is sent from our server to your computers hard drive. By enabling this feature, the cookie will remember the data entered by you and next time when you visit this site, the data stored in the cookie will be available in future.

Security :

The Site has security measures in place to protect against the loss, misuse and alteration of information under our control.

eMail / SMS Notifications :

The GePNIC eProcurement Server has functionality of automatically sending eMail / SMS alerts at various events as per the bidders preference. There is no manual intervention while sending these pre-defined eMail / SMS alerts. All events for which eMails / SMS being sent is also available to users on the Dash Board / the user login of the Bidder. Although all efforts will be made to ensure timely delivery of eMail / SMS, due to dependency in various other external factors, the delivery of eMail / SMS may not be assured and bidders are requested to check the portal on a periodic basis for any such events. Non receipt of eMail / SMS cannot be quoted as a reason for failure of service as this is an added facility being provided to users.

FORMAT FOR LETTER OF BID

(To be accepted through GTE)

To,

The Tender Committee

Central Coalfields Limited

Sub : BID for the Work : Survey, Planning, Designing, Drawing and Construction of 5 Nos Sewage Treatment Plant (STP) of different capacity based on Sequential Batch Reactor (SBR) Technology and Sewerage system pipeline network from inside individual house hold/ other buildings in the Colony to STP including all civil, mechanical and Electrical work with boundary wall around the plant including Operation and Maintenance for 04 (four) years at Barka Sayal Area on TURN-KEY basis.

NIT No. & date :10 of 2022-23 dated 13.07.2022

Tender Id : 2022_CCL_250140_1

Dear Sir,

This has reference to above referred bid. I/we have read and examined the conditions of contract, Scope of Work, technical specifications, BOQ and other documents carefully.

I /We am/are pleased to submit our bid for the above work. I/We hereby unconditionally accept the bid conditions and bid documents in its entirety for the above work and agree to abide by and fulfill all terms and conditions and specifications as contained in the bid document.

We hereby confirm total and unconditional acceptance of the TERMS and CONDITIONS OF CONTRACT (General Terms and Conditions of Contract, Additional Terms and Conditions of Contract, General Technical Conditions of Contract & Erection Conditions of Contract) and TECHNICAL SPECIFICATIONS as given in the Bid document.

We hereby also confirm that the detailed design and drawings will be submitted by us for approval, before execution of work and any changes/modifications suggested by you will be acceptable to us at the same Terms & Conditions of NIT and without any additional cost.

We hereby also confirm that any Item/Structure/Plant & Machinery, not specifically indicated in the Scope of work/Bill of Quantity, but subsequently felt necessary for satisfactory completion and commissioning of the Project, will be executed/supplied by us without any additional cost.

I/we here by submit all the documents as required to meet the eligibility criteria as per provision of the bid notice/document.

I/We hereby confirm that this bid complies with the Bid validity, Bid security and other documents as required by the Bidding documents.

If any information furnished by me/us towards eligibility criteria of this bid is found to be incorrect at any time, penal action as deemed fit may be taken against me/us for which I/We shall have no claim against CIL/Subsidiary.

Until a formal agreement is prepared and executed, this bid and your subsequent Letter of Acceptance/Work Order shall constitute a binding contract between us and Central coalfields Ltd.

Should this bid be accepted, I/we agree to furnish Performance Security within **stipulated date** and commence the work within **stipulated date**. In case of my/our failure to abide by the said provision, **Central Coalfields Limited** shall, without prejudice to any other right or remedy, be at liberty to cancel the letter of acceptance/ **work order** /award and to forfeit the Earnest Money and also debar us from participating in future tenders for a minimum period of 12(twelve) months.

Yours faithfully,

Date :

Signature of Bidder
(In case of JV, signature of all partners)

PROFORMA FOR UNDERTAKING

accepted unconditionally by bidder/s for genuineness of the information furnished online and authenticity of the documents uploaded online in support of his eligibility)

(To be accepted through GTE)

I/We solemnly declare that:

1. I I/We am/are submitting Bid for the work **Survey, Planning, Designing, Drawing and Construction of 5 Nos Sewage Treatment Plant (STP) of different capacity based on Sequential Batch Reactor (SBR) Technology and Sewerage system pipeline network from inside individual house hold/ other buildings in the Colony to STP including all civil, mechanical and Electrical work with boundary wall around the plant including Operation and Maintenance for 04 (four) years at Barka Sayal Area on TURN-KEY basis** against Bid Notice No. 10 of 2022-23 dated 13.07.2022 and I/we offer to execute the work in accordance with all the terms, conditions and provisions of the bid.
2. All information furnished by us in respect of fulfilment of eligibility criteria and qualification information of this Bid is complete, correct and true.
3. All copy of documents, credentials and documents submitted along with this Bid are genuine, authentic, true and valid.
4. I/ We hereby authorize department to seek references / clarifications from our Bankers.
5. We hereby undertake that we shall register and obtain license from the competent authority under the contract labour (Regulation & Abolition Act) as relevant, if applicable.
6. I/We have not been debarred by any procuring entity for violation of Preference to Make in India (as applicable) vide Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020, issued by Govt. of India as amended from time to time (not applicable for works with estimated value put to tender less than 5 lakh).
7. I/we do not have relationship with any other participating bidders, directly or through common third parties that puts us in a position to have access to information about or influence on the bid of another Bidder.
8. I/we or any of my/our affiliate has/have not participated as consultant in the preparation of the design or technical specification of the contract that is the subject of the bid.
9. If any information and document submitted is found to be false/ incorrect at any time, department may cancel my/our Bid and action as deemed fit may be taken against me/us, including termination of the contract, forfeiture of all dues including Earnest Money and banning of our firm and all partners of the firm etc.

MANDATE FORM FOR ELECTRONIC FUND TRANSFER / INTERNET BANKING PAYMENT.

1. Name of the Bidder :
2. Address of the Bidder :
-
- City..... Pin Code.....
- E-mail Id
- Permanent Account Number

3. Particulars of Bank:

Bank Name		Branch Name	
Branch Place		Branch City	
Pin Code		Branch Code	
MICR No.			

(Digital Code number appearing on the MICR Band of the cheque supplied by the Bank. Please attach Xerox copy of a cheque of your Bank for ensuring accuracy of the Bank Name, Branch Name and Code Number.

RTGS CODE																				
Account Type	Savings				Current				Cash Credit											
Account Number(as appearing in the Cheque Book.																				

4. Date from which the mandate should be effective.

I hereby declare that the particulars given above are correct and complete. If any transaction is delayed or not effected for reasons of incomplete or incorrect information. I shall not hold Company responsible. I also undertake to advise any change in the particulars of my account to facilitate updation of records for purpose of credit of amount through SBI Net / RTGS transfer/NEFT. I agree to discharge responsibility expected of me as a participant under the scheme. Any bank charges levied by the bank for such e-transfer shall be borne by us.

Place :

Date :

Signature of the Party / Authorised Signatory

Certified that particulars furnished above are correct as per our records.

Banker's Stamp

Date :

Signature of the Authorised official from the Bank)

PROFORMA FOR EXECUTION OF AGREEMENT.

NON-JUDICIAL STAMP PAPER
(of appropriate value as per Stamp Act)

This agreement is made on day of between (Name of Company) having its registered office at (hereinafter called the 'COMPANY' which expression shall, unless repugnant to the subject or context, include its successors and assignees) of the one part and (Name of the Contractor) carrying on business as a (partnership/ proprietorship/ Ltd. Co. etc.) firm under the name and style (hereinafter called the 'said Contractor' which expression shall, unless the context requires otherwise include them and their respective heirs, executors, administrators and legal representatives) of the other part.

Whereas the Company invited tenders for the work of “.....” and whereas the said Contractor/ Firm submitted tender for the said work and deposited a sum of Rs..... as Earnest Money and whereas the tender of the said contract has been accepted by the Company for execution of the said work.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

- 1) In this agreement words and expressions shall have the same meaning as are respectively assigned to them in the tender papers hereinafter referred to.
- 2) The following documents which are annexed to this agreement should be deemed to form and be read and construed as part of this agreement viz.
 - i) Annexure-A Tender Notice (Page .. to ..)
 - ii) Schedule –A General Terms & Conditions, Special Conditions, General Technical Specification and Safety Code (Page to)
 - iii) Schedule-B The probable Quantities and Amount (Page to)
 - iv) Schedule-C Negotiation letters (Page to)
 - iv) Schedule-D Letter of Acceptance/Work Order (Page to)
 - v) Schedule-E Drawings (Page to)
- 3) In consideration for the payment of the sum of Rs.....(W/O Value; both in words and figures) or such other sum as may be arrived at under the clause of the specification relating to Payment by items measurements at unit prices by the Company, the said Contractor shall, subject to the terms & condition contained herein execute and complete the work as described and to the extent of probable quantities as indicated in Schedule B with such variations by way of alteration, addition to or reduction from the said works.
- 4) The company has received a sum of Rs..... towards Performance Security Deposit (1st part of Security Deposit) in the form of Demand Draft / Certified Cheque/ B.G./ other form (details to be furnished) .

5) The said contractor hereby covenants with the company that the company shall deduct at 5% of R/A Bills as Retention Money (2ndpart of security deposit) to make the total Security as 10%(ten percent) of contract value, as per the terms & condition of the tender/ contract.

IN WITNESS WHEREOF THE parties herein have set their hands and seals the date and year above written.

1 Partner. Signature

2 Partner Signature

On behalf of M/S.....
The Contractor, as one of the constituted attorney,
In the presence of –

1. Name _____ Signature

Address :

Occupation :

Signed by Srion behalf of Signature
(Name of Company) in presence of -

1. Name : Signature

2. Address: .

PROFORMA OF MEMORANDUM (To be a Part of Contract Agreement)**TENDER FOR WORK**

I/We hereby tender for the execution for the CENTRAL COALFIELDS LIMITED (CCL) of the work specified in the underwritten MEMORANDUM at rates specified in the Price-bid within a period of ----- Days as per Work Order and subject to the annexed conditions of Contract and with such materials as are provided for by and in all other respects in accordance with such conditions so far as applicable.

MEMORANDUM

1	Name of Work	
2	Agreement Value of Work	
3	Performance Security Deposit	
4	Additional Performance Security Deposit	
5	Percentage to be deducted from Bills	
6	Scheduled Date of Commencement of Work	
7	Scheduled Date of Completion of Work	

PROFORMA OF BANK GUARANTEE FOR PERFORMANCE SECURITY

.....(Name and Address of the concerned Subsidiary Company/ Purchaser Company)

Re: Bank Guarantee in respect of Agreement/Contract/Purchase order vide No.....,Dated..... Between Central Coalfields Limited (Name of Purchaser Ccompany) and (Name of Supplier Company)

Messers..... a Company/Firm having its office at (herein after called "the Contractor") has entered into the Agreement/Contract/Purchase Order vide no.....dated(herein after called "the said Agreement") with Coal India Limited, Kolkata on behalf of Central Coalfields Limited/ Purchaser Company (name of the concerned subsidiary Company) (hereinafter called "the Company") to supply Stores/ materials amounting to Rs..... on the terms and conditions contained in the said contract.

The..... (name of the Bank) (hereinafter called "the Bank") having its Office at..... has at the request of the Contractor, agreed to give the Guarantee as hereinafter contained

We..... (name of the Bank) do hereby, unconditionally agree with the Company that if the Contractor shall in any way fail to observe or perform the terms and conditions of the said Agreement or shall commit any breach of its obligations there under, the Bank shall on demand, and without any objection, demur, pay to the company the said sum of or any portion thereof without requiring the Company to have recourse to any legal remedy that may be available to it to compel the Bank to pay the same , or calling on the company to compel such payment by the contractor.

Any such demand shall be conclusive as regards the liability of the Contractor to the company and as regards the amount payable by the Bank under this Guarantee. The Bank shall not be entitled to withhold payment on the ground that the Contractor has disputed its liability to pay or has disputed the quantum of the amount or that any arbitration proceeding or legal proceeding is pending between the company and the Contractor regarding the claim.

We, the Bank further agree that the Guarantee shall come into force from the date hereof and shall remain in force and effect till the period that will be taken for the performance of the said Agreement which is likely to be day of but if the period of Agreement is extended either pursuant to the provisions in the said Agreement or by mutual agreement between the contractor and the company, the Bank shall renew the period of the Bank Guarantee failing which it shall pay to the company the said sum of or such lesser amount of the said sum of as may be due to the company and as the company may demand.

This Guarantee shall remain in force until the dues of the company in respect of the said sum of are fully satisfied and the Company certifies that the Agreement has been fully carried out by the Contractor and discharges the guarantee.

The Bank further agrees with the company that the company shall have the fullest liberty without consent of the Bank and without affecting in any way the obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time for performance of the said Agreement t from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the contractor and to forebear to enforce any of the terms and conditions relating to the said Agreement and the Bank shall not be relieved from its liability by reason of such failure or extension being granted to the Contractor or to any forbearance, act or omissions on the part of the company or any indulgence by the Company to the Contractor or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of relieving or discharging the Guarantor.

The Bank further agrees that in case this Guarantee is required for a longer period and is not extended by the Bank beyond the period specified above, the Bank shall pay to the company the said

sum of or such lesser sum as may then be due to the Company and as the Company may require.

Notwithstanding anything contained herein the liability of the Bank under this Guarantee is restricted to Rs.....only. The guarantee shall remain in force till the day*..... of*..... and unless the guarantee is renewed or claim is preferred against the bank within the validity period and/or the claim period from the said date, all rights of the Company under this guarantee shall cease and the Bank shall be released and discharged from all liabilities hereunder except as provided in the preceding Clause.

The Bank has under its constitution power to give this Guarantee and [Name of the person (s)] who has signed it on behalf of the Bank has authority to do so.

Dated this.....day of.....at.....
Place.....

Signature of the authorized person(s)
For and on behalf of the Bank by:

(Signature)
(Name)

(Designation)
(Code number)
(address)

“The Bank Guarantee as referred above shall be operative at our branch at payable at

The date of guarantee shall cover a period of minimum one year or 90 days beyond the date of completion whichever is more

NOTE:

(ii). The Bank Guarantee (BG) issued by the issuing Bank on behalf of contractor in favour of “Central Coalfields Limited” shall be in paper form as well as issued under “Structured Financial Messaging System (SFMS)”.

The details of beneficiary for issue of Bank Guarantee (BG) under SFMS platform is furnished below:

A. State Bank of India as advising Bank of CCL:

1.	Name of the Beneficiary and his details.	i	Name	Central Coalfields Limited
		ii	Area	*
		iii	Bank A/C no. of beneficiary	10106155123
		iv	Customer ID/CIF no of beneficiary	80288731402
		v	Department	Civil
2.	Beneficiary Bank, Branch and address.	i	Beneficiary’s Bank	State Bank of India
		ii	Branch and Address	SME Branch, Doranda, ranchi - 834002
		iii	SFMS Code/ IFSC Code	SBIN0009620
		iv	In case of Foreign BG Swift Code	SBININBB387

PROFORMA OF BANK GUARANTEE FOR MOBILISATION ADVANCE

(On Non-Judicial Stamp paper of appropriate value as per provision of the Stamp Act applicable in the concerned state)

To
Central Coalfields Limited
.....

Dear Sir,

In consideration of Coal India Limited/Subsidiary Company having its Registered Office at (hereinafter called "the Company" which expression shall unless repugnant to the subject or context includes its successors and assigns) having agreed under the terms and conditions of the Contract No..... dated..... Entered into between Coal India Limited/Subsidiary Company and M/s having its Registered Office at (hereinafter called "the Contractor" to make mobilisation advance/lump-sum advance to the tune of Rs..... subject to submission of the Bank Guarantee for equal amount from any Nationalised/ Schedule Bank , We Bank (hereinafter referred to as the said Bank) having its Registered Office at do hereby undertake and agree to pay the Company to the extent of Rs..... on demand stating that the amount claimed by the Company is due and payable by the contractor for the reasons of non-refund and or non-recovery of the amount with interest thereon and to unconditionally pay the amount claimed by the company on such demand without any demur to the extent aforesaid.

2. We, Bank agree that the Company shall be the sole judge as to whether the said Contractor has failed/neglected in refunding the amount advanced by the Company and/or extent of loss and damages caused to or suffered by the Company on account of the amount advanced not being recovered in full and non-utilisation of the said advanced amount or part thereof for the purpose of performance of the contract and interest payable thereon and the decision of the company in this behalf shall be final and binding on us.

3) We, the said Bank further agree that the Guarantee herein contained shall remain in full force and effect upto and any claim received after the said date shall in no case bind the Bank.

4) The Company shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee or indemnity from time to time vary any of the terms and conditions of the said contract or to extend the time of performance by the said contractor or to postpone any time and from time to time any of the powers exercisable by it against the said contractor and either to enforce or to forbear from enforcing any of the terms and conditions governing the said contract or securities available to the company and the said Bank shall not be released from its liability under these presents.

5. Notwithstanding anything contained herein the liability of the said Bank under this Guarantee is restricted to Rs..... and this Guarantee shall come into force from the date hereof and shall remain in full force and effect till unless the written demand or claim under this Guarantee is made by the Company with us on or before all rights of the Company under this Guarantee shall cease to have any effect and we shall be relieved and discharged our liabilities hereunder.

6. We, the said Bank lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the company in writing and agree that any change in the constitution of the said contractor or the said Bank shall not discharge our liability hereunder.

7. This guarantee issued by Sri..... who is authorized by the Bank.

8. "The Bank Guarantee as referred above shall be operative/payable at our branch at.....
(Name and address of the Branch)

9. The Contact details of the Bank issuing BG and the local operating Branch of the Bank at Ranchi Jharkhand are as under :

Particulars	Issuing Bank	Local Operating Branch at Ranchi
Branch Code		
Postal Address		
Telephone No.		
FAX No.		
Email Id		

Signed and sealed this.....day of.....at.....

SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by :

(Signature)
(Name)
(Designation)
(Code number)
(address)

Under jurisdiction of Ranchi court only.

NOTE:

- (i) The Bank Guarantee issued by a scheduled bank shall be operative at its branch situated at Ranchi Jharkhand.
- (ii). **The Bank Guarantee (BG) issued by the issuing Bank on behalf of contractor in favour of "Central Coalfields Limited" shall be in paper form as well as issued under "Structured Financial Messaging System (SFMS)".**

The details of beneficiary for issue of Bank Guarantee (BG) under SFMS platform is furnished below:

A. State Bank of India as advising Bank of CCL:

1.	Name of the Beneficiary and his details.	i	Name	Central Coalfields Limited
		ii	Area	*
		iii	Bank A/C no. of beneficiary	10106155123
		iv	Customer ID/CIF no of beneficiary	80288731402
		v	Department	Civil
2.	Beneficiary Bank, Branch and address.	i	Beneficiary's Bank	State Bank of India
		ii	Branch and Address	SME Branch, Doranda, ranchi - 834002
		iii	SFMS Code/ IFSC Code	SBIN0009620
		iv	In case of Foreign BG Swift Code	SBININBB387

PROFORMA OF JOINT VENTURE AGREEMENT

(On Non-Judicial Stamp paper of appropriate value as per provision of the Stamp Act applicable in the concerned state)

This Joint Venture agreement is made on thisday of.....

AMONGST/BETWEEN

M/s....., having its registered Office at

Represented by Shri.....(Name and Designation) of M/s.....Who has power of Attorney to enter into Joint Venture with.....and Sign all documents/ agreements on behalf of M/s..... (hereinafter referred to as".....")

AND

M/s....., having its registered Office at

Represented by Shri.....(Name and Designation) of M/s.....who has power of Attorney to enter into Joint Venture with.....and Sign all documents/agreements on behalf of M/s..... (hereinafter referred to as".....").

AND

M/s....., having its registered Office at

Represented by Shri.....(Name and Designation) of M/s.....who has power of Attorney to enter into Joint Venture with.....and Sign all documents/agreements on behalf of M/s..... (hereinafter referred to as".....").

The expressions M/sand M/s.....and M/sshall, wherever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as "Joint Venture /Parties" and individually as "Joint Venture Partner/Party".

WHEREAS M/s.....and M/s.....agreed to form a Joint Venture in order to join their forces to obtain best results from the combinations of their individual resources of technical and management skill, finance and equipment for the benefit of the project and in order to submit the Bid for the work of "....."

..... (Hereinafter referred to as "Project") under.....(Name of Company(hereinafter referred to as "the principle Employer")).

The Parties hereby enter into this Joint Venture Agreement (hereinafter referred to as "Joint Venture agreement") to jointly prepare and submit the Bid for the Project and in the event of securing the Project from the Employer, to execute the Project in accordance with the Contract terms and conditions, to the satisfaction of the Principal Employer.

NOW THEREFORE, the parties, in consideration of the mutual premises contained herein, agree as follows:

1) FORMATION AND TERMINATION OF THE JOINT VENTURE.

The parties under this Agreement have decided to form a Joint Venture to submit the Bid for the above Project and execute the Contract with the Principal Employer for the Project, if qualified and awarded.

a) The name and style of the Joint Venture shall be "....."

(hereinafter called the "Joint Venture ")

- b) The Head Office of the Joint Venture shall be located at..... and the site office will be located at the site of the Project. All communication regarding the project will be made to..... Telephone Nos.....
- c) Neither of the parties of the Joint Venture shall be allowed to sign, pledge, sell or otherwise dispose all or part of its respective interests in the Joint Venture to any party including the existing partner of the Joint Venture.
- d) The terms of the Joint Venture shall begin as on the date first set forth above and shall terminate on the earliest of the following dates.
 - i) The Joint Venture fails to obtain qualification from the Employer.
 - ii) The Contract for the Project is not awarded to the Joint Venture.
 - iii) The Employer cancels the Project.
 - iv) The Project is completed including defects liability period to the satisfaction of the Employer and all the parties complete any and all duties, liabilities and responsibilities under or in connection with the Contract and the Joint Venture agreement.

2) LEAD PARTNER.

M/s..... shall be the Lead Partner of the Joint Venture and is In-charge for performing the contract management. M/s..... shall be attorney of the parties duly authorized to incur liabilities and receive instructions for and on behalf of any and all partners in the Joint Venture and also all the partners of the Joint Venture shall be jointly and severally liable during the bidding process and for the execution of the contract as per contract terms with the employer in accordance with the power of attorney annexed. All Joint Venture partners M/s.....; M/s.....& M/s..... nominate and authorize Shri..... (name and designation) of M/s..... to sign all letters, correspondence, papers & certificates and to submit the Pre-qualification Application / Bid documents for and on behalf of the Joint Venture.

3) REPRESENTATIVE OF THE PARTNERS OF THE JOINT VENTURE.

Each constituent party of the Joint Venture appoints the following personnel as the representative of the relevant party with full power of attorney from the Board of Directors of the concerned company, or from the partners of the entity, or from the proprietor.

<u>JV Partner</u>	<u>Name</u>	<u>Position in the respective Company</u>
M/s.....
M/s.....
M/s

4) PARTICIPATION SHARE & WORK RESPONSIBILITIES.

4.1 The parties agree that their respective participation share (hereinafter called ‘Participation Share’) in the Joint Venture shall be as follows:

- M/s..... :% (.....per cent)
- M/s..... :% (.....per cent) and
- M/s..... :% (.....per cent)

4.2 The Parties shall share the rights and obligations, risk, cost and expenses, working capitals, profits or losses or others arising out of or in relation to execution of the Project individually or collectively.

4.3 The parties shall jointly execute the works under the Project as an integrated entity and allocate responsibilities as regards division of work between themselves by organizing the adequate resources

for successful completion of the Project. However all parties shall remain jointly and severally responsible for the satisfactory execution of the Project in accordance with the Contract terms and conditions.

5) JOINT AND SEVERAL LIABILITIES.

All partner of Joint Venture shall be liable jointly and severally during the Pre-qualification and Bidding process; and in the event the contract is awarded, during the execution of the Contract, in accordance with Contract terms.

6) WORKING CAPITAL

During the execution of work/ service, the requirement of working Capital shall be met individually or collectively by the JV partners.

7) BID SECURITY:

Bid Security, Performance Security and other securities shall be paid by the Joint Venture except as otherwise agreed.

8) PERSONNEL & EQUIPMENT

Team of Managers / Engineers of all the partners of the Joint Venture will form part of the core management structure and assist in execution of the project. The list of Personnel and equipment proposed to be engaged for the project by each Party will be decided by the management committee.

9) NON PERFORMANCE OF RESPONSIBILITY BY ANY PARTY OF JOINT VENTURE .

- a) As between themselves, each Party shall be fully responsible for the fulfillment of all obligations arising out of its scope of the work for the Project to be clarified subject to the Agreement between the Parties and shall hold harmless and indemnified against any damage arising from its default or non-fulfillment of such obligations.
- b) If any Party fails to perform its obligations described in this Agreement during the execution of the Project and to cure such breach within the period designated by the non-defaulting party, then the other party shall have the right to take up work, the interest and responsibilities of the defaulting party at the cost of the defaulting party.
- c) Stepping into the shoes of the existing partner of Joint Venture with all the liabilities of the existing partner from the beginning of the contract with the prior approval on Northern Company.
- d) Notwithstanding demarcation or allotment of work of between/amongst Joint Venture partners, Joint Venture shall be liable for non-performance of the whole contract irrespective of their demarcation or share of work.
- e) In case bid being accepted by Company, the payments under the contract shall only be made to the Joint Venture and not to the individual partners.

10) BANK A/C.

Separate Bank A/c. shall be opened in the name of the Joint Venture in a scheduled or Nationalized Bank in India as per mutual Agreement and all payments due to the Joint Venture shall be received only in that account, which shall be operated jointly by the representative of the Parties hereto. The financial obligations of the Joint Venture shall be discharged through the said Joint Venture Bank Account only and also all the payments received or paid by company to the Joint Venture shall be through that account alone.

11) LIMIT OF JOINT VENTURE ACTIVITIES.

The Joint Venture activities are limited to the bidding and in case of award, to the performance of the Contract for the Project according to the conditions of the Contract with the Employer.

12) TAXES.

Each Party shall be responsible for its own taxes, duties and other levies to be imposed on each party in connection with the Project. The taxes, duties and other levies imposed on the Joint Venture in connection with the Project shall be paid from the account of the Joint Venture.

13) EXCLUSIVITY

The Parties hereto agree and undertake that they shall not directly or indirectly either individually or with other party or parties take part in the Bid for the said Project. Each Party further guarantee to the other party hereto that this undertaking shall also apply to its subsidiaries and companies under its direct or indirect control.

14) MISCELLANEOUS:

a. Neither party of the Joint Venture shall assign, pledge, sell or otherwise dispose all or part of its respective interests in the Joint Venture to all third party without the Agreement of the other party in writing.

b. Subject to the above clause, the terms and conditions of this agreement shall be binding upon the parties, the Directors, Officers, Employees, Successors, Assigns and Representatives.

15) APPLICABLE LAW

This agreement shall be interpreted under laws and regulations of India.

IN WITNESS Whereof the Parties hereto have hereunder set their respective hands and seals the day, month, year first above written.

For

For.....

Signature _____

Signature _____

(Name & Address)

(Name & Address)

(Official Seal)

(Official Seal)

Place

Place.....

Date

Date

Witness

Witness

Signature

Signature

(Name & Address)

(Name & Address)

PRE CONTRACT INTEGRITY PACT

General

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on.....day of the month of20..., between, on one hand, Central Coalfields Limited acting through General Manager (Civil)/HoD, Designation of the officer, (hereinafter called the “BUYER / Principal”, which expression shall mean and include, unless the context otherwise requires, his successors in office and assigns) of the First Part and M/s.represented by Shri....., Chief Executive Officer (hereinafter called the “BIDDER/Seller/Contractor” which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the BUYER proposes to procure **Survey, Planning, Designing, Drawing and Construction of 5 Nos Sewage Treatment Plant (STP) of different capacity based on Sequential Batch Reactor (SBR) Technology and Sewerage system pipeline network from inside individual house hold/ other buildings in the Colony to STP including all civil, mechanical and Electrical work with boundary wall around the plant including Operation and Maintenance for 04 (four) years at Barka Sayal Area on TURN-KEY basis** (Name of the Stores/Equipment/Item) and the BIDDER/Seller is willing to offer/has offered the stores and

WHEREAS the BIDDER is a private company/public company/Government undertaking/partnership/registered export agency, constituted in accordance with the relevant law in the matter and the BUYER is a Central Public Sector Unit.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to :-

Enabling the BUYER to obtain the desired said stores/equipment at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERS to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the BUYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

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. 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 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 cartelisation 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. 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 outlined above or be an accessory to such offences.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder, before contract award, has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or credibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process or to terminate the contract, if already signed, for such reason.

(1) If the Bidder / Contractor / Supplier has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal is also entitled to exclude the Bidder / Contractor / Supplier 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 within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 3 years.

(2) A transgression is considered to have occurred if the Principal, after due consideration of available facts and evidences within his / her knowledge concludes that there is a reasonable ground to suspect violation of any commitment listed under Section 2 i.e “Commitments of Bidder(s) / Contractor(s).

(3) The Bidder accepts and undertakes to respect and uphold the Principal’s absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.

(4) If the Bidder / Contractor / Supplier 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.”

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 or action can be taken as per the procedure mentioned in "Guidelines on Banning of business".

Section 6 - Equal treatment of all Bidders / Contractors / Subcontractors

(1) In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor.

(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, Coal India Limited / CMD, Subsidiary Companies

(3) The Bidder(s) / Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his/ her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable to Sub-contractors.

(4) 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, Coal India Limited / CMD, Subsidiary Companies and recuse 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 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.

(7) The Monitor will submit a written report to the Chairman, Coal India Limited / CMD, Subsidiary Companies 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) If the Monitor has reported to the Chairman, Coal India Limited / CMD, Subsidiary Companies, a substantiated suspicion of an offence under relevant IPC/ PC Act, and the Chairman, Coal India Limited / CMD, Subsidiary Companies 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.

(9) The word 'Monitor' would include both singular and plural.

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 Coal India Limited / CMD, Subsidiary Companies.

Section 10 - Other provisions

(1) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

(2) If the Contractor is a partnership or a Joint Venture, this agreement must be signed by all partners or JV members.

(3) 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.

(5) In the event of any contradiction between the Integrity Pact and its Annexure, the Clause in the Integrity Pact will prevail.

Section 11- Facilitation of Investigation

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

Section 12- Law and Place of Jurisdiction

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the BUYER.

Section 13 - Other Legal Actions.

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

(For & On behalf of the Principal)

(For & On behalf of Bidder/ Contractor)

(Office Seal)

(Office Seal)

Place -----

Date -----

Witness 1:

(Name & Address)

Witness 2:

(Name & Address)

PROFORMA FOR UNDERTAKING

(To be uploaded by the Bidder on his Letter Head during submission of bid online)

I/We,, Proprietor/Partner/Legal Attorney/Director/
Accredited Representative of M/S., solemnly declare that:

1. Myself/Our Partners/Directors don't has/have any relative as employee of **Central Coalfields Limited.**

Or

The details of relatives of Myself/ Our Partners/ Directors working as employee of Central Coalfields Limited is as follows:

- a. Name of the employee
- b. Place of posting
- c. Department
- d. Designation
- e. Type of relation – Wife/ Husband/ Father/ Step Father/ Mother/ Step-Mother/ Son/ Step-Son/ Son's wife/ Daughter/ Daughter's Husband/ Brother/ Step-Brother/ Sister/Step-Sister

2. *I/We hereby confirm that we have registration with CMPF / EPF Authorities. We shall make necessary payments as required under law.

Or

*I/We hereby undertake that we shall take appropriate steps for registration as relevant under CMPF / EPF authorities, if applicable. We shall make necessary payments as required under law.

*** Delete whichever is not applicable.**

3. ** I/We have not been banned or delisted by any Govt., or Quasi Govt. Agencies or PSUs.

Or

**I / Wehave been banned by the organization named “ _____ ” for a period of..... year/s, effective from to.....

**** Delete whichever is not applicable.**

4. We,.....
.....(Name of Partners of Partnership Firm/Joint Venture), partners of
.....(Name of Partnership Firm/Joint Venture) hereby consent to abide by the provisions of Clause 42 of General Terms and Conditions pertaining to arbitration.

(Note :- Applicable in case of Partnership firm/Joint Venture firm)

5. We certify that the works/services offered by us against the tender for the work “**Survey, Planning, Designing, Drawing and Construction of 5 Nos Sewage Treatment Plant (STP) of different capacity based on Sequential Batch Reactor (SBR) Technology and Sewerage system pipeline network from inside individual house hold/ other buildings in the Colony to STP including all civil, mechanical and Electrical work with boundary wall around the plant including Operation and Maintenance for 04 (four) years at Barka Sayal Area on TURN-KEY basis** “ against NIT No/Tender ID. 10 of 2022-23 dated 13.07.2022/ 2022_CCL_250140_1, meet the minimum local content requirement and has local content:

* Equal to or more than 50% (Select this, in case of Class-I Local Suppliers) i.e.....%
(indicating the percentage of local content)

* More than 20% but less than 50% (Select this, in case of Class-II Local Suppliers)
i.e.....% (indicating the percentage of local content)

***Delete whichever is not applicable.**

Note: If the estimated value of procurement is more than Rs. 10 crores, the bidder shall submit along with this Undertaking, a certificate (with UDIN) from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing chartered accountant or practicing chartered account (in respect of suppliers other than companies) giving the percentage of local content.

6. Certificate regarding compliance to order no.F.No.6/18/2019-PPD dt 23/7/2020 as amended from time to time of Ministry of Finance, Dept of Expenditure, Public Procurement Division with respect to restrictions on procurement of goods, services or works from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries:

I/we 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/we certify that I am/ we are not from such a country or, if from such a country, has/have been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that I/we fulfil all requirements in this regard and I am/ we are eligible to be considered.

(Where applicable, evidence of Competent Authority shall be attached.)

7. If any information and document submitted is found to be false/ incorrect at any time, department may cancel my/our Bid and action as deemed fit may be taken against me/us, including termination of the contract, forfeiture of all dues including Earnest Money and banning of our firm and all partners of the firm etc.

Yours faithfully,

Date :

Signature of Bidder
(In case of Partnership firm/ JV firm, signature of all partners with name)