



BID DOCUMENT

Name of the work:

“AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit”

Cover Page	01 Page
Copy of NIT	02 Pages
Instruction to Bidders	03 Pages
General Conditions of Contract	120 Pages
Special Terms & Conditions of the Contract	10 Pages
Safety, Health & Environment (SHE) Rules & Regulations for Contractors	38 Pages
Scope of Work & Technical Specification	137 Pages
Blank Price Bid	24 Pages

SAFE & CLEAN POWER IS OUR COMMITMENT

ODISHA POWER GENERATION CORPORATION LIMITED

**1b Thermal Power Station, Banaharpali, Jharsuguda – 768234
(ODISHA)**

Email: contract@opgc.co.in



ODISHA POWER GENERATION CORPORATION LIMITED
IB THERMAL POWER STATION
At/PO: BANHARPALI, DIST: JHARSUGUDA – 768 234 (ODISHA)

NOTICE INVITING TENDER

OPGC invites sealed bids from bona fide and financially sound Registered Agencies/Firms/Companies for execution of the following supply/works for its thermal power plant at Banharpali:

WORKS TENDER FOR UNIT-1&2 (NIT No. ITPS/CC-22/2020-21/08, Date: 05 December 2020) (Telephone; 06645-289-23/355/221/245; Email: satya.tarai@opgc.co.in; rabindra.panda@opgc.co.in; siba.pati@opgc.co.in)

S/N	Name of the work	Tender cost	EMD (Rs.)	Contract Period	Bid Sale/ Issue date	Date of receipt & submission /Opening of Bid
1.	AOH of Mechanical Equipments of Turbine Auxiliaries - Unit#1 during 2021	Rs.5600/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020
2.	AOH of Boiler Pressure Parts, Boiler & Turbine etc. of Unit#1 during 2021	Rs.5600/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020
3.	Rental Supply & Installation of Scaffolding Materials during AOH of Unit#1	Rs.5600/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020
4.	AOH of Mechanical Equipments of Ash Handling Plant, BoP etc. of Unit#1	Rs.5600/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020
5.	Repair of Boiler Tube Leakage at ITPS FY- 2020_21	Rs.5600/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020
6.	ARC for Condition Monitoring at ITPS	Rs.5600/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020
7.	AMC for Mechanical Maintenance of Main Plant Unit#1&2 for two years and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW	Rs.11200/- including GST	1% of total quoted price	As per Bid Document	05.12.20 to 28.12.20	Up to 15:00 Hrs on 29.12.2020/ 15:30 Hrs onwards on 29.12.2020

- **The Pre-bid meetings for works at SI No.7 shall be held on dated. 14.12.2020 during 11:00 Hrs to 12:00 Hrs. Interested bidders may also submit their query through e-mail.**
- **e-Reverse Auction (E-RA) shall be conducted for the works at SI. No. 2 & 7 above. The Transaction Fees for e-Reverse Auction shall be deposited to the account of MSTC Limited directly.**

The non-refundable **Transaction Fees towards e-Reverse Auction** as mentioned above shall be deposited by all Techno-Commercially qualified bidders directly to the account of MSTC before E-RA launch schedule. The date of conduct of E-RA shall be intimated in later stage to Techno Commercially qualified bidders via e-mail. Before participation in e-Reverse Auction, the bidder has to register in MSTC e-Procurement Portal well in advance and submit the E-RA fee amounting to the value intimated by M/s. MSTC Limited.

Cost of bid document (non-refundable) shall be paid by Demand Draft in favour of OPGC Ltd. drawn on State Bank of India (Code-9510) / Andhra Bank (Code-0662) / Central Bank of India (Code-283899) payable at ITPS, Banharpali or ICICI Bank, (Code-ICIC0003679) payable at Telenpali. Cost of bid document shall have to be submitted along with the bid and the DD

towards the tender cost (separate from EMD) should be prepared on or before the last date of submission/receipt of tender, otherwise the bid shall be liable for rejection. Small scale industries/National Small-Scale Industries Corporation/ MSME firms are exempted from payment of Cost of bid document only if they are entitled for exemption of the offered service. Tenderers seeking exemption shall claim in advance along with the photocopy of Valid Registration Certificates at least two days before the due submission date. However, OPGC reserves the right to accept/ reject the exemption request if the same is found unauthenticated or not relevant to the offered item. In case of any discrepancy found between tender document submitted by the agency and the master copy in our office, the latter should prevail. No claim on this account shall be entertained. Complete and signed sealed bids in hard copy form only shall be received at Contract Cell, ITPS. Bids shall be opened at Contract Cell, ITPS in the presence of the bidders or their authorized representatives, if present at the time of opening. If the last date of issue / receipt / opening happens to be a HOLIDAY, the tender will be issued/ received / opened at the respective time on the next working day. The photocopies of all the supporting documents required for participating in the tender mentioned in NIT/Tender paper shall be submitted along with the bid; otherwise the bid is liable for rejection. Bids without EMD will be rejected outright.

NB: Bidders having the requisite qualifying requirements as specified in the bid document shall only be considered for tender evaluation.

Bids received after stipulated date & time shall not be entertained. OPGC shall not take any liability on account of any postal/courier delay. OPGC reserves the right to accept / reject any or all tenders, seek additional clarifications, split up the scope among eligible bidders or cancel the tender altogether without assigning any reasons thereof.

Important: The detailed NIT along with Terms and Conditions are available for download at OPGC website at www.opgc.co.in. Addenda/Corrigenda/ Extensions, if any, will be notified on the OPGC website only and will not be published in any other media. Interested companies or entities may visit OPGC website for the tender timeline and other details.

Sd/- AGM-Contracts
(Email: rabindra.panda@opgc.co.in)

SAFE & CLEAN POWER IS OUR COMMITMENT

OPGC encourages all existing or new vendors/suppliers to register with us as empaneled vendors. Please visit our website www.opgc.co.in for details.



ODISHA POWER GENERATION CORPORATION LIMITED
Ib Thermal Power Station, Banaharpali

Name of the work:

“AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit”

Bid Document & Instruction to Bidders

Bid Document

The Bid documents consist of the following documents:

- 1) Copy of NIT
- 2) Instruction to Bidders
- 3) General Conditions of contract
- 4) Special Terms & Conditions of the Contract
- 5) Safety, Health & Environment (SHE) Rules & Regulations for Contractors
- 6) Scope of Work & Technical Specification
- 7) Blank Price bid

The bids complete in all respect must be submitted in two parts namely **Techno-commercial part and Price part**. The envelopes containing the respective parts must be sealed and super scribed with tender enquiry number, Name of the work and the name of the part. Both the envelopes should be kept in a third envelope and sealed and super scribed with tender enquiry number and Name of the work.

NB: The bid documents are not transferable.

Techno-Commercial Bid:

The bidder must submit the following along with the techno-commercial bid:

- 1) EMD as per NIT in a closed envelope. **The EMD amount will not be disclosed to the bidders during opening of Techno-Commercial Bid.**
- 2) Photo copies of GST Registration Certificate, Provident Fund Registration Certificate, ESI Registration Certificate and IT PAN.
- 3) MSME (Micro/small/medium)/NSIC/SSI status of your firm.
- 4) Signed & Stamped Scope of work, signed & Stamped General Conditions of Contract (all pages) and signed & Stamped Special Conditions of Contract as token of acceptance.
- 5) Filled in and signed formats as specified in Annexure of GCC.
- 6) Signed & Stamped Safety, Health & Environment (SHE) Rules & Regulations for Contractors.
- 7) Signed & Stamped Rules and Regulations of the e-Reverse Auction.
- 8) Credentials in support of qualifying requirements.
- 9) Signed & stamped copy of INTEGRITY PACT.
- 10) Commercial terms and conditions and deviation statement.
- 11) Un-priced Bid showing quoted/not quoted.
- 12) Credentials in support of qualifying requirements.
- 13) GST clearance of the previous Quarter in which tender was invited.

Qualifying Requirements:

The bidders must also meet the following **Qualifying Requirements** with respect to the above.

QUALIFYING REQUIREMENT
1. Party must have carried out the Similar work* of Annual Maintenance Contract for the Mechanical Maintenance of Boiler & Air- Preheater, Milling System & Fans, Turbine & Auxiliaries, Ash Handling Plant and BOP Area for Power Plant of capacity greater than 110MW (Or single unit with steaming capacity of 350TPH or above)

AND

2. Must have worked in Govt. / Public sector Power utility

OR

Must have worked in Private IPPs/ CPPs having Station capacity of 1000 MW or above

AND

3. Must have executed Minimum Two Contract works for Similar work of annual maintenance contract of Mechanical Equipment of 110MW (Or single unit with steaming capacity of 350TPH or above) capacity boiler in last five years, out of which at least one Contract work must have been executed within last two years.

AND

4. Safety Requirement- Bidder Loss Time Hours must have been less than 200 Hrs in last 3 years. (Contractor's Self Certification)

AND

5. Must have successfully completed similar nature of jobs during last Five years ending the last day of the month previous to the one in which tenders are invited.

a) At least single contract of value not less than Rs. 2.0 Crore for Similar work.

OR

b) At least of two contracts of value not less than Rs.110 Lakhs each for Similar work

OR

c) At least of three contracts of value not less than Rs.70 Lakhs each for Similar work

AND

6. Minimum Average Annual Turnover of the Bidder shall not be less than Rs 300 Lakhs in last 03(Three) Financial Years.

AND

7. The party should have eligibility to get license of Boiler Repairer & in case awarded the contractor has to obtain the license from F&B Directorate office, Odisha within two month. (Bidder has to submit self-declaration for submission of the same)

*Similar Work – It implies the Annual Maintenance Contract of the following.

1) Boiler & Air- Preheater

2) Milling System & Fans

3) Turbine & Auxiliaries

4) Ash Handling Plant

5) Balance of Plant (Water treatment Plant, CW/BCW/RW pumps, Cooling tower etc.)

The party should have carried out the Annual Maintenance Contract of minimum 3 Sections as mentioned above of which Section -Turbine & aux. is mandatory.

The AMC of 3 sections mentioned should have been executed in single work order or separate work order.

Note:

- **Tenders submitted without the above techno-commercial requirements shall be liable for rejection.**
- **The Techno-commercially qualified bidders will participate in the Reverse Auction through MSTC Limited. The price may be finalized based on Reverse Auction or Sealed Price Bid. This will be decided after techno-Commercial Evaluation. All Bidders have to give their acceptance for participating in Reverse Auction as per "Rules and Regulations of the e-Reverse Auction" which shall be binding on the bidders. Non Acceptance to participate in Reverse Auction may result in non-consideration of their bids, in case OPGC decides to go for reverse auction.**
- **The bidders who are found qualified in above will be invited for the opening of the price bids.**

Price Bid

- 1) Original price bid duly filled in, signed & stamped on each page shall be submitted. Any breakup (if required) must be submitted separately. The rates offered by the bidder shall be clearly written in English (clearly handwritten or typed) both in words and figures and shall be free from any aberrations, deletions, corrections and overwriting. In case of any illegibility of the offer submitted by bidder the interpretation by OPGC shall be final and binding on the bidder.
- 2) Insertion, postscript, addition and alteration shall not be accepted after submission of the bid.

- 3) The quoted price shall be **all-inclusive basis except GST** (Taxes, duties, other government levies except GST etc.) and shall remain firm during entire tenure of the contract and shall not be revised under any circumstances for whatsoever reason except as given in (4) below. GST applicability and rate of GST should be shown separately and shall be paid against documentary evidence.
- 4)
 1. Any increase / decrease in the GST, Cess and other taxes thereon will be reimbursed / adjusted as per actual against documentary evidence.
 2. Additional amount due to imposition of new tax by Govt. relevant to this work will be reimbursed by OPGC as per actual against documentary evidence.
 3. Any change in Income Tax will be borne by the Contractor.
 4. Quoted rate (valid on the date of opening of tender) shall be treated as base price and **all-inclusive basis except GST**.
 5. Any additional payment due to change in tax structure will be admissible if the change is effective during the scheduled completion period. No such extra payment shall be made beyond the stipulated completion date if the delay is due to the fault of the contractor. No claim shall be admissible after completion of work.
- 5) No deviation shall be allowed in the price bid.
- 6) In the Price Part, the bidder must also submit a CD containing the soft copy of price bid (with detailed item wise quoted prices) in Excel format (non-pdf) along with the signed & stamped hard copy of price bid. The prices quoted in the hard copy of price bid shall be taken as final & binding.

Instruction to the Bidders

- a) **Small scale industries/National Small Scale Industries Corporation/ MSME firms shall be exempted from payment of Earnest Money Deposit/Security Deposit/Tender Fees only if they are entitled for exemption of the offered service. Tenderers seeking exemption shall claim in advance along with the photocopy of Valid Registration Certificates at least two days before the due submission date. However, OPGC reserves the right to accept/ reject the exemption request if the same is found unauthenticated or not relevant to the offered item.**
- b) Bidders are advised to submit the tender based strictly on the terms and conditions and specifications contained in the tender documents and not stipulate any deviations in normal case.
- c) OPGC reserves the right to evaluate the quotation on such deviations having financial implications by adding the cost determined by OPGC.
- d) Wherever it is mentioned in the specification that the contractor shall perform certain work or provide certain facilities, it is understood that the contractor shall do so at his cost.
- e) Before quoting the rates the Bidder should go through the specifications, scope of work etc. and get himself fully conversant with them. The bid should **include cost of mobilization and cost to adhere to all safety norms** as described in the tender. No relaxation or request for revision of quoted/accepted rates shall be entertained subsequent to the opening of bid on account of mobilization or Safety costs.
- f) The details of items in the price schedule shall be read in conjunction with the corresponding technical specifications. Items of work provided in the price schedule but not covered in the technical specifications shall be executed strictly as per instructions of Engineer in charge.
- g) The Bidders shall quote rates inclusive of the complete cost towards consumables, tools and tackles, equipments, labour, levies, taxes and duties if any, all safety PPE's as per OPGC norms to all workmen, rectification, maintenance till handing over, supervision overheads, profits and all incidental charges not specifically mentioned but reasonably implied and necessary to complete the work according to contract.
- h) Bidder shall also indicate the cost of PPEs (in %) included in the Price Bid.
- i) OPGC reserves the rights to split the scope & quantity to more than one agency among the bidders.
- j) OPGC reserves the rights to cancel the tender without assigning any reasons thereof.
- k) OPGC reserves the rights of accepting the whole or any part of the tender and bidder shall be bound to perform the same at their quoted rates.

Disclaimer:

These documents are published in our website only for the purpose of bidders interested to participate in the Tender. OPGC shall not be held responsible in any manner in the event of any unauthorized usages of these documents other than the intended purpose.

GENERAL CONDITIONS OF CONTRACT



**ODISHA POWER GENERATION CORPORATION LIMITED
7TH FLOOR, ZONE – A, FORTUNE TOWERS,**

***CHANDRASEKHARPUR, BHUBANESWAR – 751 023
(ODISHA)***

ODISHA POWER GENERATION CORPORATION LIMITED

7TH FLOOR, ZONE – A, FORTUNE TOWERS,
CHANDRASEKHARPUR, BHUBANESWAR - 751 023

INSTRUCTION TO BIDDERS

VOLUME-I

INDEX

	<u>Page</u>	
	From	To
1. COVERING LETTER	10	--
2. NOTICE INVITING TENDER	11	13
3. PROFORMA OF LETTER OF UNDERTAKING	13	14
4. INSTRUCTIONS TO BIDDER	15	20

**ODISHA POWER GENERATION CORPORATION LTD
IB THERMAL POWER STATION
BANHARPALI-768234, DIST. JHARSUGUDA**

**TENDER
FOR**

Name of the work: "AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit"

1. To be submitted by **03:00 P.M. of dt. 29/12/2020** to Contract Cell, ITPS, Jharsuguda.
2. Techno-commercial bids to be opened in presence of Bidders or their duly authorized representatives who may like to be present **at 3:30 P.M. onwards on dt.29/12/2020** in the office of **Contract Cell, ITPS.**

Issued to M/s

Signature of officer issuing the documents... **Sd/-**

Designation: **AGM - Contracts, ITPS.**

Date:

**ODISHA POWER GENERATION CORPORATION LTD
IB THERMAL POWER STATION, BANHARPALI**

NOTICE INVITING TENDER

1. Tenders are invited on behalf of the OPGC Ltd. for the work **“AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit”**
2. The Tender & rates shall be in the prescribed form provided by OPGC.
3. The works are required to be completed as per SCC, in accordance with phasing, if any, indicated in the Tender documents.
4. Normally Bidders having corresponding class of license, PF Code, IT PAN and **GST Registration Certificate**, expertise for the work required to be executed and financial capacity will be considered.
5. The person who floats the NIT shall be the Accepting Authority herein after referred to as such for the purpose of this Tender.
6. A Bidder shall produce Income Tax PAN, **GST** registration certificates and PF Registration number.
7. Tender documents consisting of plans, drawings, specifications, Schedule(s) of Quantities / Price Schedule of various classes of work to be done, the Conditions of Contract and other necessary documents will be sold (**soft copy only**) on payment of **Rs. 11,200/- (inclusive of GST)** in shape of Demand Draft in favour of Odisha Power Generation Corporation Ltd. drawn on State Bank of India (Code-9510) / Andhra Bank (Code-0662) / Central Bank of India (Code-283899) on or after **05/12/2020** up to **28/12/2020**. Cost of tender paper is not refundable.
8. Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their Tenders as to the nature of the ground and sub-soil (so far as is practicable and related to particular work), the form and nature of the site, nature of work, capacity of concerned plant, present condition of the plant, labour force problem relating to present Contract labour, custom & system of the local folk, means of access to the site, accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their Tender. A Bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed.
9. Submission of a Tender by a Bidder implies that he has read this notice along with the notice inviting tender advertised in the newspaper and all other tender documents and has made himself aware of the scope and specifications of the work to be done and of local conditions and other factors bearing on the execution of the works.
10. A Bidder should quote his rates in figures as well as in words. The amount for each item should be worked out and the requisite totals given. Special care shall be taken to write rates in figures as well as in words, and the amounts in figures only in such a way that interpolation is not possible. The total amount shall be written both in figures and in words. In case of figures, the words ‘Rs.’ should be written before the figure of rupees and the words ‘Paise’ after the decimal figures, e.g. Rs.2.15 P. In case of words, the words ‘Rupees’ should precede and the words ‘Paise’ should be written at the end. Unless the rate is in whole rupees and followed by the word ‘Only’ it should invariably be up to two places of decimal.

11. In the case of item rate Tenders, only rates quoted shall be considered. Any Tender containing percentage below / above the schedule of rate quoted is liable to be rejected. In case of lump sum tenders, only quoted amount shall be considered.
12. Any Bidder for the works shall not be witness in the Bid of any other Bidder for the same works. Failure to observe this condition shall render the Tender of the Bidder tendering as well as of those witnessing the Tender liable for rejection.
13. Tender shall be received **up to 3:00 PM of dt. 29/12/2020** and shall be opened at **03:30 P.M onwards on the same day** in the presence of those Bidders or their duly authorized representatives who may like to be present.
14. The Tender shall be accompanied by Earnest Money worth **1% of the First Year quoted price**. The Earnest Money offered shall be in shape of Demand Draft / Pay Order in favour of Odisha Power Generation Corporation Ltd drawn on State Bank of India (Code-9510) / Andhra Bank (Code-0662) / Central Bank of India (Code-283899) **or Bank guarantee issued by any Nationalized /scheduled Bank in the enclosed proforma**.
- 15.1 The Tender shall be accompanied with letter of undertaking on non-judicial stamp paper of appropriate value in the prescribed format.
- 15.2 The Earnest Money shall be made payable without any condition/demure to the Owner on demand. The Earnest Money shall be valid for a period of **Three (03) calendar months** from the date of opening of the bid.
- 15.3 In consideration of the Owner opening and considering the Tender for purpose of award of Contract, the Bidder shall keep his Tender valid for a period of **one hundred eighty (180) days** from the date of opening of the Tender, during which period the Bidder agrees not to vary, alter or revoke his Tender either in whole or in part. If the Bidder however, fails to keep his Tender valid for one hundred eighty (180) days or varies its terms and conditions during the said period then the Owner shall be entitled to forfeit the Earnest Money amount without any notice or proof of damages etc. The Bidder shall submit his Tender as required in the Tender documents along with letter of undertaking in the proforma enclosed herewith.
- 15.4 The Earnest Money of all unsuccessful Bidders will be returned within thirty (30) days after the award of the Contract.
- 15.5 Any Tender not accompanied with **both Earnest Money and letter of undertaking or any of the two** in accordance with aforesaid provisions shall be rejected by the Owner as non-responsive Bid.
- 15.6 No interest will be payable by the Owner on the said amount covered under Earnest Money / other security deposits.
15. On finalization of Tender, Earnest Money of successful Bidder will be treated as part of the initial security at the option of the said Contractor or shall be returned to the successful bidder at his option.
16. A Bidder shall submit the Tender which satisfies each and every condition laid down in this notice and other tender documents, failing which the Tender will be liable to be rejected.
17. The Odisha Power Generation Corporation Ltd. do not bind themselves to accept the lowest or any Tender or to give any reasons for their decision. The Owner reserves the right to allow the Public Sector Undertakings price preference facilities as admissible under existing Govt. policy. The prospective Bidders may apprise themselves of the relevant Govt. notification in this regard before submission of their bid. The Odisha Power Generation Corporation Ltd. reserves the right of accepting the whole or any part of the Tender or split the total scope of work among eligible Bidders and Bidder (s) shall be bound to perform the same at his/their quoted rates.

18. GST, VAT / Sales Tax / Work Contract Tax or any other tax on materials in respect of this Contract shall be payable by the Contractor and the Owner will not entertain any claim whatsoever in this respect.

For and on behalf of Odisha Power Generation Corporation Ltd.

Signature...**Sd/-**

Designation: **AGM-Contracts, ITPS.**

Date:

PROFORMA OF LETTER OF UNDERTAKING TO BE SUBMITTED BY THE BIDDER ALONG WITH HIS
TENDER.

(To be executed on non-judicial stamp paper of requisite value)

Ref:

Date:

To

Odisha Power Generation Corporation Ltd.,
IB Thermal Power Station,
Banharpali.

(Hereinafter referred to as the Owner)

I/We have read and examined the following documents relating to

(Name of the works)

- (a) Notice inviting Tender
- (b) Format for Letter of undertaking
- (c) General Conditions of Contract including Contractors Labour Regulations, Model Rules for Labour Welfare, Safety Code, schedule A & B Annexure I to XVII.
- (d) Special Conditions of Contract including Scope of Work
- (e) Price Schedule / Bill of Quantities
- (f) Technical Specifications.
- (g) Drawings.

I/We hereby tender for execution of the works referred to in the aforesaid documents upon the terms and conditions contained or referred to therein and in accordance in all respects with the specifications, designs, drawings and other relevant details contained in Schedule of Quantities / Price schedule attached with the tender documents and the period (s) of completion as stipulated in Schedule 'A' of General Conditions of Contract.

In consideration of I/We being invited to Tender, I/We agree to keep the Tender open for acceptance for 180 days from the due date of opening of bid thereof and not to make any modifications in its terms and conditions which are not acceptable to the Owner.

A sum of Rs..... is hereby forwarded in shape of Demand draft drawn on State Bank of India (Code-9510) / Andhra Bank (Code-0662) / Central Bank of India (Code-283899) or Bank **Quantity Variation** issued by any Nationalized/Scheduled Bank in the enclosed proforma as Earnest Money in the manner prescribed in clause 15 of NIT enclosed herewith. If I/We fail to keep the Tender open as aforesaid or make any modifications in the terms and conditions of the Tender, which are not acceptable to the Owner, I/We agree that the Owner shall, without prejudice to any other remedy, be at liberty to forfeit the said earnest money absolutely. Should this Tender be accepted, I/We hereby agree to abide by and fulfill all the terms, conditions and provisions of the aforesaid documents.

If, after the Tender is accepted, I/We fail to commence the execution of the works as provided in the conditions, I/We agree that the Owner shall without prejudice to any other right or remedy be at liberty to forfeit the said earnest money absolutely.

Signature of Bidder

Duly authorized to sign the Tender on behalf
of the (in block capitals).....

.....
Dated.....
Postal Address.....
Telegraphic Address.....
Telephone No.....
Fax No.....
E-mail address

Witness.....

Date.....

Address.....

INSTRUCTION TO BIDDER (S):

1.1 Site visit & collection of information:

The Bidders are advised to visit the site, collect information regarding communication, transportation, banking facility, availability of skilled / unskilled labours, their customs, religious or otherwise culture, political environment, climatic conditions, education & medical facilities etc. to their satisfaction and acquaint with the nature & condition of work prior to working out the price of the Tender.

1.2 Bidders are advised to submit Tenders based strictly on terms & conditions and specification contained in the tender documents and not stipulate any deviations. Should it however become unavoidable, deviations should be stipulated in the prescribed proforma only in the format in annexure VII of G.C.C. Owner reserves the right to evaluate the Tenders containing deviations by loading or offloading the cost of such deviations.

1.3 Addenda / Corrigenda issued to this tender must be signed & submitted with tender on due date or on extended date if any. The Bidder should write clearly the revised quantities on the Schedule of original Tender Documents and should price the work based on revised quantities / conditions. All those who were issued tender documents prior to issue of addenda / corrigenda shall be provided with another set of fresh blank price schedule / schedule of items free of cost. The Bidders shall submit their tender in the fresh schedule. But however if the Bidder has already submitted his tender prior to issue of such addenda / corrigenda, they shall resubmit a fresh offer marked on the envelope as "Amended Offer". The original offer submitted by such party shall be destroyed in presence of the Bidder on the date of opening.

1.4 Preparation of Bid:

The Bidder(s) shall submit the bid in two parts, namely-

- 1) Part-I : Techno commercial Bid
- 2) Part-II : Price Bid

PART-I: TECHNO-COMMERCIAL BID

A complete set of original Tender documents as specified in clause 3.1 of G.C.C. issued to the Bidder except blank price bid / bill of quantity duly filled in as prescribed in different clauses of the Tender documents with signature & stamp in all pages as token of unconditional acceptance shall constitute Techno-commercial Bid.

The Bidder shall enclose the following documents in this Bid.

- a) Crossed Demand Draft for requisite amount only drawn in favour of Odisha Power Generation Corporation Ltd or Bank guarantee issued by any Nationalized Bank/scheduled Bank in the enclosed proforma in the manner prescribed in clause-15 of NIT enclosed herewith towards the Earnest Money without which the Tender shall be liable for summarily rejection.
- b) Details of work of similar nature and magnitude executed by the Bidder during last three years (Works executed in name of Bidder) in Annexure-I of G.C.C.
- c) Details of present commitments of the Bidder in Annexure-II of G.C.C.
- d) Details of equipments in Annexure-III of G.C.C.

- e) Organization chart showing number of qualified Engineers and Supervisory personnel in the roll of the firm in Annexure-IV of G.C.C.
- f) Duly filled in information about Bidder as per Annexure-V of G.C.C.
- g) List of enclosures as per Annexure-VI of G.C.C.
- h) Exception & deviation statement in Annexure-VII of G.C.C.
- i) Details of proposed organization in Annexure-VIII of G.C.C.
- j) Documents showing annual turnover in Annexure-IX of G.C.C.
- k) Photocopy of Sales Tax Registration Certificate, valid VAT/Sales Tax Clearance Certificate and Income Tax PAN.
- l) Photocopy of P.F. Registration Certificate and GST registration Certificate of appropriate category issued by competent authority.
- m) Photocopy copy of the Registration of Firm / Company.
- n) Present & permanent Address for correspondence along with Telephone No./Fax No./E-mail address etc.
- o) Any other technical information, Bidder wishes to furnish.
- p) Letter of undertaking in judicial stamp paper of worth Rs.5.00 in the format enclosed.
- q) Documents in support of authentication of the person who signed the tender. Only proprietor, partner, directors or permanent employee with due power of attorney is recognized for such signature.

Note: If required additional sheet may be used to furnish all above information but in the format provided in General Conditions of Contract.

The techno-commercial bid with all its enclosures as mentioned in clause 1.4 should be put in an envelope, sealed & superscribed as "TECHNO-COMMERCIAL BID". This envelope must contain Name of the work, NIT No., Due date of opening and Name & Address of the Bidder on bottom left hand corner of the cover.

PART-II: PRICE BID

Price bid shall include -

- a) Original price bid / schedule of quantity duly filled in, signed & stamped on each page as token of unconditional acceptance shall constitute the Price Bid. The Bidder shall take utmost care in filling the tender documents corresponding to instruction to Bidder and relevant information elsewhere in Tender document.
- b) Price Bid shall be completed in all respects with all their attachments / enclosures, if any.

- c) The price bid shall be prepared in the manner prescribed in various clauses of Tender document and put in a separate sealed envelope super scribed as "PRICE BID". This envelope must contain Name of work, NIT No. at the top and Name & Address of the Bidder on left hand bottom corner of the cover.

1.5 COMPLETE BID:

Both the Techno-commercial & Price Bid in separate sealed cover shall be put in a third envelope, sealed & superscribed with Name of the Work, NIT No., Due date of opening. The full name, postal address, telegraphic address and telex/telephone/fax/E-Mail of the Bidder shall be written on the bottom left corner of the envelope.

1.6 SUBMISSION OF BID:

Completed Bid shall be submitted to the Owner within due date and during office hours only. The Tenders shall be put into a box, marked as Tender Box or handed over to Contract Cell against receipt of the same.

1.7 OPENING OF TENDER:

The techno-commercial bid shall be opened at a predetermined time, venue & date in presence of the Bidder(s) or their authorized representative who may like to be present. Partner, director or permanent employee of the firm duly authorized can only be authorized representative.

Price bid shall be opened at a future date under intimation to all technically qualified Bidders and in presence of them or their authorized representatives who shall participate.

1.8 CAUTION TO BIDDER:

The person who shall come to purchase tender documents, submit the Tender or participate in the opening of the Tender must abide by the safety rule of OPGC right from the plant gate. Some of the checkpoints are, the vehicle must have valid insurance & tax paid road permit, valid driving license of the driver / Owner as the case may be. Persons with full shoes shall be allowed to enter the plant & our plant gate shall provide other items such as hard hat, safety glass & visitor pass. Not more than 2(two) persons for one Tender shall be allowed to participate in Tender opening.

1.9 ALL PAGES TO BE INITIALED:

All the pages of Tender documents shall be initialed. But first & last pages of all volumes of documents shall be signed with date by the Bidders or their authorized representatives.

1.10 RATES TO BE IN FIGURES & WORDS:

The Bidder shall quote both in figures and in words for the rates and amount tendered by him in the Schedule of quantities / Price schedule forming part of the Tender document, in such a way that interpolation is not possible. The amount of each item shall be worked out and entered and requisite total given for all items. The tendered amount for the work shall be entered in the Tender and duly signed by the Bidder.

If any ambiguities are observed in the rates & amount given in words & figures the following procedure shall be followed:

- a) When there is difference between the rates in figures and words, rate which corresponds to the amount worked out by the Bidder, shall be taken as correct.
- b) When the rate quoted by the Bidder in figures and words tally but the amount is incorrect, the rate quoted by the Bidder shall be taken as correct but not the amount.

- c) When it is not possible to ascertain the correct rate by either of above methods, the rate quoted in words shall be taken as correct.

1.10.1 The Bidder shall quote in English language only.

1.11 CORRECTIONS & ERASES:

No erases or over writings are permissible. All corrections and alterations in the entries of tender papers shall be signed by the Bidder with date.

1.12 DETAILS & SIGNATURE OF BIDDER:

1.12.1 The Tender shall contain the name, residence and place of business of person or persons making the Tender and shall be signed by the Bidder with his usual signature. Partnership firms shall furnish the full names of the partners in the Tender. It should be signed in the partnerships name by all the partners or by duly authorized representative followed by the name and designation of the person signing. Tender by a Corporation shall be signed by an authorized representative and a power of attorney / authorization on its behalf shall accompany the Tender. A copy of constitution of the firm with names of all partners shall be furnished. In case of cooperative society, the authorized representative of the society will sign the Tender. Similar principle shall be followed in case of any Trust and Hindu Undivided Family business.

1.12.2 When the Bidder signs a Tender in a language other than English, the total amount tendered or only rate quoted in maintenance Contract in addition be written in the same language. The signature should be attested, at least by one witness.

1.13 ABNORMAL RATES:

The Contractor is expected to quote the rate for each item after careful analysis of cost involved for the satisfactory performance and completion of item work considering all specifications and conditions of Contract. This will avoid loss of profit or gain in case of curtailment or change in specification for any other item. In case the rates quoted by the Bidder's for any item are unusually high or unusually low it will be sufficient cause for the rejection of the Tender unless the Owner is convinced about the reasonableness of the analysis for rate furnished by the Bidder (on demand) after scrutiny.

1.14 THE SCHEDULE:

1.14.1 The work shall be executed strictly as per the Time Schedule, indicated in the tender documents.

1.14.2 Monthly / weekly work programme will be drawn up by the Contractor before commencement of work & submitted to Engineer-in-charge for approval. The programme & progress will be reviewed from time to time and if required, the programme may be re-scheduled by Engineer-in-charge. The Contractor shall also be responsible to provide materials within his scope in time to achieve the programme. In all matters concerning the extent of programme set out weekly and monthly, the decision of the Engineer-in-charge will be final and binding on the Contractor.

1.15 RECORD KEEPING:

Relevant records are to be maintained by the Contractor in day-to-day / monthly basis & furnished to Engineer-in-charge or his representative for scrutiny, Management Information System and payment etc.

ODISHA POWER GENERATION CORPORATION LIMITED

7TH FLOOR, ZONE – A, FORTUNE TOWERS,
CHANDRASEKHARPUR, BHUBANESWAR - 751 023

GENERAL CONDITIONS OF CONTRACT

VOLUME-II

INDEX

Section	Description	Page	
		<u>From</u>	<u>To</u>
I.	General	22	25
II.	Definition & interpretation	26	30
III.	General information to Bidders	31	36
IV.	General obligations / general conditions	36	56
V.	Scope & Performance of work	56	60
VI.	Certificate and payment	60	66
VII.	Statutory obligation	67	68
VIII.	Labour Laws	69	78
IX.	Safety provisions	79	90
X.	Penalty	91	92
XI.	Arbitration & Jurisdiction of Court	93	94

SECTION-I

1.0 GENERAL

Odisha Power Generation Corporation Limited is a Govt. of Odisha undertaking and Ib Thermal Power Station, Banharpali is one of its units. At present AES Corporation, USA has 49% stake in Odisha Power Generation Corporation Limited. The Ib Thermal plant is situated close to Hirakud reservoir and at a distance of 40 Kms from Jharsuguda Railway Junction and 18 Kms from Belpahar Railway Station in the state of Odisha both on S.E. Railways. ITPS is at present operating 2x210 MW coal based power plant. The management is looking forward to engage a bonafide, resourceful, potential and experienced Contractor of good financial capacity for the jobs specified in Special Conditions of Contract in Volume-III.

- 1.1 One set of Tender document shall be issued to each Bidder. Bidders shall be required to submit the Tender duly signed and stamped in all pages of the document along with their offers. All Tenders shall be prepared and submitted by typing or printing with indelible black ink on white paper in consecutively numbered pages and in solid binding along with duly filled-in formats given in the Annexure. One additional booklet (Volume-IV) containing the bill of quantities / price bid as issued to be submitted by the Bidder in two copies in the price bid part.
- 1.2 The tender document is not transferable. Transfer of tender documents issued to one Bidder to another is not permissible. Similarly, transfer of Tender submitted by one Bidder to another party is not permissible. The alteration of Tender once submitted shall not be entertained except in case of issue of Addenda / Corrigenda.
- 1.3 Tender shall be submitted under a covering letter indicating clearly the summary of tender chapters with annexure / schedules of the complete Tender.
- 1.4 Insertion, postscript, addition and alteration shall not be accepted unless confirmed by the Bidder's signature.
- 1.5 All the copies of Tender shall be complete in all respects with all their attachments/enclosures.
- 1.6 The Bidder shall satisfy the Owner that the firm represented possesses the necessary experience and that he has at his disposal suitable modern facilities and specialized employees to ensure that his work is of best quality and workmanship is according to the latest proven technology and engineering practices. The Bidder shall satisfy the Owner that he is financially in a position to fulfill Contractual obligations, offered to be undertaken by him.
- 1.7 Bidder's complete offer (all the parts) shall be prepared and submitted in double sealed envelope with Name of the work, NIT No. & date and Due date super scribed prominently on the outside of the envelope:

The full name, postal address, telegraphic address and telex/ telephone/ fax / E-mail address of the Bidder shall be written on the bottom left corner of the sealed envelopes.

- 1.8 **SCOPE OF WORK AND PARTICULARS TO BE FURNISHED IN THE TENDER:**
- i) The work shall be carried out on item rate basis / job rate basis for which schedule of quantities / blank price schedule have been issued for different items of work as defined in the scope of work, technical specification in Special Conditions of Contract.
 - ii) The Tender not covering the total scope of work and services as detailed out in tender documents is liable for rejection.
- 1.8.1 The Bidder shall carefully check the enclosed Technical Specifications and shall satisfy himself as to the suitability of the work as given in the Technical Specifications and shall take full responsibility for the completion of work as per defined scope.
- 1.9 **PRICE QUOTATION:**
- 1.9.1 The Bidder shall quote his price against each item of the schedule as indicated in Schedule of Quantities / Blank price schedule enclosed with technical specification, both in figures and in words clearly.
- 1.9.2 Rates shall be quoted both in figures & in words in clear legible letters. No overwriting is allowed. All scoring and cancellation should be countersigned by the Bidder. In case of illegibility, the interpretation of Owner shall be final.
- 1.9.3 Bidder shall quote rates against the items in the schedule of items for the work / price schedule as fully described and contained therein. No modifications to the work content in the items will be allowed.
- 1.9.4 The offered unit rates shall remain **FIRM** for variation in completed value of the Contract including the cost of additional / altered / new items of work to any extent.
- 1.9.5 Any request from the Bidder in respect of additions, alterations, modifications, corrections etc. of either terms and conditions or rates of his Tender after opening of Tenders may lead to rejection of his Tender.
- 1.10 **RECEIPT OF TENDER:**
- Tender shall be received at the office of concerned Engineer-in-charge / Contract cell as per advertisement. The Bidder has the option of sending the Tender by Registered Post or submitting the Tender in person, so as to reach the Engineer-in-charge / Contract cell as the case may be on or before the date and time set out for the same in the Invitation to Tender. Tender submitted by FAX/TELEX/TELEGRAM/ E-mail shall not be accepted.
- 1.11 **TENDER OPENING:**
- The Tender will be opened in the manner and at the time, date and place set for opening of Tenders as described in the Notice Inviting Tender/ Special Conditions of Contract.
- 1.12 **LANGUAGE TO BE USED IN FILLING OF BID DOCUMENTS:**
- The Tender shall be submitted in English language only.
- 1.13 **EARNEST MONEY:**
- Bidders shall submit Earnest Money of value as specified in Special Conditions of Contract / NIT and in the manner prescribed in clause-15 of Notice Inviting Tender. Earnest Money shall be returned to the unsuccessful Bidders at the expiry of the validity period unless otherwise extended or on finalization of the Contract. Earnest Money of the successful Bidder shall be returned after he furnishes the initial Security Deposit and Contract is signed. No interest shall be paid on Earnest Money. E.M.D. shall not be accepted in any other form than as mentioned above and the Tender shall be summarily rejected without E.M.D. The

E.M.D. shall be returned in form of A/c payee cheques / D.D. Bank charges shall be to the accounts of Contractor if D.D. is required.

1.13.1 Forfeiture of E.M.D. & rejection of Bid, if-

- a) The Tender is revoked during its validity period.
- b) The prices are increased unilaterally after the Tender opening and during validity of offer.
- c) The Owner accepts the Bidder's bid proposal and the Bidder refuse to enter into Contract after the Contract is awarded to him.
- d) The Bidder fails to submit initial Security Deposit within the period specified in Special Conditions of Contract.

1.14 **NO CLAIM OR COMPENSATION FOR SUBMISSION OF TENDER:**

The Bidder whose Tender is not accepted shall not be entitled to claim any costs, charges and expenses incidental to or incurred by him through or in connection with his submission of Tender or its consideration on the Owner, even though Owner may modify / withdraw the Invitation to Tender or does not accept the Tender.

1.15 **INCOME TAX PAN & SALES TAX CLEARANCE CERTIFICATE AND P.F. CODE:**

Bidder shall furnish the Income Tax PAN and valid Sales Tax clearance certificate issued by the concerned authority & P.F. Code with the Technical Bid of the Tender.

1.16 **NOTICE ON BEHALF OF OWNER:**

All notices of technical / commercial nature shall be issued by the Engineer-in-charge from time to time after LOI is released till closure of Contract.

1.17 **SITE INFORMATION & LOCAL CONDITIONS:**

1.17.1 **Site information**

Information regarding the work site, plant capacities, location, approach to site and metrological condition, work culture etc. as prevailing at the site can be obtained by the Bidders by site visit & interaction with Engineer-in-charge or others.

1.17.2 **Local Conditions**

It is suggested that the Bidder must visit the site and shall satisfy and acquaint himself of the site condition and shall appraise himself of the procedure for engagement of labour and shall collect any other information which may be required before submitting the Tender.

1.17.3 **Claims and objections due to ignorance of site conditions will not be considered after submission of Tender.**

The Bidder shall be deemed to have visited and carefully examined the site and surroundings, to have satisfied himself about the nature and details of all existing infrastructures and also as to the nature and conditions of the plant and equipment installed, means of transport and communications, whether by land, water or air and as to possible interruptions thereto and ingress & exit from the site, to have made independent enquiries, examined and satisfied himself as to the sites for disposal of surplus materials and debris, the available accommodation, and all other similar matters which may affect the work.

- i) The Bidder shall be deemed to have acquainted himself of Government taxes, laws, statute, regulations, levies and other charges relating to his work at site.

- ii) Any neglect or omission or failure on the part of the Bidder in obtaining necessary and reliable information as stated above or on any other matter affecting the Bidder shall not relieve him from any risks or liabilities or the entire responsibility for completion of the work in accordance with the Tender Documents.

1.18 OTHER CONDITIONS:

The Bidder is required to carefully examine the General Conditions of Contract, Special Conditions of Contract, the Technical Specification, drawings and other details relating to work and given in the tender documents and fully acquaint himself as to all conditions and matters which may in any way affect the work or the cost thereof. The Bidder shall be deemed to have on his own and independently obtained all information for the purpose of preparing the Tender and his Tender as accepted shall be deemed to have taken into account all contingencies as may arise due to such information or lack of the same.

- 1.18.1 The Bidder shall be deemed to have exhaustively examined the tender documents including the General Conditions of the Contract, Special Conditions of Contract, Technical Specifications to have obtained all information and clarifications on all matters whatsoever that might affect the carrying out the work and to have satisfied himself as to the adequacy of his Tender. He is deemed to have known the scope, nature and magnitude of the work and the requirements of materials and labour involved etc. and as to all work he has to complete in accordance with the Contract whatever be the defects, omissions or errors that may be found in the Tender Documents.

- 1.18.2 In case of conflict between the conditions given in the Special Conditions of Contract / Technical Specification and the General Conditions of the Contract, the conditions given in the technical specification shall prevail over the General & Special conditions of the Contract.

1.19 SAFETY MEASURE:

The Contractor has to abide by the Owner's safety rules in vogue at the time of Tendering and enforcement of any additional rules from time to time during the Contract period and its extension if any.

1.20 STATUTORY PROVISION:

All statutory provisions like Contract Labour Acts, Employees Provident Fund Acts, Payment of Wage Act, Bonus Act, Minimum Wages Act, Workman Compensation Act, Sales Tax/Income Tax Acts at the time of submission of Contract and any new Acts applicable to such Contract / Contract labour during the Contract period shall be liability of the Contractor.

1.21 EXECUTION OF CONTRACTS:

- 1.21.1 After LOI / Work Order is accepted by the Contractor, Contract will be executed by and between Owner and the Contractor within 30 days as per prescribed proforma provided by OPGC. The agreement shall be executed on non-judicial stamp paper of appropriate value purchased in the State of Odisha.

End of Section-I

SECTION-II

2.0 DEFINITIONS AND INTERPRETATIONS

The following words and expressions (as hereinafter defined) shall have the meanings hereby assigned to them except where the context otherwise requires.

- 2.1 "Accepting Authority" shall mean the authority mentioned in Schedule 'A'.
- 2.2 The 'Alteration / Variation of Order' means an order given in writing by the Engineer-in-charge to effect additions to or deletions from or alteration in the Works.
- 2.3 'Approved' shall mean approved in writing including subsequent written confirmation of previous verbal approval and 'Approval' means approved in writing including as aforesaid.
- 2.4 'Bidder' means a person or group of persons or a company who offer rates under certain conditions with an intention of performance against any invitation to Tender if accepted by the person inviting Tender.
- 2.5 The 'Completion Certificate' shall mean the certificate to be issued by the Engineer-in-charge certifying that the work is completed in all respect commensurate to the provisions of Contract & to his satisfaction.
- 2.6 'Constructional plant' shall mean all equipments, materials, appliances or things of whatsoever nature required for execution, completion or maintenance of the works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
- 2.7 The 'Contract' shall mean enforceable agreement between the Owner and the Contractor for execution of the works including therein collectively all documents such as: -
- i) General Conditions of Contract
 - ii) Special Conditions of Contract including Scope of Work, Price Schedule / Bill of Quantities, Technical Specification & Approved Work Schedule.
 - iii) Agreed Statement of Deviation
 - iv) Field Quality Assurance Plan
 - v) Drawings if provided
 - vi) LOI / Work Order
 - vii) All relevant correspondence having bearing on Tender between Bidder & Owner before acceptance of Tender.

All the above documents are complementary to each other.

- 2.8 The 'Contractor' shall mean the successful Bidder whose Tender has been accepted by Owner and LOI accepted by the successful Bidder and includes his/their/its legal representative(s), successor(s) and permitted assignee(s).

'Contractor' is a person/firm/company in relation to any establishment who undertakes to produce a given result for the establishment other than a mere supply of goods or articles of manufacturer to such establishment through Contract labour or who supply Contract labour for any work of the establishment and includes a subcontractor or agent as the case may be.

- 2.9 All functions pertaining to the operation of Contract means all acts, such as planning, scheduling, testing, measuring, certification of bill, closing of Contract etc., directing, issue of spares & consumables and controlling the activities of Contractor necessary for execution of the Contract and coordinating between the functioning agency & Owner or his functionary representative.
- 2.10 'Day' means a day of 24 hours from midnight irrespective of the number of hours worked in that day. However, for the purpose of work involving shift working "Day" means a day of 24 hours from 6 a.m. to 6 a.m. next.
- 2.11 'Drawings' shall include maps, plans and tracings or prints thereof with any modification approved in writing by the Engineer-in-charge and such other drawings as may from time to time, be furnished or approved in writing by the Engineer-in-charge.
- 2.12 The 'Engineer-in-charge' or 'Officer-In-charge' shall mean the engineer / person as the case may be nominated by the Owner from time to time and shall include those who are expressly authorized by the Owner to act for and on his behalf for all functions pertaining to operation of the Contract.
- 2.13 'Excepted Risks' are risks due to riots (otherwise than among Contractors employees) and civil commotion (in so far as both these are uninsurable), war (whether declared or not), invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power any acts of government, damage from aircraft, acts of god such as earth quake, lightening and unprecedented floods and other causes over which the Contractor has not control and accepted as such by the accepting authority or causes solely due to use or occupation by the Owner of the part of works in respect of which a certificate of completion has been issued.
- 2.14 The 'Final Certificate' in relation to the work shall mean the certificate regarding the satisfactory compliance of the various provisions of the Contract to be issued by the Owner or his representative after the period of risk-liability is over. Risk liability period shall be specified in Special Conditions of Contract.
- 2.15 'Headings' in this Contract document are given solely to facilitate reference and are not part of the Contract documents and are not to be taken into account in the interpretation of the provisions of the Contract.
- 2.16 'Language for Drawings & Instruction': All the drawings, titles, notes, instructions, dimensions etc. shall be in English language only.
- 2.17 'Letter of Intent (LOI)' shall mean an intimation by a letter to Bidder that their Tender has been accepted in accordance with the provisions contained in the letter and hence to take preparatory steps and compliance of formalities to commence the work from the date desired by Owner.
- 2.18 The 'Managing Director' shall mean the Managing Director of Odisha Power Generation Corporation Ltd or his successors in office as designated by the Owner.

- 2.19 'Market Rate' shall be the rate as decided by Engineer-in-charge on the basis of the cost of materials and labour at the site where the work is to be executed, plus the percentage mentioned in schedule-A to cover all overheads and profit (No percentage shall be added for materials issued by the Owner).
- 2.20 'Metric System': All technical documents regarding the measurement of works are given in the metric system and all work under the Contract should be carried out according to the metric system only. All documents concerning the work shall also be maintained in the metric system.
- 2.21 'Notice in writing or written notice' shall mean a notice in writing, typed or printed matters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received in the ordinary course of post, it would have been delivered.
- 2.22 The 'Owner' shall mean the Odisha Power Generation Corporation Limited (OPGCL), a company incorporated under the Companies Act, 1956 having its registered office at 7th Floor, Module – A, Fortune Towers, Chandrasekharpur, Bhubaneswar-751023 or any other places if modified subsequently and shall include its Managing Director or other Administrative Officers authorised to deal with these presents and are concerned on his behalf and are posted in any of the offices of OPGCL and shall also include Owner's successors and assignees.
- 2.23 'Paying Officer' shall mean Head of finance / Manager (Finance).
- 2.24 The 'Period of Defect Liability' in relation to a work means the specified period from the date of issue of completion certificate up to the date of issue of final certificate, which the Contractor stands responsible for rectifying all defects that may develop in the works.
- 2.25 'Plans' shall mean all maps, drawings, sketches and layout as incorporated in the Contract in order to define broadly the scope and specifications of the work & works and all reproductions thereof.
- 2.26 'Schedule(s)' referred to in these conditions shall mean the relevant statement of details annexed to the tender papers issued by the Owner and the amendments thereto issued from time to time.
- 2.27 'Singular & Plural': Unless otherwise stated specifically, the singular shall include the plural and vice-versa wherever the context so requires. The 'Tender' shall mean the offer(s) submitted by the Bidder(s) & subsequent agreed conditions/clarifications for acceptance by the Owner. Words implying persons shall include relevant corporate companies or registered associations or body of individuals or firms of partnership, cooperative society as the case may be.
- 2.28 Site / Work place' shall mean the lands and other spaces above & below the ground level on which the works are to be carried out, any other lands or places provided by the Owner for the purpose of the Contract.

- 2.29 'Specification' shall mean all directions, various technical details, standards, quality provisions and requirements attached to the Contract, which pertain to the method and manner of performing the work(s) to the quantities and qualities of the work(s) and the materials to be furnished under the Contract for the work(s) as may be amplified or modified by the Owner or the Engineer-in-charge during the performance of Contract in order to meet the unforeseen conditions in the best interests of the work(s). It shall also include the latest edition including all addenda / corrigenda or relevant BIS Specifications and other relevant codes.
- 2.30 The 'Sub-contractor' shall mean any person or firm or company (other than the Contractor) to whom whole or any part of the work has been entrusted by the Contractor, with the written consent of the Owner or his representatives and the legal representatives, successors and permitted assignee of such person, firm or company.
- 2.31 'Temporary Works' shall mean all temporary works of every kind required for execution, completion or maintenance of the Contracted works.
- 2.32 The "Tender" shall mean the offer submitted by the Bidder and subsequent conditions accepted by the Owner.
- 2.33 'Urgent Work' shall mean any urgent measures which in the opinion of Engineer-in-charge become necessary during the progress of the work to obviate any risk of accident or failure or disruption of generation which become necessary for security.
- 2.34 'Value of Contract' shall mean the sum accepted or the sum calculated in accordance with the prices accepted in Tender and/or the Contract rates as payable to the Contractor for the entire execution and full completion of the work.
The 'Contract sum' shall mean:
- a) In case of lump sum Contracts, the sum for which the Tender is accepted.
 - b) In case of percentage rate Contracts, the estimated value of the works as mentioned in the Tender adjusted by the Contractor's percentage.
 - c) In case of item rate Contract, the value of works arrived at after multiplication of the quantities shown in the schedule of quantities by the item rates quoted by the Bidder for the various items.
- 2.35 'Week' means a period of seven consecutive days without regard to the number of hours worked in any day in that week.
- 2.36 'Working day' means any day, which is not declared to be holiday or rest day by the Owner.
- 2.37 The 'Works' shall mean and include all works to be executed in accordance with the Contract or part thereof as the case may be and shall include all extras, additions, altered or substituted works as required for the purpose of the Contract or as may be required to be executed by the Owner / Engineer-in-charge at an agreed price if not available in scope.
- 2.38 **NATURE OF CONTRACT:** The Contract may be for -
- a) Construction / Fabrication / Erection of plant & equipment.
 - b) Civil construction.
 - c) Operation (any system).

- d) Maintenance (Civil/Electrical/Mechanical/Miscellaneous works, such as upkeepment of plant, Plantation etc.)
- e) Composite / Turnkey package.

2.39 Earnest Money:

The Bidder is required to submit 'Earnest Money' with Bids as guarantee (Bid guarantee) to abide by the terms & conditions of Tender document and comply with the work if offered.

2.40 Schedule of Rate:

Schedule of Rates means the latest rate published by Works Department / P.H. Department. / Irrigation Department., Govt. of Odisha as the case may be.

2.41 Schedule of Quantities:

Schedule of Quantities is details of item wise quantity issued by the Owner in the Price Bid and the rate & amount offered by the Bidder therein and its subsequent agreement by both parties. This is applicable for construction & civil maintenance job only.

2.42 Price Schedule:

Price schedule is a document in which description of operation / maintenance, probable frequency during a stipulated period and blank unit rate are provided by the Owner. Bidder shall fill up the blanks and submit it as Price Bid, which is subsequently agreed by both the parties directly or after negotiation.

2.43 "Site In-charge" is an employee of Contractor who is categorically authorized to manage the site for day-to-day activities on his behalf.

2.44 "Labour" means workers employed by a Contractor directly or indirectly through a sub-contractor or by an agent to do any skilled, semi-skilled, unskilled, manual, technical or clerical work relating to the subject of Contract for hire or reward.

2.45 "Minimum wage" means wages as defined under the Minimum Wages Act-1948 and amended from time to time.

2.46 Dispute regarding interpretation and definition:
In case of any dispute regarding interpretation and definition, the decision of OPGC shall be final.

End of Section-II

SECTION-III

3.0 GENERAL INFORMATION TO BIDDER (S):

3.1 ISSUE OF TENDER PAPER:

Owner shall issue one set of priced tender documents which consists of:

- i) Instructions to Bidder including NIT & Proforma of letter of undertaking
- ii) General Conditions of Contract
- iii) Special Conditions of Contract including Technical Specification and Scope of Work
- iv) Blank Price Bid / Bill of Quantities
- v) Drawings

3.2 The Technical Bids shall be opened as per the stipulation in NIT. Information provided and documents submitted by the Bidders in Techno-commercial bid shall be processed, examined, verified and evaluated for ascertaining the suitability of Bidders to qualify for opening of Price bid. The price bids shall be opened with prior intimation to all technically qualified Bidders only and in presence of them or their authorized representatives. Only proprietor, partner, director or permanent employee with necessary power of attorney shall be accepted as authorized representative.

3.3 WITNESS:

Witness and sureties should normally be persons of status and property. Their names, occupation and address shall be stated below their signature.

3.4 VALIDITY:

Offers submitted by Bidders shall remain valid for a period of 180 days from the scheduled date of opening of the Tender. In case of Bidder revoking or canceling his Tender or varying any term(s) in regards thereof the Earnest Money paid by him shall be forfeited and bid cancelled.

3.5 ADDENDA/CORRIGENDA:

3.5.1 Addenda / Corrigenda to the tender document may be issued reasonably prior to the date of submission of the Tenders to clarify documents or to reflect modification in the design or Contract terms. If such issues made, subsequent to sale of Tender paper, time extension shall be given and submission of Bid shall be dealt with in accordance with Clause 1.3 of Instructions to Bidder (s).

3.5.2 The addenda / corrigenda will be issued / mailed to each person or organization to which a set of tender documents has been issued. Each recipient shall acknowledge the receipt of the same and attach one copy of the addenda/corrigenda issued, which shall form part of Tender Documents. In case of paper publication of such addenda/corrigenda, copy of the same may be treated as part of original tender documents.

3.5.3 REVISED PRICE BID:

In case of any deviation proposed by any of the Bidders and accepted by the Owner during evaluation of Technical Bid, the same shall be intimated to all technically qualified Bidders with provision of submission of fresh Price Bid taking into consideration the accepted deviation.

3.6 RIGHT OF OWNER TO ACCEPT OR REJECT TENDER:

3.6.1 The right to accept the Tender rests with the Owner. The Owner further does not bind himself to accept the lowest Tender and reserves the authority to reject any or all the Tenders received without assigning any reason whatsoever. The whole work may be split up between two or more Contractors or accepted in part (not entirely) if considered expedient. The rates shall be the lowest/negotiated for such eventualities. Tenders in which any of the particulars and prescribed information is missing or incomplete in any respect and/or the prescribed conditions are not fulfilled are liable to be rejected. The decision of the Owner in respect of the above shall be final and binding on the Bidders.

3.6.2 Canvassing in connection with Tenders is strictly prohibited. The submitted Tenders of the Bidders who resort to canvassing are liable for rejection. Tenders containing uncalled remarks or any additional conditions are liable to be rejected.

3.7 BIDDER'S RESPONSIBILITY:

The intending Bidders shall be deemed to have visited the site and familiarized themselves thoroughly with the site conditions before submitting the Tender. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the works in strict conformity with the drawings and specifications. The correctness of the details given in the Tender Documents as guideline information to help the bidder but to make up the Tender is not guaranteed.

3.8 NOTE TO PRICE SCHEDULE / SCHEDULE OF QUANTITY:

3.8.1 The Bidder shall be deemed to have studied the specifications and details of work to be done within time schedule and to be acquainted himself of the conditions prevailing at site.

3.8.2 Rates must be filled in the original Tender document. Any exceptions taken by the Bidder to the schedule of quantity / price schedule shall be brought out in the terms and conditions of offer.

3.8.3 The schedule of quantity / price schedule should be read in conjunction with all the other sections and documents of the Tender.

3.9 EQUIPMENTS TO THE CONTRACTOR ON CHARGEABLE BASIS:

Owner shall not provide any equipment to the Contractor on chargeable basis or otherwise.

3.10 ISSUE OF PRIME MATERIALS:

3.10.1 Rate shall be offered including the cost of labour & prime materials like steel, cement etc. in case of construction and civil repair maintenance work.

3.10.2 In case of mechanical & electrical maintenance, Owner shall provide steel materials other than reinforcement steel. Spares, lubricants, special consumables forming part of the job, fasteners, packing including mill internals etc. shall be provided by the Owner and shall not be included in price of Bidder. Other consumable shall be provided by Contractor.

The Contractor shall arrange and stock in full or in part of prime materials as per direction of Engineer-in-charge within 7 days of commencement of work and obtain a certificate from Engineer-in-charge to this effect. The payment against the prime materials shall be made progressively on certification of utilization from Engineer-in-charge.

3.11 ARRANGEMENT BEYOND CONTRACT:

It may be sometimes so required to provide materials & services by the Contractor beyond the Scope of Contract. In such situation, the price must be finalized before actual event.

- 3.12 **FOREIGN EXCHANGE VARIATION:**
In case imported items are involved in the Contract, the price fluctuation corresponds to the fluctuation in the price of foreign exchange. Hence, amount of foreign exchange involved, the exchange rate for the currency on the date of offer and rate of duty should be specifically mentioned by the Contractor.
- 3.13 **PRICE ESCALATION:**
In case of price escalation provision, base date, indices on the base date and documents / publications shall be referred on the due date and actual date of completion of work without any ambiguity.
- 3.14 **PURCHASES FROM SUBCONTRACTOR / SUB VENDOR:**
The Owner shall not directly or otherwise be involved with any subcontractor or sub-vendor. No sales tax form 'C' / form IV or Road Permit to any of the Contractor/subcontractor/sub-vendor shall be issued under any circumstances.
- 3.15 **INCOME TAX / WORKS CONTRACT TAX / SALES TAX / GST / ANY OTHER TAX & DUTIES:**
Income Tax / Works Contract Tax / Sales Tax / GST / any other taxes & duties if applicable at the prevailing rate shall be paid by Contractor and shall be deducted from their Running bills if applicable.
- 3.16 **EXCISE:**
Certain items of work such as manufacturing of steel vessels and pipes etc attract excise duty. The Contractor shall register himself with excise department shall deal with directly and Owner shall take no liability on account of excise duty to be paid by the Contractor.
- 3.17 The price to be quoted by the Bidders shall be kept firm up to completion of work. No escalation shall be allowed.
- 3.18 The person signing the Tender should have requisite authorization of the firm submitting the Tender. This is applicable only to the Joint Stock Company & the authorized person shall be a director / partner / regular employee of the said firm. In case of unregistered firm, the Owner, Managing partners, or authorized partner to this effect shall sign the Tender.
- 3.19 **OVERRUN CHARGES:**
Delay in completion of work beyond the control of the Contractor such as non-availability of front, drawings, specifications, materials or force majeure etc, Contractor has to increase the additional facility to complete the work in time. No overrun charge shall be considered. But, however the Engineer-in-charge shall examine the period of delay and possibility of adherence to schedule by providing reasonable additional manpower/facility and if satisfied that completion of work shall not be possible by providing reasonable additional manpower, time extension shall be allowed to the Contractor & no penalty shall be levied on this account. No overrun charge shall be paid.
- 3.20 **FACILITIES TO CONTRACTOR (s):**
- 3.20.1 **Water Supply:** (a) Water for drinking and sanitation purpose shall be provided to the Contractor for the site work, free of cost. (b) Unfiltered water for construction / maintenance works shall be supplied from the nearest source free of cost. But the

Contractor shall arrange to transport water from the nearest source allowed to him for all purpose.

3.20.2 **Power Supply:** Power supply will be provided to the Contractor for the site work and office at a cost to be decided by the Owner. The power will be supplied from the nearest point to the site and Contractor shall arrange to tap the power to his site at his own cost.

3.20.3 **Land for Contractor's Field Office, Godown & Workshop**

a) The Owner at his discretion and convenience may provide the land for construction of Contractor's temporary field office, godowns and site store required for the execution of the Contract near to the site but out of plant gate free of cost. The Contractor shall at his cost construct all these temporary building structures and provide water supply, sanitary & power supply arrangement as approved by the Engineer-in-charge, with due regard to Owner's Safety Rule.

b) On completion of the work undertaken by the Contractor, they shall remove all temporary works erected by them and have the site cleared as directed by Engineer-in-charge. If the Contractor fails to comply with these requirements, the Engineer-in-charge has the right to remove any structure, such surplus, rubbish materials and dispose off the same as deemed fit and get the site cleared and the Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials disposed as aforesaid. The land provided shall be solely on temporary basis, which is terminable at any time without notice or without assigning any reasons. In the event of any such termination or the termination of the Contract / completion thereof, the Contractor shall forthwith vacate the premises. The Owner reserves the right to ask the Contractor for demolition at any time during the currency of the Contract to vacate the land by giving seven days notice on security / safety reasons or Owner's interest.

c) **Medical facility:**

Owner shall extend free medical consultancy / services as available at ITPS hospital to the Contractor personnel during their assignment but no medicine shall be provided.

d) **Accommodation:**

Owner may provide accommodation subject to availability to the company executives on chargeable basis, which has to be determined by the Owner from time to time. In such an event, rent for 6 months shall be retained from 1st Running bill of the Contractor as security & rent from second month shall be recovered from subsequent running bills. The amount hold as security shall be returned to the Contractor on handing over the vacate possession of accommodation with security amount.

3.21 **LIABILITY OF CONTRACTOR IN CASE OF STRIKE OF THEIR LABOURS:**

3.21.1 In case Contractor's labour go on strike with advance notice as per rule, it is responsibility of the Contractor to mobilize such manpower from their other sites or otherwise and continue the work so that execution of Contract is not affected. In such an event, the failure to perform shall lead the Owner to get the work done by any other agency, but at the cost & risk of the Contractor. Further, the Contract shall be terminated with seven (7) days notice in O&M Contract and the Contractor may be debarred from participating in any future Bid in OPGC Ltd. In case of construction work, non-adherence to schedule shall lead to cancellation of Contract or imposition of penalty at the discretion of the Engineer-in-charge. If the labours go on strike without prior notice, the situation shall be treated as force majeure provided nonperformance is for a reasonable period only. If the situation is beyond

reasonable control of the Contractor but has taken appropriate steps as a man of common prudence would have taken in his own case, Owner may consider in case to case basis to either terminate the Contract or otherwise get the work done by other means but at the cost & risk of the Contractor. Only events of such illegal strike, which make the performance impossible at the time of occurrence and for a considerable time period for mobilization, shall be considered as force majeure.

3.21.2 The operation shall continue round the clock for the entire Contract period without interruption unless otherwise notified by Engineer-in-charge. Hence, staff for attending maintenance job shall be kept ready by the Contractor on all Sundays and other National & festival holidays at their own cost. In case of construction work, the work shall be executed as per the direction of Engineer-in-charge.

3.21.3 For satisfactory performance of Contract & to meet the odd hour work and emergency requirement etc and to meet the schedule of construction work, the requisite number of manpower has to be arranged by the Contractor at their own cost.

3.22 SPARES & CONSUMABLES:

The items of materials, spares, consumables, tools & plants to be provided by Owner if any either on cost or free of charges shall be specified in Special Conditions Contracts.

3.23 OTHER CONDITIONS:

3.23.1 Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, technical specifications, schedule, and drawings and any other documents forming part of this Contract documents.

3.23.2 Where any clause of the Special Conditions of Contract contradicts with any provisions of the General Conditions of Contract, the provisions of Special Conditions of Contract shall be deemed to override the provisions of General Conditions of Contract.

3.23.3 In case of contradiction among Bureau of Indian Standard Specifications, General Conditions of Contract, Special Conditions of Contract, Notice Inviting Tender, Technical Specifications, Drawings, Schedule of quantity & time, the following shall prevail in order of preference.

- i) Detailed work order forming part of Contract
- ii) Schedule of Quantities
- iii) Technical Specifications.
- iv) Notice Inviting Tender
- v) Special Conditions of Contract
- vi) Drawings
- vii) General Conditions of Contract
- viii) Bureau of Indian Standard

3.24 Wherever it is mentioned in the specification that the Contractor shall perform certain work or provide certain facilities, it is understood that the Contractor shall do so at his cost.

3.25 DURATION OF CONTRACT:

The period of Contract shall be specified in the Special Conditions of Contract. The Contract period shall reckon from the date of issue of LOI. OPGCL reserves the right to withdraw any item(s) of works from the scope by serving a 7 days notice to the Contractor without giving any reason for the same and take up the job departmentally or otherwise if performance of Contractor is found to be unsatisfactory. Value for the items of work thus withdrawn shall not be payable by the Owner. The Contractor shall not claim any compensation on this account.

3.25.1 The period of Contract may be extended with mutual consent if the delay is beyond the control of Contractor at the discretion of the Engineer-in-charge.

3.25.2 In case Owner desires to extend the period of any Operation / Maintenance Contract by an additional duration of 2/3 months, the Contractor has to accept the proposal of Owner at original rate and terms & conditions.

3.26 **MATERIALS HANDLING:**

Contractor shall draw all the materials from Warehouse being duly authorized by Engineer-in-charge. Requisite loading, transportation & unloading of all such materials shall be the responsibility of Contractor. Only in case of heavy materials, Owner shall provide means of loading / unloading at the cost to be specified in the Special Conditions of Contract.

End of Section-III

SECTION-IV

4.0 GENERAL OBLIGATIONS / GENERAL CONDITIONS:

4.1 INTERPRETATION OF CONTRACT DOCUMENTS:

4.1.1 Complete documents forming the Contract are to be taken as mutually explanatory. Should there be any discrepancy, inconsistency, error or omission in the Contract or any of them, the matter may be referred to the Engineer-in-charge who shall give his decisions and issue instructions to the Contractor directing in what manner the work is to be carried out. The decision of the Engineer-in-charge shall be final and conclusive and the Contractor shall carry out work in accordance with this decision.

4.1.2 Both details of drawings & specifications constitute integral part of the scope of work.

4.1.3 Notwithstanding any of the items of works mentioned in Technical Specification / Scope of work, the Contractor has to do all such works necessary for completion of the work to meet the end objective with due regard to sound engineering practice as directed by Engineer-in-charge.

4.2 SPECIAL CONDITIONS OF CONTRACT:

4.2.1 Special conditions of Contract shall be read in conjunction with the General Conditions of Contract, Specifications of work, drawing and other documents forming part of this Contract wherever the context so requires.

4.2.2 Notwithstanding the sub-divisions of the documents into the separate sections and volumes each part shall be deemed to be supplementary & complementary to every other part and shall be read with the Contract Agreement so far as it may be practicable. All documents of Contract & Tender have nexus with each other.

4.3 If there are conflicting provisions made in any one of the documents forming part of the Contract, the Owner shall be the deciding authority with regard to the correctness of the document.

4.4 Any error or omission in any part of Contract documents shall not vitiate the Contract or release the Contractor from execution of the whole or any part of the works comprised therein according to drawings & specification or from any of his obligations under the Contract.

4.5 The materials, design and workmanship shall satisfy the relevant Bureau of Indian Standard, the job specifications contained herein and codes referred to. Where the job specifications stipulate the requirement in addition to those contained in the standard codes and specification, these additional requirements shall also be satisfied.

4.6 BIDDER TO OBTAIN HIS OWN INFORMATION ON SITE CONDITION & CONDITION OF WORK:

4.6.1 The Bidder shall be deemed to have examined the tender documents, to have obtained his own information in all matters, whatsoever that might influence carrying out the works at the scheduled rates and satisfied himself to the sufficiency of his Tender. He is deemed to know the scope, nature as to what works he has to complete in accordance with the Contract document whatever be the defect, omission or errors that may be found in the Contract Document. The Contractor shall be deemed to have visited site and surrounding areas, to have satisfied himself to the nature of all existing structures, and also as to the nature and the conditions of available facilities like railways, roadways, bridges, culverts, means of transport and communications by land, water or air and possible interruptions

thereto the access to and from site and to have made enquiries, examined & satisfied himself of the site for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus, materials, the available accommodation like depots, buildings as may be necessary for executing and completing the work to have made local, independent enquiries as to the sub-soil, water, land variations thereof, storms, prevailing winds and climatic conditions and all other similar matters affecting the works. He is deemed to have acquainted himself with his liability for payment of Government taxes, custom duties and other charges. He is deemed to have acquainted himself with the local labour attitude, work culture, customs & systems etc.

4.6.2 Any neglect or failure on the part of the Bidder in obtaining necessary and reliable information or issues stated at 4.6.1 or any other matters affecting the Contract shall not relieve him from any risks or liabilities or the entire responsibility for completion of the works at the scheduled rates and time in strict accordance with the Contract documents.

4.6.3 Any change in technological requirement shall be binding on the Contractor and no extra claim on this account shall be entertained.

4.6.4 No verbal agreement or inference from conversation with any officer or employee of the Owner either before, during or after execution of the Contract agreement shall in any way affect or modify the terms or obligations herein contained.

4.7 MUTUAL LIABILITIES AMONG CONTRACTS:

The Contractor who are executing more than one Contract under OPGC, any penalty or recoveries of one Contract shall be made from other Contract & vice versa.

4.8 CONTRACT REVIEW MEETING:

Engineer-in-charge shall arrange Contract Review Meeting in regular intervals in case the performance subject to any difficulty and take decision in connexion with amendment of time, quantity, price etc.

4.9 SECURITY DEPOSIT:

4.9.1 A sum of 10% of the accepted value of the Tender or actual value of the work to be executed whichever is higher for Contracts not exceeding Rs.1 crore, 7.5% for the value of Contracts above Rs.1 crore up to Rs.5 crore and 5% for the value of Contracts over Rs.5 crore shall have to be deposited by the Contractor as security deposit with the Owner & retained by the Owner until the expiry of defect liability period.

4.9.2 This may be deposited initially at 2.0% of the value of the Contract (referred as initial security deposit) within 10 days of receipt by him of LOI and the balance will be recovered in installments through the deduction @ 10% of the gross value of the each running bill for the Contract up to Rs.1 crore, 7.5% for Contract between Rs.1 crore to Rs.5 crore and 5% for Contract over Rs.5 crore, till total security deposit is collected. No further deduction from the bills will be made on this account subject to clause. 4.9.7 hereafter.

4.9.3 Alternatively the Contractor may at his option have to deposit the full amount as mentioned in clause 4.9.2 above towards security within 10 days of issue of LOI. This amount will have to be suitably enhanced to the tune of corresponding percentage of the executed value if any.

4.9.4 Contractor shall furnish the initial or total security amount by Demand Draft in the manner specified in **Clause- 1.13** up to Contract value of Rs.25.00 lac only. Beyond Contract value of Rs.25.00 lac the initial or total security deposit shall be accepted in form of Bank Guarantee in the prescribed format from any nationalized or scheduled bank. In all the cases if total security is not deposited either in form of Demand Draft or Bank Guarantee the security as

mentioned in Clause 4.9.2 shall be recovered from the running bill of the Contractor. The Bank Guarantee facility shall be extended to only companies of repute at the discretion of OPGC.

- 4.9.5 The earnest money deposited with the Tender shall be adjusted towards initial security deposit at the option of the Bidder.
- 4.9.6 If the Contractor/subcontractor or their employees damage, break, deface or destroy the property belonging to the Owner or others during the execution of the Contract, the same shall be made good by the Contractor at his own expense and in default thereof the Engineer-in-charge may cause the same to be made good by other agencies and recover expenses from the Contractor for which the certificate of the Engineer-in-charge shall be final.
- 4.9.7 All compensation or other sums of money payable by the Contractor to the Owner or recoveries to be made under terms of this Contract may be deducted from their security deposit or from any sums which may be due or may become due to the Contractor by the Owner on any account whatsoever. In the event of his security being reduced by reasons of any such deduction or sale, the Contractor shall within ten days thereafter make good by bank drafts, any sum or sums which may have fallen short of Security deposit amount or any part thereof. No interest shall be payable by the Owner for sum deposited/retained as security deposit.
- 4.9.8 The security deposit will be refunded after the expiry of the period of defect liability as stipulated in the Contract and on submission of final certificate.
- 4.9.9 **The variation in security deposit:**
Any agency stands L1 in any Bid while they are executing any other Contract with Owner, the security deposit of such L1 Contract shall be enhanced to 20%. After successful completion of 1st mile stone / initial three months as the case may be, 10% of the security may be refunded to the Contractor.

4.10 **FORFEITURE OF SECURITY DEPOSIT:**

Whenever any claim against the Contractor for the payment of a sum of money arises out of or under the Contract, the Owner shall be entitled to recover such sum by appropriating in part or whole the security deposit of the Contractor and to sell any Government security deposit of the Contractor forming whole or part of such security deposit. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable as the case may be, shall be deducted from any sum then due or which at any time thereafter may become due to the Contractor under particular Contract or any other contract with Owner. The Contractor shall pay to the Owner on demand any balance remaining due. In case any dues can not be recovered out of Contract(s), the amount may be recovered as debt liability.

In the event of any breach by the Contractor or any loss or damage caused to the Owner which in the opinion of the Owner has arisen, the decision of the Engineer-in-charge shall be final and binding on the Contractor or in the event of the termination of the Contract for any such breach, the security deposit is liable to be forfeited. The decision of forfeiture by the Owner shall be final and binding on the Contractor.

4.11 **AMENDMENT OF QUANTITY, VALUE & PERIOD OF COMPLETION:**

In case of lump sum Contract, no deviation shall be allowed. But in case of lump sum Contract based on Bill of Quantities and item rate Contract if any deviation in quantity or omission of items are discovered in course of performance of Contract, the cumulative

effect of which varies the Contract sum up to 5%, the error shall be rectified/amended and the value so varying shall be added with or deducted from the Contract sum @ original contract cost as the case may be. Deviation shall be allowed subject to recommendation of Technical Services department, if the varying value shall exceed 5% of Contract value only. In case of annual maintenance Contract in respect of mechanical maintenance, electrical maintenance, plant cleaning or any other operational activities time extension for completion of any item does not arise. But the period of service may be extended beyond Contract period at the discretion of management if situation so demands. In addition to this, the Engineer-in-charge reserves the power -

- a) to make alteration in, omission from, additions to or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work;
- b) to omit a part of the works in case of non-availability of a portion of the site or for any other reasons. The Contractor shall be bound to carry out the work in accordance with any instructions given by the Engineer-in-charge to the extent the omission does not change the value of Contract by more than 10%. Consequent alterations, omissions, addition or substitution shall form part of the Contract as if originally provided therein and the Contractor may be directed to do in the manner above specified as part of the works. The Contractor shall carry out the work on the same conditions in all respect including rate on which he agreed to do the main work. But if such alteration, omission, addition or substitution radically change the original nature of the Contract shall be ordered by the Engineer-in-charge as a deviation and in the event of deviation being ordered which in the opinion of Contractor changes the original nature of the Contract, fresh rate shall be worked out by Engineer-in-charge with mutual consent.

Rate for such additional, altered or substituted work shall be determined by the Engineer-in-charge as follows:-

- i) If the rate for additional, altered or substituted items of work is specified in the schedule of quantities / price schedule, the Contractor shall carry out the additional, altered or substituted items at the same rate. In case of composite Tenders where two or more schedules of quantities may form part of the Contract, the applicable rate shall be taken from the schedule of quantity of that particular part in which the deviation is involved, failing that at the lowest applicable rate for the same item of work in the other schedules of quantities.
- ii) If the rate for altered, additional or substituted item of work is not specified in the schedule of quantities / price schedule, the rate for that item shall be derived from the rate for the nearest similar item specified therein. In case of composite Tenders where two or more schedules of quantities form part of the Contract, the rate shall be derived from the nearest similar item in the schedule of quantities of the particular part of works in which the deviation is involved failing that from the lowest of the nearest similar item in other schedule of quantities.
- iii) If the rate of any additional, altered or substituted item of work cannot be determined in the manner specified in sub-para (i) & (ii) above, then such

item of work shall be carried out at the rate entered in the Schedule of Rates mentioned in schedule A plus/minus the percentage by which the tendered amount of the works actually awarded is higher or lower than the estimated amount of works actually awarded.

- iv) If the rate for any altered, additional or substituted item of work cannot be determined in the manner specified in sub paras (i) to (iii) of Clause 4.11, due to non-availability of rate in Schedule A, then the rate for such item of work shall be determined by the Engineer-in-charge on the basis of the purchase price as supported by the vouchers plus mutually agreed labour rate. In case the Engineer-in-charge considers the purchase price unreasonable, the price shall be determined on the basis of market rate(s) prevailing during the fortnight following the date of order.

4.12 **SUSPENSION OF WORKS:**

The Contractor shall, on receipt of the order in writing of the Engineer-in-charge, suspend the progress of the works or any part thereof for such time and in such manner, as the Engineer-in-charge may consider necessary for any of the following reasons:

- i) On account of any default on part of the Contractor; or
- ii) For proper execution of the works or part thereof for reasons other than the default of the Contractor;

In any of the above cases the Contractor shall properly protect and secure the works to the extent necessary and carry out the instructions given on that behalf by the Engineer-in-charge during such suspension period.

4.12.1 **compensation:**

Compensation for suspension of work under (ii) of Clause 4.12 shall be dealt with on request of Contractor by the Contract Review Meeting depending on the period of suspension & condition of suspension etc.

4.12.2 **Time extension for suspension of work:**

Time extension for suspension of work under Clause 4.12 (ii) shall be dealt in accordance with Clause No.4.13

4.13 **TIME EXTENSION FOR DELAY IN COMPLETION OF WORK:**

The time allowed for execution of total works as specified in the Schedule-“A” with due regard of achieving the corresponding milestone mutually agreed upon or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works shall commence from the 15th day after the date on which the Owner issues written orders to commence the work.

As soon as possible after the Contract is finalized the Engineer-in-charge and the Contractor shall agree upon a Time and Progress Chart/PERT chart / L₂ network before agreement is signed. The chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate & forecast the dates of commencement and completion of various sections of the work corresponding to various milestones.

The target date of achieving various milestones and activities between two consecutive milestones shall be agreed upon mutually and reviewed in regular intervals by Engineer-in-charge. During review, the date of achievement of milestone may be adjusted if required but not the date of completion of work as per schedule. However, no time extension shall be permitted beyond the time of completion as per Contract.

4.13.1 Time extension on account of quantity amendment /deviation:

If the work is delayed due to increase in scope / quantity the time for completion of milestone of the total works shall, in the event of any deviation/amendment resulting in additional quantity over the Contract quantity being ordered, be extended as under.

- a) in the proportion which the additional cost of the altered, additional, substituted works bears to the original Contract sum, plus
- b) 25% of the time calculated in (a) above or such further additional time as may be considered reasonable by the Engineer-in-charge.

Alternatively, variation in completion time of milestone may be worked out mutually in Contract Review Meeting depending on the prevailing conditions and need of the hour.

4.13.2 Time extension for suspension of work without fault of Contractor:

In case of suspension of work for no fault of Contractor time extension shall be allowed to the Contractor as deemed proper by Contract Review Meeting on request of the Contractor.

4.13.3 Time Extension for delay on account of: -

- a) force majeure;
- b) abnormally bad weather, or
- c) delay on the part of other Contractors engaged by Owner in executing work not forming part of this Contract but having bearing on this Contract;
- d) non-availability of stores to be provided by the Owner under the Contract;
- e) any other related cause beyond the control of Contractor –

-provided the Contractor shall immediately give notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-charge to proceed with the works. The case may be examined in the Contract Review Meeting and decision thereon shall be final.

4.13.4 Request for extension of time shall be made by the Contractor in writing within 24 hours of the happening of the event causing delay for consideration of Owner. The Contractor may also indicate the period of extension desired with supporting reasons.

4.13.5 In any such case the authority mentioned in Schedule-A may give a fair and reasonable extension of time for completion of the work on the recommendation of Contract Review Meeting. Such extension shall be communicated to the Contractor by the Engineer-in-charge in writing, within 15 days of the date of receipt of such request by the Engineer-in-charge.

4.14 MATERIALS:

- a) *The Contractor shall at his own expenses provide all materials required for the works other than those, which are to be supplied by the Owner.*
 - i. All materials to be provided by the Contractor shall be in conformity with the specifications laid down in the Contract and the Contractor shall if required by the

Engineer-in-charge, furnish proof to the satisfaction of the Engineer-in-charge to that effect.

- ii. If required the Contractor shall at his own expense and before 15 days of use of the material submit to the Engineer-in-charge the samples of materials proposed to be used in the works. The Engineer-in-charge shall within seven days of receipt of samples or within such further period as he may require and intimate to the Contractor in writing, whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith submit fresh samples to the Engineer-in-charge for his approval complying with the specifications laid down in the Contract.
- iii. The Engineer-in-charge shall have full powers for removal of any or all of the materials brought to site by the Contractor which are not in accordance with the Contract specifications or do not conform in character or quality of samples approved by him. In case of default on the part of the Contractor in removing rejected materials, the Engineer-in-charge shall be at liberty to have them removed by other means. The Engineer-in-charge shall have full powers to procure other proper materials to be substituted for rejected materials and in the event of the Contractor's refusal to comply, he may cause the same to be supplied by other means. All costs, which may be incurred for such removal and/or substitution, shall be borne by the Contractor.
- iv) The Contractor shall indemnify the Owner, its representatives or employees of the Owner against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any article or materials or part thereof included in the scope of Contractor. In the event of any claim being made or action being brought against the Owner, its representatives or employees of the Owner in respect of any such matters as aforesaid, the Contractor shall immediately be notified thereof, provided that such indemnity is not applicable when such infringement has taken place in complying with the specific directions issued by the Owner; but the Contractor shall pay any royalties or other charges payable in respect of any such use, the amount so paid being reimbursed to the Contractor only if the use was the result of any drawings and/or specifications issued after Contract agreement is signed.

Further, if any such action is instituted by any agency after closure of Contract or any structure or utility is eroded or damaged within 2 to 3 years of performance on account of related work of the Contractor, the Contractor shall be liable for such cost and expenses for which Contractor shall provide corporate warranty for further 2 years beyond defect liability period.

- v. Subject as hereinafter provided in Condition 7.1 all charges on account of octroi, entry tax, sales tax, royalty and other duties on materials obtained for the works from any source (excluding materials supplied by the Owner) shall be borne by the Contractor.
- vi. The Engineer-in-charge shall be entitled to have tests carried out as specified in the Contract for any materials supplied by the Contractor other than those for which, as stated above, satisfactory proof has already been furnished, at the cost of the Contractor and the Contractor shall provide at his expense all facilities which the Engineer-in-charge may require for the purpose. If no tests are specified in the Contract, and such tests are required by the Engineer-in-charge, the Contractor shall

provide all facilities required for the purpose and the charges for these tests shall be borne by the Contractor only if the tests disclose that the said materials are not in accordance with the provision of the Contract. The cost of materials consumed in tests shall be borne by the Contractor in all cases except when otherwise provided.

- vii. In addition the Contractor shall perform / submit at his own cost such tests/samples forming out of the same materials & in same process, such as concrete cube, welded test piece etc. as may be required by the Engineer-in-charge made out of the materials issued by the Owner or Contractor, except for the costs of materials used in such tests/samples.

b) *Material to be provided by the Owner:*

Materials to be provided by the Owner are shown in Schedule 'B' which also stipulates place of issue and rate (s) to be charged, free issue, allowable % of loss in respect thereof.

- i. If after issue of LOI the Contractor desires the Owner to provide any other materials, such materials may be provided by the Owner, if available, at rates to be fixed by the Engineer-in-charge. The Owner reserves the right not to issue any such materials. The non-issue of such materials will not entitle the Contractor for any compensation whatsoever either in time or in cost.

- ii. (1) The Owner may issue all the materials as per Contract to the Contractor at its warehouse, site stores, or nearest railhead. In case the materials are issued at the nearest railhead the cost of transportation only from such railhead to the site will be borne by the Owner subject to the reasonableness of such transportation cost being certified by the Engineer-in-charge. All other costs such as loading, unloading, transportation to Contractor's go-down, storage etc till the materials are utilized in the works and return of surplus & scrap, if any to the Owner shall be to the account of the Contractor.

(2) For the materials listed in Schedule B, which the Owner has agreed to supply to the Contractor, he shall give a reasonable notice in writing his requirements to the Engineer-in-charge in accordance with the agreed phased programme. Such materials shall be supplied for the purposes of the Contract only and the value of materials so supplied at the rates specified in the aforesaid schedule shall be set off or deducted, as and when materials are consumed in items of work for which payment is being made to the Contractor from any sums there or which may thereafter become due to the Contractor under the Contract. At the time of submission of bills the Contractor shall properly account for the materials issued to him to the satisfaction of the Engineer-in-charge, certify that balance of materials supplied is available at site. The value of the stores/materials as may be supplied by to the Contractor by the Owner shall be debited to the Contractor's account at the rates as shown in Schedule-B and if they are not entered in the Schedule, they shall be debited at cost price which for the purpose of the Contract shall include cost of transportation & all other expenses whatsoever such as normal storage, supervision charges which shall have been incurred in obtaining the same at the Owner's stores.

- iii. The Contractor shall bear the cost of loading and transportation to site, unloading, storing under cover as required, assembling and joining the several parts together as necessary and incorporating or fixing materials in the works including all preparatory work of whatever description as may be required.
- iv. Surplus of all materials issued to the Contractor by the Owner for use, inclusion or fixing in the works (including preparatory work) shall, on completion or on foreclosures of the works, be returned by the Contractor at his expense, at the place

of issue, after making due allowance for actual consumption, reasonable wear and tear and /or waste. The reasonable wastage percentage shall however be mentioned in Schedule-B against each items. If the Contractor is required to deliver such materials at a place other than the place of issue, he shall do so and the transportation charges from the site to such place, less the transportation charges which would have been incurred by the Contractor had such materials been delivered at the place of issue, shall be borne by the Owner.

- v. *Return of surplus Materials / scraps:*
Percentage of wastage acceptable to the Owner in respect of cement, structural steel, reinforcement steel and other such materials is furnished in Schedule-B.

Cut pieces of reinforcement rods of length 3.0 meters and above shall be accepted by the Owner and credited at the issue rates. Other pieces below 3 mtr length shall be returnable as scrap to Owner if issued.

- vi. Surplus materials returned by the Contractor shall be credited to him by the Engineer-in-charge at rates not exceeding those at which these were originally issued to him after taking into consideration any deterioration or damage which may have been caused to the said materials whilst in the custody of the Contractor.
- vii. If on completion of works the Contractor fails to return surplus materials out of those provided by the Owner, then in addition to any other liability which the Contractor would incur, the Engineer-in-charge may, by a written notice to the Contractor, require him to pay within a fortnight of receipt of the notice, for such unreturned surplus materials at the rates specified in Special Conditions of Contract.
- viii. *Empty cement bags:*
The rate of cement is inclusive of cost of bag.

c) *General:*

Materials required for the works, whether brought by the Contractor or provided by the Owner, shall be stored by the Contractor only at places approved by the Engineer-in-charge. Storage and safe custody of materials shall be the responsibility of the Contractor.

- i. Owner's officials concerned with the Contract shall be entitled at any time to inspect and examine any materials intended to be used in works either on the site or at factory or workshop or other place(s) where such materials are assembled, fabricated, manufactured or at any place(s) where these are lying or from which these are being obtained and the Contractor shall give such facilities as may be required for such inspection and examination.
- ii) All materials brought to the site shall become and remain the absolute property of the Owner and shall not be removed from the site/shifted to any place inside the plant without the prior written permission of the Engineer-in-charge. But whenever the works are finally completed or terminated and advance if any in respect of any such material is fully recovered, the Contractor shall at his own expense forthwith remove from the site all surplus material originally brought by him and upon such removal, the same shall revert in and become the property of the Contractor.
- iii) All plant, tools & other materials brought by the Contractor to the site must be declared at the time of bringing the same to the site & security gate pass obtained before entering the plant as records and reference.
- iv) It shall be the duty of the Contractor to inspect the materials issued to him at the time of taking delivery & satisfy himself that they are in good condition after the materials have been delivered by the Owner, it shall be the responsibility of the

Contractor to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/or replaced by him at his own cost according to the direction of the Engineer-in-charge.

- v) Account of the materials issued by the Owner shall be maintained by the Contractor indicating the daily receipt, consumption and balance in hand in a manner prescribed by the Engineer-in-charge. All connected papers, requisitions, issues, returns etc. shall be always available for inspection in the Contractor's office at site.
- vi) Materials & equipments supplied by the Owner shall not be utilized for any other purpose(s) then issued for.

4.15 **LABOUR:**

- 4.15.1 The Contractor shall employ labour in sufficient numbers to maintain the required rate of progress / attend the repair-maintenance on it's occurrence and of quality to ensure workmanship of the degree specified in the Contract and to the satisfaction of the Engineer-in-charge. The Contractor shall not employ in connection with the works any person who has not completed his/her eighteen years of age.
- 4.15.2 The Contractor shall in respect of labour employed by him or his subcontractors comply with or cause to be complied with the Contractors Labour Regulations as per clause 8.5 in regard to all matters provided therein.
- 4.15.3 Employees State Insurance (ESI) Act is applicable to IB TPS. As per Enforcement of the scheme, the Contractor shall be liable to pay his contribution and the employees contribution to the State Insurance Scheme in respect of all labour employed by him for the execution of the Contract, in accordance with the provision of "The Employees State Insurance Act, 1948" as amended from time to time. In case, the Contractor fails to submit full details of his account of labour employed and the contribution payable, the Engineer-in-charge shall recover from the running bills of Contractor an amount of contribution as assessed by him. The amount so recovered shall be adjusted against the actual contribution payable for Employees State Insurance.
- 4.15.4 The Engineer-in-charge shall on a report having been made by an Inspecting Officer as defined in the Contractor Labour Regulations have been the power to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or worker by reason of non-fulfillment of the Conditions of the Contract for the benefit of workers, non-payment of wages or of deductions made from his or their wages which are not justified by the terms of the Contract or non-observance of the said Contractors Labour Regulations.
- 4.15.5 In the event of the Contractor committing a default or breach any of the provisions of the aforesaid Contractors Labour Regulations as amended from time to time or furnishing any information or submitting or filling any Form/Register/Slip under the provisions of these Regulations which is materially incorrect, then on the report of the Inspecting Officers as defined in the Contractors Labour Regulations the Contractor shall without prejudice to any other liability pay to the Owner a sum not exceeding Rs.500.00 as liquidated damages for every default, breach or furnishing, making, submitting, filling materially incorrect statement as may be fixed by the Engineer-in-charge and in the event of the Contractor's default continuing in this respect the liquidated damages may be enhanced to Rs.500.00 per day for each day of default subject to a maximum of ten percent of the contract value. The Engineer-in-charge shall deduct such amount from bills or security deposit of the Contractor and credit the same to the Welfare Fund constituted under Contract Labour (R&A) Act 1970. The decision of the Engineer-in-charge in this respect shall be final and binding.

- 4.15.6 **Model Rules for Labour Welfare:** The Contractor shall at his own expense comply with or cause to be complied with Model Rules for Labour Welfare as mentioned at (Cl. 8.4) or rules framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the works. In case the Contractor fails to make arrangements as aforesaid, the Engineer-in-charge shall be entitled to do so and recover the cost thereof from the Contractor.
- 4.15.7 **Safety code:** The Contractor shall at his own expense arrange for the safety provisions as per Sec-IX or as required by the Engineer-in-charge, in respect of all labour directly or indirectly employed for performance of the works and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer-in-charge shall be entitled to do so and recover 150% of the cost of materials from the Contractor.
- (i) Failure to comply with Model Rules for labour welfare, Safety Code or the provisions relating to report on accidents and to grant of maternity benefits to female workers shall make the Contractor liable to pay to the Owner as liquidated damages an amount not exceeding Rs.500.00 for each default or materially incorrect statement. The decision of the Engineer-in-charge in such matters based on report from the Inspecting Officer as defined in the Contractors Labour Regulations at Clause 8.5 shall be final and binding and deductions for recovery of such liquidated damages may be made from any amount payable to the Contractor.
- 4.16 The Contractor shall not be permitted to enter in (other than for inspection purpose) or take possession of the site until instructed to do so by the Engineer-in-charge in writing. The portion of the site to be occupied by the Contractor shall be defined and/or marked on the site plan, failing which these shall be indicated by the Engineer-in-charge at site and the Contractor shall on no account be allowed to extend his operations beyond these areas. In respect of any land allotted to the Contractor for purposes of or in connection with the Contract, the Contractor shall be a licensee subject to the following and such other terms and conditions as may be imposed by licensor: -
- (i) that he shall pay a nominal license fee of Rs.1 per year or part of a year for use and occupation, in respect of each and every separate areas of land allotted to him.
- (ii) that such use or occupation shall not confer any right of tenancy of the land to the Contractor,
- (iii) that the Contractor shall be liable to vacate the land on demand by the Engineer-in-charge,
- (iv) that the Contractor shall have no right to any construction over this land without the written permission of the Engineer-in-charge. In case he is allowed to construct any structure he shall have to demolish and clear the same before handing over the completed work unless agreed to the contrary.
- 4.16.1 The Contractor shall provide, if required on the site, all temporary access thereto and shall alter, adapt and maintain the same as required from time to time and shall take up and clear them away as and when no longer required and as and when ordered by the Engineer-in-charge and make good all damages done to the site.
- 4.17 **SETTING OUT THE WORKS:**
The Engineer-in-charge in case of construction work shall supply dimensioned drawings, levels and other information necessary to enable the Contractor to set out the works and the Contractor shall set out the works and be responsible for the accuracy of the same. He

shall rectify at his own cost and to the satisfaction of the Engineer-in-charge any error found at any stage, which may arise through inaccurate setting out unless such error is based on incorrect data furnished in writing by the Engineer-in-charge. The Contractor shall protect and preserve all benchmarks used in setting out the works till end of the Defects Liability Period unless the Engineer-in-charge direct their earlier removal. But in case of maintenance, the Engineer-in-charge shall direct the Contractor to attend certain job provided that all spares & consumables within the scope of Owner are available to the Contractor.

4.18 SITE DRAINAGE:

All water, which may accumulate on the site during the progress of the works or in trenches and excavations, from other than the Excepted Risks, shall be removed from the site to the satisfaction of the Engineer-in-charge and at the Contractor's expense.

4.19 NUISANCE:

The Contractor shall not at any time do, cause or permit any nuisance on site or do anything which shall cause unnecessary disturbance or inconvenience to Owners, tenants or occupiers of other properties near the site and to the public in general.

4.20 MATERIALS OBTAINED FROM EXCAVATION/SCRAP/REJECTS:

Materials of any kind obtained from excavation on the site shall remain the property of the Owner and shall be disposed of as the Engineer-in-charge may direct.

4.21 TREASURE, TROVE, FOSSILS etc:

All fossils, coins, articles of value or antiquity and structures and other things of geological or archaeological interest discovered on the site shall be the absolute property of the Owner and the Contractor shall take reasonable precautions to prevent his workmen or any other person from removing or damaging any such article or thing shall immediately upon discovery thereof and before removal acquaint the Engineer-in-charge with such discovery and carry out the Engineer-in-charge's directions as to the disposal of the same at the expense of the Owner.

4.22 PROTECTION OF TREES:

Trees designated by the Engineer-in-charge shall be protected from damage during the course of the works and earth level within 1 meter of each such tree shall not be charged. Where necessary such trees shall be protected by providing temporary fencing.

4.23 The Contractor shall provide and maintain at his own expense all lights, guards, fencing and watch & ward as and when necessary or required by the Engineer-in-charge for the protection of the works or for the safety and convenience of those employed on the works or the public.

4.24 CONTRACTOR'S SUPERVISION:

The Contractor shall either himself supervise the execution of the works or shall appoint a competent person duly authorizing him to supervise the work on his behalf, if the Contractor has himself not sufficient knowledge and experience to be capable or receiving instructions or cannot give his full attention to the works. Such employee having power of attorney shall be considered to have the same force as the Contractor himself. If the Contractor fails to appoint a suitable person acceptable to the Engineer-in-charge, the

Engineer-in-charge shall have full powers to suspend the execution of the works until such date as a suitable person is appointed and the Contractor shall be held responsible for the delay so caused to the works.

4.25 INSPECTION AND APPROVAL:

All works embracing more than one process / stage shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice to the Engineer-in-charge or his authorized representative when each stage is ready. In default of due notice the Engineer-in-charge shall be entitled to appraise the quality and extent thereof.

4.25.1 No work shall be covered up or put out of view without the approval of the Engineer-in-charge or his authorized representative and the Contractor shall afford full opportunity for examination and measurement of any work which is about to be covered up or put out of view and for examination of foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer-in-charge or his authorized representative whenever any such work is ready for examination and the Engineer-in-charge or his representative shall without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examination and measuring such work or of examining such foundations. In the event of the failure of the Contractor to give such notice he shall, if required by the Engineer-in-charge, uncover such work at the Contractor's expense.

4.25.2 The Engineer-in-charge or his representative shall have powers at any time to inspect and examine any part of the works and the Contractor shall give such facilities as may be required for such inspection and examination.

4.26 DUTIES & POWERS OF ENGR-IN-CHARGE'S REPRESENTATIVE:

4.26.1 The duties of the representative of the Engineer-in-charge are to watch and supervise the works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to order any work involving any extra payment by the Owner or to make any variation in the works.

4.26.2 The Engineer-in-charge may from time to time in writing delegate to his representative any of the powers and authorities vested in the Engineer-in-charge and shall furnish to the Contractor a copy of all such written delegation of powers and authorities. Any written instruction or written approval given by the representative of the Engineer-in-charge to the Contractor within the terms of such delegation shall bind the Contractor and the Owner as though it has been given by the Engineer-in-charge.

4.26.3 Any work or material approved by the representative of Engineer-in-charge shall not be disapproved by Engineer-in-charge and can not order the pulling down, removal or breaking up thereof at Contractor's cost.

4.26.4 If the Contractor shall be dissatisfied with any decision of the representative of the Engineer-in-charge he shall be entitled to refer the matter to the Engineer-in-charge who shall there upon confirm, reverse or vary such decision. No claim of losses alleged to have been caused by any discrepancies out of instructions, doubts or misunderstanding shall in any event be admissible.

4.26.5 Owner not bound by personal consent of any officer other than Engineer-in-charge.

The Contractor shall not be entitled to any increase on the scheduled rates or any other rights or claims whatsoever by reason of any consent, explanation, statement or alleged understanding, promise or guarantees given or to have been given to him by any person other than Engineer-in-charge in writing.

4.27 REMOVAL OF WORKMEN:

The Contractor shall employ in and about the Execution of the works only such persons as are skilled and experienced in their several trades and the Engineer-in-charge shall be at liberty to object to and require the Contractor to remove from the works any person employed by the Contractor in or about the execution of the works who in the opinion of the Engineer-in-charge misconducts himself or is incompetent or negligent in the proper performance of his duties and such person shall not be again employed in the work without permission of the Engineer-in-charge.

4.28 UNCOVERING AND MAKING GOOD:

The Contractor shall uncover any part of the works and/or make openings in or through the same as the Engineer-in-charge may from time to time direct for his verification and shall reinstate and make good such part to the satisfaction of the Engineer-in-charge. If any such part has been covered up or put out of view after being approved by the Engineer-in-charge and is subsequently found on uncovering to be executed in accordance with the Contract, the expenses of uncovering and/or making opening in or through, reinstating and making good the same shall be borne by the Owner. In any other case all such expenses shall be borne by the Contractor.

4.29 WORK DURING NIGHT SUNDAYS AND HOLIDAYS:

Subject to any provisions to the contrary contained in the Contract, none of the permanent works except emergency maintenance work & operation shall be carried out during night or on Sundays or on authorized holidays without the permission in writing of the Engineer-in-charge. But in case of maintenance Contract, the Contractor shall be required to work any time any day as required by Engineer-in-charge.

4.30 TIME OF PERFORMANCE:

The work covered by this Contract shall be commenced on due date / within 15 days of issue of Letter of Intent as applicable. The Contractor should bear in mind that time is the essence of the Contract, unless such time be extended at the discretion of the Owner.

4.31 FORCE MAJEURE:

4.31.1 Any delays in or failure of performance of either parties thereto shall not constitute default hereunder or give rise to any claims for damages if any, to the extent such delays in or failure of performance caused by occurrences such as acts of God or the public enemy, expropriation or confiscation of facilities by Government Authority, compliance with any order or request of any Government authorities, act of war, rebellion, civil commotion, sabotage, fire, flood, earthquake, explosion, implosion, riots, public strife provided always that such occurrences result in impossibility of performance of the Contract.

4.31.2 Only events of force majeure, which impede the execution of the Contract at the time of occurrence, shall be taken into cognizance.

4.32 FAILURE OF CONTRACTOR TO COMPLY WITH THE PROVISIONS OF THE CONTRACT:

4.32.1 If the Contractor refuses or fails to execute the work or any part thereof with such diligence or fails to perform any of his obligations under the Contract or in any manner commits a breach of any of the provisions of the Contract it shall be open to the Owner at its option by serving 7 days notice to the Contractor to:

- a) Determine the Contract: in which event the Contract shall stand terminated and shall cease to be in force and effect on and from the date appointed by the Owner on that

behalf, whereupon the Contractor shall stop forthwith any of the Contract work then in progress, except such work as the Owner may in writing require to be done to safeguard any property or work, or installation from damages and the Owner for its part, may take over the work remaining unfinished by the Contractor and complete the same through fresh Contractor or by other means, at the risk and cost of the Contractor, and any of his sureties if any, shall be liable for any excess cost at the rates specified in the schedule of quantities and rates.

- b) Without determining the Contract: to take over the work of the Contractor or any part thereof and complete the same through a fresh Contractor or by other means at the risk and cost of the Contractor. The Contractor and any of his sureties are liable for any excess cost over and above the cost at the rates specified in the schedule of quantities/rates, incurred by such works having been taken over and completed by the Owner. Besides the Contractor shall also be liable for any compensation accruing due to any loss incurred by the Owner.
- c) In other cases, the decision of the Owner is binding on the Contractor.

4.32.2 In the events of clause 4.32.1 (a)

- a) The whole or part of the security deposit furnished by the Contractor is liable to be forfeited without prejudice to the right of the Owner to recover from the Contractor the excess cost referred to in the sub-clause aforesaid, the Owner shall also have the right of taking possession and utilizing in completing the works or any part thereof, such of materials, equipments and T&P available at work site belonging to the Contractor as may be necessary and the Contractor shall not be entitled for any compensation for use or damage to such materials, equipments, tools & plants.
- b) The amount that may have become due to the Contractor on account of the work already executed by him shall not be payable to him until after the expiry of six (6) calendar months reckoned from the date of termination of Contract or from taking over of the work or part thereof by the Owner as the case may be, during which period the responsibilities for faulty materials or workmanship in respect of such work shall under the Contract, rest exclusively with the Contractor. This amount shall be subject to deduction of any amounts due from the Contractor to the Owner under the terms of the Contract authorized or required to be reserved or retained by the Owner.

4.32.3 Before termination of the Contract as per clause 4.32.1(a)or(b) if in the judgment of the Owner, the default or defaults committed by the Contractor is/are curable and can be cured by the Contractor if an opportunity given to him, then the Owner may issue notice in writing calling the Contractor to cure the default within such time specified in the notice.

4.32.4 The Owner shall also have the right to proceed or take action as per 4.32.1(a) (b), in the event that the Contractor becomes bankrupt, insolvent, compounds with his creditors, assigns the Contract in favour of his creditors or any other persons, or being a company or a corporation goes into liquidation provided that in the said events it shall not be necessary for the Owner to give any prior notice to the Contractor.

4.32.5 Termination of the Contract as provided for in sub-clause 4.32.1(a)&(b) shall not prejudice or affect the rights of the Owner, which may have accrued up to the date of such termination.

4.33 **CONTRACTOR REMAINS LIABLE TO PAY COMPENSATION IF ACTION NOT TAKEN AS PER CLAUSE 4.32**

4.33.1 a) Non-exercise of power conferred on the Owner by Clause 4.32 when due, shall not imply a waiver of any of the conditions and shall be exercisable in the event of any further case of default by the contractor for which he is declared liable to pay compensation. The liability of

Contractor for past & future compensation shall remain unaffected. The Owner may take possession of all or any T&P, materials and stores at the work site belonging to Contractor on payment at Contract rate/market rate as the case may be or rate worked out by Engineer-in-charge. Otherwise, Engineer-in-charge may serve notice to remove such T&P, materials and stores from the site within a stipulated time. In the event the Contractor fails to comply, the Engineer-in-charge may remove them at the cost & risk of the Contractor.

b) In other cases, the decision of the Owner is binding on the Contractor.

4.33.2 In the event of Clause 4.32, Clause 4.33 shall be applicable without any prejudice. But in case of such cancellation the Owner shall not hold the estate of the deceased Contractor and/or the surviving partners of the Contractor's firm liable for any damages for non-completion of Contract.

4.34 **NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK:**

At any time from the commencement of the work if the Owner decides for whatsoever reason, not to carry out the whole work or part thereof as specified in the Tender, then Owner shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment or compensation on whatsoever account (profit or advantage which he might have derived by executing the work in full) neither shall have any claim for compensation by reason of any alterations having been made from the original specification, drawings, designs and instructions which may involve any curtailment of the work as originally contemplated.

4.35 **CHANGE OF CONSTITUTION:**

When the Contractor is a partnership firm the prior approval in writing from the Owner shall be obtained before any changes are made in the constitution of the firm. Where the Contractor is an individual or a Hindu Undivided family business concern, such approval as aforesaid shall, likewise be obtained before such Contractor enters into any partnership firm, where the reconstituted firm would have the right to carry out the work hereby undertaken by the Contractor. In either case if prior approval is not obtained, the Contract shall be deemed to have been allotted in contravention of clause 4.41 hereinafter and the action and consequence shall ensure as provided in that clause.

4.36 **TERMINATION OF CONTRACT FOR DEATH:**

If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies or if the Contractor is a partnership concern and one of the partners dies then, unless the Owner is satisfied that the legal representative of the individual or the proprietary concern or the surviving partners of partnership firm are capable of carrying out and completing Contract, the Owner is entitled to cancel the Contract for the incomplete part without being in anyway liable for any compensation payment to the establishment of the deceased Contractor and/or to the surviving partners of the Contractors firm on account of the cancellation of Contract. The decision of the Owner in such assessment shall be final and binding on the parties. In the events of satisfaction of the Engineer-in-charge that subcontractor, if any shall provide competent and efficient supervision over the work entrusted to them, may allow the surviving partner to complete the work contracted in case of partnership firm at the discretion of the Owner. In the event of such cancellation, the Owner shall not hold the estate of the deceased Contractor and/or the surviving partners of the Contractor's firm liable for damage for not completing the Contract.

- 4.37 **TERMINATION OF CONTRACT FOR CONTINUOUS UNSATISFACTORY PERFORMANCE:**
The Contract may be terminated at any time by giving 15 days notice in case performance of the Contractor is found to be continuously unsatisfactory. In case of termination of Contract either on expiry of Contract period or during the period of Contract due to continuous poor performance, labour unrest, indiscipline etc., Owner shall have no liability for providing employment/compensation to the labours engaged by Contractor under any circumstance. EMD/Security retained from the Contractor so far and payable if any on any other accounts shall be forfeited. Balance work shall be carried out at the cost & risk of the defaulting Contractor.
- 4.38 **MEMBERS OF THE OWNER NOT INDIVIDUALLY LIABLE:**
No official or employee of the Owner including Engineer-in-charge shall in any way be personally bound or liable for the acts or obligations of the Owner under the Contract or answerable for any default or omission in the observance or performance of the acts, matter or things which are herein contained.
- 4.39 **CONTRACTOR'S OFFICE/STORE/WORKSHOP AT SITE:**
The Contractor shall provide and maintain an office outside the plant gate for his Site Incharge, staff and such office shall be opened at all reasonable hours to receive instructions, notices or other communications. The Contractor at all time shall maintain a site instruction book and compliance of these shall be communicated to the Engineer-in-charge from time to time and the whole documents to be preserved and handed over after completion of works.
- 4.40 **CONTRACTOR'S SUBORDINATE STAFF AND THEIR CONDUCT:**
- 4.40.1 The Contractor on award of the work shall identify, authorize and depute a qualified employee of the Contractor having sufficient experience in carrying out work of similar nature to whom the equipments, materials if any shall be issued and instruction for works given. The Contractor shall also provide to the satisfaction of the Engineer-in-charge sufficient and qualified staff to supervise the execution of the work, competent site-in-charge, foremen and leading hands including those specially qualified by previous experience to supervise the types of works comprised in the Contract in such manner as will ensure the best quality and expeditious working. At any time in the opinion of the Engineer-in-charge any additional, qualified experienced staff for supervision is considered necessary, they will be provided by the Contractor without additional financial burden to Owner. The Contractor shall ensure to the satisfaction of the Engineer-in-charge competent and efficient supervision over the work entrusted to them including their Sub-Contractors if any (deployed with prior permission of the Owner) and comply all statutory provisions of Contract Labour (R&A) Acts 1970.
- 4.40.2 If any of the Contractor's site-in-charge, assistants, foremen or any employee in the opinion of Engineer-in-charge be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or that in the opinion of the Owner's Engineer-in-charge undesirable for administrative or any other ground, the continuance of such person(s) in Contractor establishment, then at the directions of Engineer-in-charge the Contractor shall at once remove such person(s) from the establishment of the Contractor at the Owner's premises without any financial burden to Owner.

- 4.40.3 The Contractor shall be responsible for the proper behavior of all the staff, foremen, workmen and others, shall exercise proper degree of control over them and in particular without prejudice to the said generality the Contractor shall be bound to prohibit/prevent any of the employees from trespassing or acting in anyway detrimental or prejudicial to the interest of the community or the properties or Owner's land or properties in the neighborhood. In the event of such trespassing, the Contractor shall be responsible for all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-charge upon any matter arising under this clause shall be final.
- 4.40.4 All Contractors personnel entering into the Owners premises shall be properly identified by badges of a type acceptable to the Owner which must be worn at all times on Owners premises.
- 4.40.5 Attention is drawn to the Contract Labour (R&A) Act 1970 whereby no master-servant relationship is created between the Owner and the Contractor's labour and no claim for employment / compensation of any such labour from the Owner shall be tenable or entertained.
- 4.41 **SUBLETTING OF WORK:**
In normal cases, sub-contracting is not permitted. But however Engineer-in-charge may permit the same in case he is satisfied that subcontracting is required. No power of attorney holder other than a regular employee, partner or director of the firm shall be considered for Site In-charge of Contractor. No Contractor with the power of attorney of some other Contractor shall be entertained to execute any work. The Contractor is advised not to enter into Contract before obtaining the consent of Engiener-in-charge to that effect.
- 4.41.1 No part of the Contract nor share or interest therein shall in any manner or degree be transferred, assigned or sublet by the Contractor directly or indirectly to any person, firm or corporation whatsoever except as provided for in the succeeding sub-clauses without the prior consent in writing of the Owner.
- 4.41.2 **Contractors liability not reduced by subcontract:**
Notwithstanding any subcontract with such approval as aforesaid and notwithstanding that the Engineer-in-charge shall have received copies of any subcontracts, the Contractors shall be and shall remain solely responsible for the quality and timely execution of the works and performance of all the conditions of the Contract in all respects as if such subcontract or subletting had not taken place, and as if such work had been done directly by the Contractor.
- 4.41.3 **No remedy for action taken under clause 4.41:**
For action taken by the Owner under the clause shall not relieve the Contractor of any of his liabilities under the Contract or give rise to any right or compensation, extension of time or otherwise.
- 4.42 **POWER OF INTERFERENCE:**
- 4.42.1 If the Contractor shall not commence the work in the manner described in the Contract documents or if he at any time in the opinion of the Engineer-in-charge-
- i) Fails to carry out the works in conformity with the Contract documents or
 - ii) Fails to carry out the works in accordance with the Contract schedule
 - iii) Substantially suspend work or the works for a period of seven days without approval of the Engineer-in-charge,
 - iv) Fails to carry out and execute the works to the satisfaction of the Engineer-in-charge.

- v) Fails to supply sufficient or suitable constructional plant, temporary works, labour, materials or other things or Tools & Plants, minimum infrastructure facilities.
- vi) Commit, suffer or permit any other breach of any of the provisions of the Contract on his part to be performed or observed or persist in any of the above mentioned breaches of the Contract for seven days, after notice in writing shall have been given to the Contractor by the Engineer-in-charge requiring such breach to be remedied, or
- vi) If the Contractor during the continuance of the Contract shall become bankrupt, make any arrangement for composition with his creditors or go into liquidation, the Owner shall have the power to enter into the works and take over the possession of the materials, temporary work, constructional plant, stock and complete the works by other Contractors, firm or corporation as the Owner in his absolute discretion may think proper to employ and to use or authorize the use of any materials, temporary works, constructional plant, and stock as aforesaid, without making payment to the Contractor for the said materials, other than such as may be certified in writing by the Engineer-in-charge to be reasonable & not being liable for any loss or damage thereto. The Owner shall by reason of his taking possession of the work or of the works being completed by other Contractor (due account being taken of any such extra work or works which may be omitted) then the excess amount if any shall be deducted from any money which may be due for work done by the Contractor under the Contract and not paid for. Any further deficiency shall forthwith be made good by sell in such manner and for such price as he may think fit all or any of the constructional plant, materials etc. available at site.

4.43 CONTRACTOR'S RESPONSIBILITY FOR COMPLIANCE OF STATUTORY NORMS & OTHER RULES APPLICABLE TO SUCH CONTRACT:

The Contractor shall conform in all respect to the provisions of statutory regulations, ordinances, bylaws of any local or duly constituted authorities or public bodies, which may be applicable from time to time to the works or any temporary works. The Contractor shall keep the Owner indemnified against all penalties and liabilities of every kind, arising out of non-adherence to such statutes, ordinances, laws, rules, regulations etc. All costs & expenses borne by the Owner in way of penalty, associated litigations etc. on account of Contractor's default shall be recovered from the Contractor from his dues or from the dues of any other contract with Owner or as debt liability.

4.44 OTHER AGENCIES AT SITE:

The Contractor shall have to execute the work in such place and condition where other Agencies will also be engaged for other works such as site grading, filling & leveling, electrical & mechanical engineering works, operation & maintenance activities of running plant etc. No claim shall be entertained due to work being executed in the above circumstances. The Contractor shall do their work in a time & manner taking all safety precautions so as to avoid interference with other activities but their activities should not lag behind. Engineer-in-charge's decision in this respect is final.

4.45 CORRESPONDENCES /NOTICES:

4.45.1 Power of Attorney:

Owner/ Engineer-in-charge shall ordinarily correspond with the Contractor at the address furnished by the Contractor. Any notice to be sent to the Contractor by Owner shall be sent by registered post to the address of the Contractor. The Contractor shall submit due power of attorney in favour of their site-in-charge at site for the purpose of receipt of all letters,

notices, drafts, cheques, job instruction and execution of job etc. from Owner and to correspond & transact with Owner on behalf of Contractor & pertaining to this Contract only.

4.45.2 Address for Correspondence:

The Contractor shall give full & correct address of his Registered Office with Telephone (s), Fax (s) and E-mail numbers etc. if any to the Owner for correspondence. In case of any change of address during currency of the Contract, the Contractor shall forthwith intimate the same to the Owner failing which such act shall be treated as a fraudulent motive of Contractor.

4.45.3 Notice to the Contractor:

Any notice may be served on the Contractor or his site-in-charge at the job site or by registered mail directly to the address furnished by the Contractor or both. Proof of issue of such notice shall be conclusive on the Contractor having been duly informed of the contents therein.

4.45.4 Notice to the Owner:

Any notice to be given to the Owner under the terms of Contract shall be served by sending the same by Registered mail to or delivering the same at the respective site office of Ib Thermal Power Station, addressed to the Engineer-in-charge.

4.45.5 Notices to local bodies:

- i) Contractor shall comply with and give all notices required under any Government authority, instrument, rule or order made under any Act of Parliament, State laws or any regulation or bye-laws of any local authority relating to the works. He shall before making any variation from the Contract drawing necessitated by such compliance give to the Engineer-in-charge a written notice giving reasons for the proposed variation and obtain the Engineer-in-charge's instructions thereon.
- ii) The Contractor shall pay and indemnify the Owner against any liability in respect of any fees or charges payable under any Act of Parliament, State laws or any Government instrument, rule or order and any regulations or byelaws of any local authority in respect of the works.

4.45.6 Instructions & Notices:

- i) Subject as otherwise provided in this Contract, all notices to be given and all other actions to be taken on behalf of the Owner may be given or taken by the Engineer-in-charge / Officer-in-charge or his authorized representative.
- ii) All instructions, notices and communications etc., under the Contract shall be given in writing and if sent by registered post to the last known place of abode or business of the Contractor shall be deemed to have been served on the date when in the ordinary course of post these would have been delivered to him.
- iii) The Contractor or his site-in-charge shall be in attendance at the site (s) during all working hours and shall superintend the execution of the works with such additional assistance in each trade, as the Engineer-in-charge may consider necessary. In no case site-in-charge shall remain absent from site without prior permission of the Engineer-in-charge. Orders given to the Contractor's site-in-charge shall be considered to have the same force as if they had been given to the Contractor himself.
- iv) The Engineer-in-charge shall communicate or confirm the instructions to the Contractor in respect of the execution of work in a field work Site Order Book maintained in the office of the Engineer-in-charge and the Contractor or his authorized representative shall confirm receipt of such instructions by signing the

relevant entries in this Book. If required by the Contractor, he shall be furnished a copy of such instruction (s).

4.46 RIGHTS OF OWNER ON VARIOUS INTERESTS:

- i) The Owner reserves the right to distribute the work between more than one Contractor. The Contractor shall cooperate and afford the other Contractors all reasonable opportunity for access to the works for the carriage and storage of materials and execution of their works.
- ii) Wherever the work being done by any department of the Owner or by the Contractor engaged by the Owner as per the condition of work covered by this Contract, the respective rights and various interests involved shall be determined by the Engineer-in-charge to secure the completion of the various portions of the work in general harmony.

4.47 NEGOTIATION OF RATES:

In case Owner finds the lowest price to be at higher side in consideration of market price of various inputs including labour component, may call the lowest Bidders for negotiation of price based on analysis of their rate etc.

4.48 ISSUE OF LOI:

The Letter of Intent shall be released by the Owner or the Engineer-in-charge with the rates and other terms & conditions finally arrived at negotiation. The Contractor shall commence performance of the Contract on the basis of this LOI/Work order.

4.49 Firm work order shall be released / Contract agreement executed within 30 days of issue of Letter of Intent. Letter of Intent / Work Order shall be accepted by the Contractor by endorsement and return the duplicate copy of work order endorsed as unconditional acceptance of rates & terms and conditions of work order to the Owner and form part of Contract.

End of Section-IV

SECTION-V

5.0 SCOPE & PERFORMANCE OF WORK

5.1 SCOPE OF WORK:

Scope of particular work in detail is available in Special Conditions of Contract for information of Bidders.

5.2 USE OF CONTRACT DOCUMENTS:

The Contractor shall be provided drawings free of charge with tender documents / during the progress of work. He shall keep one copy of Contract documents with drawings on the site in good order and the same shall at all reasonable times be available for inspection and use by the Engineer-in-charge/his representatives / other inspecting officers.

5.2.1 None of these documents shall be used by the Contractor for any purpose other than that of this Contract.

5.2.2 The Contractor shall take necessary steps to ensure that all persons employed on any work in connection with this Contract have noticed that the Indian Official Secret Act 1923 (XIX of 1923) applied to them and shall continue to apply even after the execution of such works under the Contract.

5.3 WORKS TO BE CARRIED OUT:

The works to be carried out under the Contract shall except as otherwise provided in these conditions include all labours, materials, tools, plant, equipment and transport which may be required in preparation of and for full & entire execution for completion of works. The description given in the schedule of quantity shall unless otherwise stated, be held to include waste of materials, carriage and cartage, carrying in, return of empties, hoisting, setting, fitting and fixing in position and all other labour necessary in and for the full and entire execution and completion as aforesaid in accordance with good practice and recognized principles of engineering.

5.4 SCHEDULE OF WORK:

After receipt of LOI the schedule of work shall be drawn by the Contractor taking into account and dovetailing the technicality of work, sequence of work, material availability, materials on transit, materials on order, weather condition, nature & urgency of works, their permutation & combination for an integrated approach for timely completion of the works at ultimate cost. The Engineer-in-charge after scrutinizing the schedule submitted by the Contractor shall approve before actual work commences.

5.5 EXECUTION OF WORKS:

All the works shall be executed in strict conformity with the provisions of the Contract documents, specifications and instructions by the Engineer-in-charge whether mentioned in the Contract or not. The Contractor shall be responsible for ensuring that works are executed in the most substantial and proper workman like manner using the quality materials and labour during the progress of and up to completion of job in strict accordance with the specifications and to the entire satisfaction of the Engineer-in-charge.

- 5.6 **COORDINATION AND INSPECTION OF WORKS:**
The coordination and inspection of the day-to-day work under the Contract shall be the responsibility of the Engineer-in-charge or his authorized representatives. A field work order book shall be maintained by the Contractor in which written instruction for specific job be entered. These shall be signed by the Contractor or his authorized representative by way of acknowledgment within 12 hours.
- 5.7 **GENERAL CONDITION OF WORK:**
The working time of the work is 48 hours per week per man in general. In case of overtime work is permitted in case of need, the Owner will not compensate for the same. Shift working at 2 to 3 shifts per day will become necessary and the Contractor shall take this aspect into consideration while formulating his rates for Tender. No extra claim will be entertained by the Owner on this account.
- 5.8 **REPORTING OF WORK STATUS:**
The Contractor shall submit to the Engineer-in-charge reports at regular intervals regarding the progress of work as desired from time to time.
- 5.9 **DRAWING / SEQUENCE TO BE PROVIDED BY OWNER :**
In the progress of work, detailed working drawings on the basis of which actual execution of the work has to proceed, shall be furnished in stages. The Contractor shall be deemed to have gone through the drawings issued to him thoroughly and carefully, in conjunction with all other connected drawings and discrepancies if any shall be brought to the notice of the Engineer-in-charge, before actually carrying out the works. Wherever drawing is not possible, sequence of operation or work instructions shall be given by the Engineer-in-charge as in case of maintenance works etc.
- 5.10 **LIABILITIES FOR DEFECTS, IMPERFECTIONS etc. AND RECTIFICATION THEREOF:**
If it shall appear to the Engineer-in-charge that any work has been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor for the execution of work are unsound or of quality inferior to that Contracted for, or otherwise not in accordance with the Contract, the Contractor shall on demand in writing from the Engineer-in-charge or his authorized representative specifying the work, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct that work so specified and provide other proper and suitable materials or articles at his own charge and cost, and in the event of failure to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid the Engineer-in-charge may on expiry of notice period rectify or removes, and re-execute the work or remove and replace with others, the materials or articles complained or as the case may be at the risk and expense in all respects of the Contractor. The decision of Engineer-in-charge as to any question arising under this clause shall be final and conclusive.
- 5.11 **TWELVE MONTHS PERIOD OF DEFECT LIABILITY FROM THE DATE OF ACTUAL COMPLETION OF WORK RECORDED IN COMPLETION CERTIFICATE:**
From the commencement to completion of the work, the Contractor shall take full responsibility for the care of all works including all temporary works and in case any damage, loss or injury shall happen to the work or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same so

that on completion the work shall be in good order and in conformity in every respects with the requirements of the Contract and the Engineer-in-charge's instruction.

The defect liability period shall be 12 months from the date of completion. On completion of such period and on final certification of satisfactory performance report of the Contracted work from Engineer-in-charge, the security deposit shall be released. The period of 12 months shall be counted from the date of completion of last repair of defect in case of any defect appears after completion of work / from the date of completion as mentioned in completion certificate.

5.12 TRAINING OF APPRENTICES:

The Contractor shall during the currency of the Contract when called upon by the Engineer-in-charge engage and also ensure engagement by subcontractor and other employed by the Contractor in connection with the works, such number of Apprentices in the categories mentioned in Schedule A and for such periods as may be required by the Engineer-in-charge. The Contractor shall train them as required under the Apprentices Act, 1961 and shall be responsible for all obligations of the employer under the Act, excluding the liability to make payment to Apprentices as required under the Act.

5.13 Contractor's liability & insurance:

From commencement to completion of the works, the Contractor shall take full responsibility of the site for taking care and precautions to prevent loss or damage and to minimize loss or damage to the maximum extent possible and shall be liable for any damage or loss that may happen to the works or any part thereof and all Owner's T & P from any cause whatsoever (save and except the Excepted Risks) and shall at his own cost repair and make good the same so that at completion of the works, all Owner's T & P shall be in good order and condition and in conformity in every respect with the requirements of BI standard and to the satisfaction of the Engineer-in-charge and to the satisfaction of Engineer-in-charge where BIS is not available.

5.13.1 In the event of any loss or damage to the works or any part thereof or to any T & P or to any material or articles at the site from any of the Excepted Risks the following provisions shall apply:

- a) The Contractor shall, as may be directed in writing by the Engineer-in-charge, remove from the site any debris and so much of the works as shall have been damaged, taking to the Owner's store such T & P, articles and/or materials as may be directed:
- b) The Contractor shall, as may be directed in writing by the Engineer-in-charge, proceed with the erection and completion of the works under and in accordance with the provisions and conditions of the Contract.

5.13.2 Compensation on account of loss due to damage for Excepted perils:

The value of re-execution of work, which is lost or damaged in Excepted Risks, shall be ascertained in the same rate under the Contract and added to the contract sum as deviation. Provided the Contractor was alert and has taken sufficient precaution as a man of general prudence should have taken to prevent the loss or damage to minimize the amount of such loss in his own case.

5.13.3 Where Owner's buildings or a part thereof is rented to the Contractor he shall insure the entire building if the building or any part thereof is used by him for the purpose of storing or using materials of combustible nature, as to which the decision of the Engineer-in-charge shall be final and binding.

- 5.13.4 The Contractor shall indemnify and keep indemnified the Owner against all losses and claims for injuries or damage to any persons or any property whatsoever which may arise out of or in consequence of the construction and maintenance works and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto.
- 5.13.5 Before commencing execution of the work, the Contractor shall, without in any way limiting his obligations and responsibilities under this condition, insure against any damage, loss or injury which may occur to any property. (excluding that of the Owner but including the Owner's building rented by the Contractor wholly or in a part and any part of which is used by him for storing combustible materials), or to any person (including any employee of the Owner) by or arising out of carrying out of the Contract.
- 5.13.6 The Contractor shall at all times indemnify the Owner against all claims, damages or compensation under the provisions of Payment of Wages Act, 1936. Minimum Wages Act, 1948; Employer's Liability Act, 1938; the Workmen's Compensation Act, 1923; Industrial Disputes Act, 1947 and the Maternity Benefit Act, 1961 or any Modifications thereof or any other law relating thereto and rules made hereunder from time to time or as a consequence of any accident or injury to any workman or other persons in or about the works, whether in the employment of the Contractor or not, save and except where such accident or injury has resulted from any act of the Owner, his agents or servants, and also against all costs, charges and expenses of any suit, action or proceedings arising out of such accident or injury and against all sum or sums which may with the consent of the Contractor be paid to compromise or compound any claim. Without limiting his obligations and liabilities as above provided, the Contractor shall insure against all claims, damages or compensation payable under the Workmen's Compensation Act, 1923 or any modification thereof or any other law relating thereto.
- 5.13.7 The Contractor shall ensure that similar insurance policies are taken out by his subcontractors (if any) and shall be responsible for any claims or losses to the Owner resulting from their failure to obtain adequate insurance protection in connection thereof. The Contractor shall produce or cause to be produced by his subcontractors (if any) as the case may be, the relevant policy or policies and premium receipts as and when required by the Engineer-in-charge.
- 5.13.8 If the Contractor and/or his subcontractors (if any) shall fail to effect and keep in force the insurance referred to above or any other insurance which he/they may be required to effect under the terms of the Contract then and in any such case the Owner may, without being bound to, effect and keep in force any such insurance and pay such premium or premiums as may be necessary for the purpose and from time to time deduct the amount so paid by the Owner from any moneys due or which may become due to the Contractor or recover the same as a debt due from the Contractor.

The above conditions are applicable for value of work below one crore rupees. But in case of contract involving considerable risk or damage and of value more than one crore, the Contractor has to obtain blanket insurance policy for all his works, T & P and manpower and assign in favour of the Owner.

5.14 Retention of cost & expenses

a) In the event the contractor is involved with violation of any act(s) relating to safety, environment, labour and workmen compensation, taxes & duties etc. and consequent legal action & penalty during execution of contract the issue is open in relevant Govt. Deptt.,

estimated value of cost and expenses towards the same shall be retained from the final bill till disposal of the case.

b) If any contractor avoids to attend workmen's compensation commissioner court on summon, he shall not be entertained for award of any future contract in OPGC. The cost & expenses of compensation towards the death or permanent disablement shall be deducted from the corresponding Contract or any other Contract executed by the same Contractor in OPGC or lastly as debt liability.

End of Section-V

SECTION-VI

6.0 **CERTIFICATE AND PAYMENT:**

6.1 **SCHEDULE OF QUANTITY / PRICE SCHEDULE AND PAYMENT:**

6.1.1 **Contractor's remuneration:**

The price to be paid by the Owner to the Contractor for the whole of the work done and for the performance of all the obligations undertaken by the Contractor under the Contract shall be ascertained by the application of the respective rates in schedule of quantity / price schedule (the inclusive nature of which is more particularly defined by way of application but not of limitation of item of activities, materials & expenses specified in clause No.6.1.2) and payment to be made accordingly to the work actually executed and approved by the Engineer-in-charge. The sum so ascertained shall (exception only as and to the extent expressly provided herein) constitute the remuneration of the Contractor under the Contract and no further or other payment whatsoever shall be or become due or payable to the Contractor under the Contract.

6.1.2 **Activities & expenses to be included in rates:**

The prices/rates agreed both by the Contractor and Owner and subsequently incorporated in the Contract shall remain firm till the issue of Final Certificate and shall not be subject to escalation. The said schedule of quantity / price schedule shall be deemed to include and cover all costs, expenses and liabilities of every description and all risks of every kind to be taken in execution, completion and handing over the work to the Owner by the Contractor. The Contractor shall be deemed to have known the nature, scope, magnitude and the extent of the works and materials required though the Contract Document may not fully and precisely furnish them. He shall make such provision in the rates accepted as he may consider necessary to cover those of such items of work and materials as may be reasonable and necessary to complete the work. The opinion of the Engineer-in-charge as to the items of work which are necessary and reasonable for completion of work shall be final and binding on Contractor although the same may not be shown on or described specifically in Contract document.

6.1.3 **Rates to cover taxes and duties:**

No exemption or reduction of custom duties, excise duties, sales tax, works Contract tax, entry tax or any port duties, royalty, transport charges, stamp duties of Central or State Government or Local Body or Municipal Taxes or duties, taxes or charges, income tax whatsoever will be granted or obtained and all expenses of which shall be deemed to be included in and covered by the accepted rates. The Contractor shall also obtain and pay for all permits or other privileges necessary to complete the work.

6.1.4 **Accepted rates cannot be altered**

For work under item rate basis, no alteration will be allowed in the rates by reasons of works or any part of them being modified, altered, extended, diminished or omitted. The accepted rates is of fully inclusive rates which have been agreed by the Contractor and the Owner and cannot be altered under any circumstances. However, if the quantity of such modification, alteration, extension, reduction or omission is substantial and exceeds 5% in the Contract price, the variation in rate may be examined and amended by Engineer-in-charge on recommendation of Contract Review Meeting (refer Clause No.4.11)

6.1.5 **The rates to cover for working in operating plant:** Contractor's rates shall be deemed to include the factors such as work shall be carried out in operating plant and shall take sufficient care in moving the plants, equipments and materials from one place to another, so that they do not cause any damage to any person or to the property of the Owner or to third party including overhead and underground cables/pipe lines. In the event of such

damage including eventual loss of generation and operation of the plant or services in any plant or establishment as estimated by the Owner or ascertained by the third party shall be borne by the Contractor. The aforesaid risk shall be covered by insurance as per Clause 5.13.5 This shall be applicable when Contract value is more than one crore.

6.2 PROCEDURE FOR MEASUREMENT OF WORK EITHER IN PROGRESS OR FINAL:

6.2.1 Methods of measurement:

The measurement shall be taken in accordance with the procedure set in the specifications. No local or general method of measurement shall be adopted. In case the method of measurement is not specified in the specifications, the procedure of Bureau of Indian Standard shall prevail.

6.2.2 Measurement of work in progress:

All measurements shall be in metric system. All the works in progress will be jointly measured by the representatives of Owner and the Contractor progressively in construction & civil maintenance work. In case of mechanical /electrical / C&I maintenance & upkeepment work etc. the item of work performed by the Contractor shall be recorded daily preferably immediately on completion in the manner stipulated in conditions of Contract. Such measurements will be recorded in the prescribed measurement book by the representative of Owner and signed by both parties as token of acceptance by both either on completion of certain item or in an interval of days or hours as the case may be.

6.2.3 Final measurement:

On completion of work final measurement shall be taken in the similar fashion as stated earlier and sum total of part measurement shall be compared. Final measurement shall be considered for final payment.

6.2.4 Before taking measurements of any construction work, the Engineer-in-charge or his authorized representative for the purpose shall give a notice with reasonable time to the Contractor. In case of operation or maintenance work the Contractor or his authorized representative shall obtain the signature of Engineer-in-charge or his representative in support of completion of any item of work to the satisfaction of Engineer-in-charge. All these details shall be recorded in measurement book in prescribed format to be provided by Engineer-in-charge / printed standard Measurement Book available in the market.

If the Contractor fails to attend or to send an authorized representative for measurement after such a notice or failure of Engineer-in-charge on Contractor's request in case of maintenance work as the case may be or fails to countersign or to record the objection within a week from the date of measurement, then in any such event, the measurement taken by the Engineer-in-charge / his representative shall be taken to be correct measurement of work.

6.2.5 The Contractor shall, without extra charge, provide assistance in every measurement in respect of labour and other things necessary for measurements.

6.2.6 If the Contractor objects to any of the measurements recorded in the measurement book, the matter shall be referred to the subsequent Contract Review Meeting. The decision taken in the Contract Review Meeting shall be final & binding.

6.2.7 Billing:

The Contractor shall submit bill in approved proforma in accordance with the Contract terms and the agreed billing schedules in duplicate to the Engineer-in-charge / Officer-in-charge as the case may be giving abstract and detailed measurement for the various items executed during a pre-determined period / month, as the case may be. In case of maintenance/ upkeepment contract, monthly bill shall be preferred during 1st week of the

succeeding month. In case of construction work the bill shall be furnished after achieving milestone or as provided in the Contract. The Engineer-in-charge shall take or cause to be taken the requisite measurements for the purpose of having the same verified and the claim as far as admissible, adjusted, if possible, before the expiry of 21 days from the presentation of the bill. This is applicable for running bills only.

6.3 PAYMENT OF CONTRACTOR'S BILL:

Payment due to the Contractor shall be made by the Owner, by Crossed Account Payee cheque forwarding the same to registered office or the notified office of the Contractor. The cheque shall also be handed over to the Contractor or their Site-in-charge if authorized for the purpose against due receipt. In no case will Owner be responsible if the cheque is mislaid or misappropriated by unauthorized person / persons. Demand draft may also be issued after deduction of bank commission charges if requested by the Contractor.

All payment shall be made in Indian currency only.

6.3.1 Payment of running bill:

Interim bills shall be submitted by the Contractor at intervals mentioned in Schedule A on or before the date fixed by the Engineer-in-charge for the work executed. The Engineer-in-charge / Officer-in-charge shall then arrange to have the bill verified by comparing with the measurement already taken.

6.3.2 On certification of Engineer-in-charge, payment to which the Contractor is considered entitled by way of interim payment shall be made for all the work executed, after deducting there from the amounts already paid, the security deposit and such other amounts as may be deductible or recoverable in terms of the Contract.

6.3.3 Payment of the Contractor's interim bills shall be made by the Owner within 21 days from the date of acceptance of the bill by Engineer-in-charge.

6.3.4 Any interim certificate given relating to work done may be modified or corrected by any subsequent interim certificate or by the final certificate. No certificate of the Engineer-in-charge supporting an interim payment shall itself be conclusive evidence that any work to which it relates is / are in accordance with the Contract.

6.4 RECEIPT OF PAYMENT:

Receipt of payment made on account of work when executed by a firm, must be signed by the Contractor in case of proprietary firm and otherwise a person holding due power of attorney in this respect on behalf of the Contractor, except when the Contractors are described in their Tender as a limited company in which case the receipts must be signed in the name of the company by one of its principal officers or by some other persons having authority to give effectual receipt for the company.

6.5 COMPLETION CERTIFICATE:

6.5.1 Eligibility criteria for issue of Completion Certificate: -

No certificate of completion shall be issued nor shall the work be considered to be completed till the Contractor shall have removed from the premises on which the work has been executed, all such scaffolding, sheds and surplus materials except such as are required for rectification of defects, rubbish and all huts and sanitary arrangements required for his workmen on the site in connection with the execution of the work, as shall have been erected by the Contractor or the workmen and cleaned all dirt from the parts of building (s) in or upon or about which the work has been executed or of which he may have had possession for the purpose of the execution thereof and cleaned floors, gutters and drains, eased doors and sashes, oiled locks and fastenings, labeled keys clearly and handed them over to the Engineer-in-charge and made the whole premises fit for immediate occupation

or use to the satisfaction of the Engineer-in-charge. If the Contractor shall fail to comply with any of the requirements of this conditions as aforesaid on or before the scheduled date of completion of the works, the Engineer-in-charge may at the expense of the Contractor fulfill such requirements and dispose of the scaffoldings, surplus materials and rubbish, etc. as he thinks fit and the Contractor shall have no claim in respect of any such scaffolding or surplus materials except for any sum actually realized by the sale thereof less the cost of fulfilling the requirements and any other amount that may be due from the Contractor. If the expenses of fulfilling such requirements are more than the amount realized on such disposal as aforesaid, the Contractor shall forthwith on demand pay such excess.

6.5.2 Application for Completion Certificate.

As soon as the work is completed and the Contractor fulfills his obligations in all respect, he shall be eligible to apply for Completion Certificate. The Owner or his representative shall normally issue to the Contractor the Completion Certificate within 30 days after receiving an application from the Contractor after verifying from the completion documents and satisfying himself that the work has been completed in accordance and as set out in the construction and erection drawings and the Contract Documents. In case of operation or maintenance Contract, satisfactory performance during Contract period shall be basis for issue of Completion Certificate.

6.5.3 Issue of Completion Certificate:

On receipt of request from the Contractor Engineer-in-charge shall inspect whole of the work and shall issue a certificate of completion indicating: -

- a) Date of completion of work
- b) Value of the Contract / value of work executed
- c) Quality of performance
- d) Level of safety maintained during the work.

6.5.4 If at any time before completion of the entire work, items or groups of items for which separate periods of completion have been specified, have been completed the Engineer-in-charge can take possession of any such parts being hereinafter in this condition referred to as 'the relevant part') notwithstanding anything expressed or implied elsewhere in this Contract:

(a) Within thirty days of the date of completion of such items or groups of items or possession of the relevant part the Engineer-in-charge shall issue Completion Certificate for the 'relevant part' provided the Contractor fulfils his obligations under clause 6.5.1 for the 'relevant part'.

(b) The Defects Liability Period in respect of such items and the 'relevant part' shall be deemed to have commenced from the certified date of completion of such items or the 'relevant part' as the case may be.

(c) The Contractor may reduce the value insured under Clause 5.13 by the full value of the completed items or 'relevant part' as estimated by the Engineer-in-charge for this purpose. This estimate shall be applicable for this particular purpose only.

(d) In such case Compensation / Liquidated Damage for delay shall be calculated in accordance with Clause 6.9 on total value of the work, less the value of 'relevant part' taking into consideration the due date of completion as per Contract and subsequent time extension, if any.

6.6 FINAL PAYMENT:

During progress of work in case of construction work and period fixed for payment in case of provision of services such as operation and maintenance, running bills shall be preferred by the Contractor as per the terms of Contract and shall be paid on the basis of measurement

certification of Engineer-in-charge / Officer-in-charge from time to time or in fixed intervals.
But final bill shall be paid on receipt of -

- i) Final bill (n'th & final bill must be written over the bill)
- ii) Measurement book with all its supporting documents
- iii) Completion Certificate of Engineer-in-charge
- iv) Store clearance
- v) Evidence in support of clearance of labour dues.
- vi) Evidence in support of payment of PF dues
- vii) No claim certificate by the Contractor
- viii) Total amount of dues, less-
 - a) Payment already made through running bills
 - b) Advances if any
 - c) Penalty if any
 - d) Liquidated damage
 - e) Amounts towards the cost of tools & plants not returned to warehouse
 - f) Value of the surplus of material issued not returned to store.
 - g) Any estimated amount on account of default of Contractor in statutory or environmental matter or dispute open in Court of Law.
 - h) Clearance from Personnel & Administration department relating to rent for accommodation, water & electricity bills etc.

6.7 TERMS OF PAYMENT:

- (a) The running bill corresponding to the terms of Contract raised by the Contractor shall be paid to him on certification of Engineer-in-charge.
- (b) The bill for any permissible period shall be submitted within 7 days of expiry of the said period and payment shall be released within 21 days of submission of the bill provided the same is received by Engineer-in-charge.
- (c) All statutory deductions levied by the Govt. or other statutory authorities at the rate prevailing at the time of payment of bill shall be deducted from the running bills.
- (d) The Engineer-in-charge reserves the right to effect deductions towards penalty & other recoveries if any, under the terms & conditions of Contract.
- (e) Final bill shall be settled after submission of the same with all related documents as per Clause 6.6 within the period specified in Clause 6.8

6.8 TIME LIMIT FOR PAYMENT OF FINAL BILL:

- 6.8.1 The final bill shall be submitted by the Contractor within three months of physical completion of the work. No further claims can be made by the Contractor after submission of the final bill and all claims shall be deemed to have either been included in the final bill or waived and extinguished. Payment of those items of the bill in respect of which there is no dispute and of items in dispute for quantities and rates as approved by Engineer-in-charge, shall be made within the period specified herein this clause, the period being reckoned from the date of receipt of the bill by the Engineer-in-charge. If the decision of Engineer-in-charge is not agreed by the Contractor, the dispute either in quantity or rate or both shall be referred to Contract Review Meeting and the decision made thereof shall be final & binding on both parties.

The time limit for release of final payment corresponding to the Contract value are furnished below: -

- (a) Contract value not exceeding Four months from the date of

Rs.5 lakhs

acceptance of
Final bill by the
Engr-in-charge

(b) Contract value exceeding Six month --- do ----
Rs.5 lakhs

Provided the Contractor has furnished all required documents in accordance to clause 6.6. The period of release of fund shall be counted from the date of compliance of last documents or formalities.

For above purpose, original Contract value or the actual value of the work whichever is higher shall be taken into consideration.

6.9 LIQUIDATED DAMAGES FOR DELAY:

If the Contractor fails to maintain the required progress in terms of achieving milestone fixed in the time & progress schedule or to complete the work as the case may be under Contract & clear the site on or before the due date or extended date of completion they shall without prejudice to any other right or remedy shall be liable for liquidated damage as stipulated below or such small amount as may be fixed by the Engineer-in-charge on the Contract value of the work or actual value of the work whichever is higher for every week during which the progress remains below the specified time of completion subject to the total amount of compensation for delay to be paid under this condition shall not exceed the under noted percentage of the Contract value or of the Contract value of the item or group of items of work for which a separate period of completion is given:

This will also be applicable to items or group of items for which separate period of completion has been specified.

Rates & upper limit of Liquidated Damage:

<u>Completion period</u>		% of Contract / Work value per week	Maximum % of Contract / work value
a.	Due Completion period (as originally stipulated) not exceeding 6 months	@ 1%	10%
b.	Due Completion period (as originally stipulated) exceeding 6 months but not exceeding 2 years	@ 0.5%	7.5%
c.	Due Completion period (as originally stipulated) exceeding 2 years	@ 0.25%	5%

6.9.1 The amount of liquidated damage (LD) may be adjusted or set-off against any sum payable to the Contractor under this or any other Contract with the Owner. In case at the time of the amount of LD comes to the notice of the Owner the Contractor does not have any amount pending with the Owner, the Contractor shall be served with a notice and in turn the Contractor has to deposit the said amount in shape of D/D with the Owner in the fashion mentioned earlier.

End of Section-VI

SECTION-VII

7.0 STATUTORY OBLIGATION & INSURANCE

7.1 TAXES:

7.1.1 The Contractor shall defray all taxes such as toll, local taxes, excise duty, royalty, income tax, sales tax, GST, work contract tax and other payments and compensation, if any in connection with the procurement and handling of materials, fabrication and execution of works or any method or process connected with the works. Sales tax, Entry tax, Excise duty and any other tax on materials required for the work & works shall be payable by the Contractor and the Owner will not entertain any claim whatsoever in this respect. The final rate is inclusive of work contract tax & other taxes applicable including GST to this work or materials thereto.

7.1.2 Notwithstanding anything contained elsewhere in the Contract, the Owner shall deduct at source from the payments due to the Contractor, the taxes as required under Odisha Sales Tax Act or as amended from time to time or under any other statute. It is for the Contractor to deal with the Sales Tax authorities directly in respect of any claim or refund relating to the above deductions and the Owner shall not be liable or responsible for any claims or payments or reimbursements in this regard. Income tax as applicable shall be deducted from all running bills.

7.2 INSURANCE:

The Contractor shall obtain insurance coverage to the construction work & related materials against loss under force majeure and assign the policy to the Owner where risk involvement is expected. The Contractor shall also at his own expenses carry and maintain group insurance with accidental benefit from reputed insurance companies to the satisfaction of the Owner as follows: -

7.2.1 **Employees State Insurance Act:**

At present this area is included in the scope of ESI scheme. The Contractor has to accept full and exclusive liability for compliance with all obligations imposed by the Employees State Insurance Act, 1948, and the Contractor further has to defend, indemnify and hold Owner harmless from any liability or penalty which may be imposed by the Central, State or Local Authority by the reason of any asserted violation by Contractor or subcontractor of the Employees State Insurance Act, 1948 and also from all claims, suits or proceeding that may be brought against the Owner arising under growing out of or by reasons of the work provided for by this Contract whether brought by employees of the Contractor, by third parties or by Central or State Government Authority or any political sub-division thereof. The Contractor agrees to fill in with the Employees State Insurance Corporation, the Declaration Forms and all forms which may be required in respect of the Contractor's or subcontractor's employees, whose aggregate remuneration is Rs.6500.00 per month or less or as amended from time to time and who are employed in the work provided for or those covered by ESI from time to time under the agreement. The Contractor shall deduct and secure the agreement of the subcontractor to deduct the employees' contribution as per the first schedule of the employee's State Insurance Act from wages and affix the employee's contribution cards at wages payments intervals. The Contractor shall remit and secure the agreement of the subcontractor to remit to the State Bank of India, employee's State Insurance Corporation Account, and the employee's contribution as required by the Act. The Contractor agrees to maintain all cards and records as required under the Act in respect of employee's and payments and Contractor shall secure the agreement of the subcontractor to maintain such records. Any expenses incurred for the contribution, making contributions or maintaining records shall be to the Contractor or subcontractor's account.

The Owner shall retain such sum as may be necessary from the total Contract value until the Contractor shall furnish satisfactory proof that all contributions as required by the employees State Insurance Act, 1948, have been paid. This will be pending on the contractor when the employee's State Insurance Act is extended to the place of work.

7.2.2 Workmen Compensation and Employer's Liability Insurance:

Insurance shall be effected for all the Contractor's employees engaged in the performance of this Contract. If any of the work is sublet, the Contractor shall require the subcontractor to provide workmen's compensation and employee's liability insurance for the latter's employees if such employees are not covered under the Contractor insurance.

7.2.3 Any other insurance required under Law or by Owner:

Contractor shall also carry and maintain any and all other insurances, which he may be required under any law from time to time. He shall also carry and maintain any other insurance, which may be required by the Owner.

7.2.4 Accident or Injury to workmen:

The Owner shall not be liable for or in respect of any damages or compensation payable by law in respect or in consequence of an accident or injury to any workmen or other persons in the Employment of the Contractor or any subcontractor save and except any accident or injury resulting from any willful act or default of the Owner, his agents or servants and the Contractor shall indemnify and keep indemnified the Owner against all such damages and compensation (save and except as aforesaid) and against all claims, demands, proceedings, costs, charges and expenses, whatsoever in respect or in relation thereto.

7.2.5 Transit Insurance:

The Contractor shall obtain adequate Transit insurance coverage at his own cost in respect of all items to be transported by the Contractor to the site of work.

7.3 EMPLOYEES PROVIDENT FUND:

The Contractor has to obtain P.F. code numbers from the P.F. Commissioner and photocopy of such coverage certificate shall be submitted to Engineer-in-charge prior to commencement of work. The Contractor has to furnish certified challan copy showing the amount deposited against this particular work if the Contractor executes works at different places in India and deposit the total amount in one challan only. In addition to this, Contractor shall furnish an undertaking with a list of deployed Contract labour for whom such amount is deposited. Contractor shall comply all P.F. formalities for all the workmen engaged for this work and keep OPGC indemnified.

End of Section-VII

SECTION-VIII

8.0 LABOUR LAWS

8.1 LABOUR LAWS:

Contractor shall comply with all laws, ordinances, regulations and notification / instruction of Govt. concerning the health, wages, welfare, safety and employment and non-employment of his workers and shall exclusively bear the consequences of failure to comply therewith.

The following points are to be observed strictly by the Contractor.

- i) No labour below the age of 18 (eighteen) years shall be employed on the work.
- ii) The Contractor shall not pay less than the notified wages by the appropriate government towards minimum wages from time to time and must comply with Minimum Wages Act. The payment has to be made to the labours in the presence of authorized representative of the Owner / Engineer-in-charge.
- iii) The Contractor shall at his expense comply with all labour laws and keep the Owner indemnified in respect thereof.
- iv) The Contractor shall pay equal wages for men & women in accordance with Equal Remuneration Act 1976.
- v) The Contractor under the Contract Labour (Regulation and Abolition) Act, shall have a valid Labour license from appropriate licensing authority prior to starting / within 15 days of commencement of the work under the Contract. Validity of the license shall be maintained till expiry of Contract period & its extension, if any.
- vi) The Contractor shall employ labour in sufficient numbers to maintain the schedule of work and of quality to ensure workmanship of the degree specified in the Contract and to the satisfaction of the Engineer-in-charge.
- vii) The Contractor shall furnish to the Engineer-in-charge at the interval of every 15 days a statement of the workmen employed on the works and also furnish information in Form-VIII, Part I & II under rule 73 of Odisha Contract Labour (R&A) Rule, 1975 or rules made there under.
- vii) The Contractor shall comply with the provisions of the Factories Act 1948, Payment of Wages Act 1936, Minimum Wages Act 1948, Employees Liability Act 1938, Workmen's Compensation Act 1923, the Maternity Benefit Act 1961, Employees Provident Fund (and Miscellaneous Provision) Act 1952 & Contract Labour (Regulation & Abolition) Act 1970 or any modifications thereof or any other laws relating thereto and rules made there-under from time to time. Owner shall not be held responsible for any injury sustained by Contractor's workmen while on duty.

In the event of any employment injury the Contractor has to pay necessary compensation pertaining to treatment & other associated benefits to the injured employee. In the event of fatal injury, death compensation to the legal heir of said employee shall be paid by the Contractor. In case of failure by the Contractor to pay the compensation as decided by the competent authority under the Workmen's Compensation Act, the Engineer-in-charge shall deduct the necessary amount from any outstanding bill of the Contractor or security and deposit the same with competent authority. In case before decision by the competent authority, if the Contract is being closed, estimated amount towards such compensation shall be retained from Contractor till finalization. For this purpose, the amount if falls short under the particular Contract shall be realized from any other Contract which the

Contractor is executing. The Contractor has to make all statutory records and register required in support of compliance of above provisions. Relevant statutory return shall be submitted with appropriate authority as required under the above Acts & rules with a copy to P&A department of Owner. All the records shall be kept within the work premises and must be made available on demand by Owner/Concerned statutory authority for scrutiny.

- ix) The Contractor shall indemnify the Owner against any payments to be made under and for the observance of the provisions of the aforesaid Acts without prejudice to his rights to claim indemnity from his subcontractor, if any.
- x) The Contractor has to make payment to their staff and labours by 7th day of succeeding month irrespective of release of Contractor's payment by Owner. In case of any default in the matter of payment to the labour, the following penalty apart from legal liability shall be imposed and recovered from Contractor's running bills.
 - (a) 0.1% of Contract value will be deducted for each day of delay of wages disbursement after 7th day of last wage period subject to maximum 1% of Contract value.
 - (b) Repetition of three such cases may attract immediate termination of Contract without any further reference to Contractor as per terms of Contract.
- (xi) Owner shall not take responsibility of Contractor's labours either during execution of Contract or on closure of Contract or termination of Contract.
- xii) However, in the event of default of any Contractor in payment to their labours for more than one month from the date of payment and if the service is essential for the Owner and the Contract can not immediately be terminated, the Engineer-in-charge shall make the payment to the workmen and recover the same amount from any due of the Contractor. Under such circumstances the Contractor shall be liable for immediate termination as deemed fit by the Owner.
- (xiii) The Contractor shall ensure that all the employees engaged by the Contractor including his subcontractor, if any, obtain health certificate from any competent medical practitioner under the provisions of Factories Act without any financial implication to Owner.
- (xiv) Every worker who has worked under the Contractor shall be allowed leave with wages, national & festival holidays, weekly off and extra wages or overtime as per law. The Contractor should provide employment card, wage slip and should maintain such other records in respect of engagement of workers as required by Contract Labour (R&A) Act 1970 and rules made there under. This provision must be ensured by the Contractor.

8.2 CONTRACTOR TO INDEMNIFY THE OWNER:

- 8.2.1 The Contractor shall indemnify the Owner and every officer and employee of the Owner including the Engineer-in-charge and his staff against all actions, proceedings, claims, demands costs and expenses whatsoever arising out of or in connection with the matters referred to in Clause 8.1 and elsewhere which may be made against the Owner for or in respect of or arising out of any act / omission by the Contractor in the performance of his obligations under the Contract. The Owner shall not be liable for or in respect of any demand or compensation payable by law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or his subcontractor and Contractor shall indemnify and keep indemnified the Owner against all such damage, compensation and against all claims, damages, proceedings, costs, charges and expenses whatsoever thereof or in relation thereto.

8.2.2 **Payment of Claims and Damages:**

Should the Owner have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the cost incurred by the Owner shall be charged to and paid by the Contractor and the Contractor shall not be at liberty to dispute or question the right of the Owner to make such payments notwithstanding the same may have been made without his consent or authority or in law or otherwise to the contrary.

8.2.3 The Contractor shall intimate to the Workman Compensation Commissioner in Form EE-I within prescribed period the employment accident with relevant information with copy to the Owner. The Contractor shall take all legal steps for compliance of the provisions of Workman Compensation Act relating to accident falling which Owner under circumstance shall take up the case for which all costs and expenses shall be recovered from the Contractor and the said Contract shall be liable to be terminated & the Contractor liable to be debarred from future participation in bid. In case the amount can not be recovered from dues / security / dues of other contracts with Owner, the same shall be recovered as debt liability.

8.3 **HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS:**

In respect of all labours directly or indirectly employed in the works for the performance of Contract, the Contractor shall comply with or cause to be complied with all the rules and regulations of the local sanitary and other authorities or as framed by the Owner from time to time for the protection of health and sanitary arrangements for all workers.

*8.4 **MODEL RULES FOR LABOUR WELFARE**

8.4.1 *First Aid:*

a) At every workplace where the number of workmen engaged exceeds 50, there shall be maintained in a readily accessible place first aid box containing the following equipments:

- (i) 12 small sterilized dressings
- (ii) 6 medium size sterilized dressings
- (iii) 6 large size sterilized dressings
- (iv) 6 large size sterilized burn dressings
- (v) 6 (15 gms.) packet sterilized cotton wool
- (vi) 1 (60 ml.) bottle containing a two per cent alcoholic solution of iodine
- (vii) 1 (60 ml.) bottle containing sal-volatile having the dose and mode of administration indicated on the label.
- (viii) 1 role of adhesive plaster
- (ix) A snake-bite lancet
- (x) 1 (30 gms) bottle of potassium permanganate crystals
- (xi) 1 pair scissors
- (xii) 1 copy of the first aid leaflet issued by the Director General, Factory Advice Service and Labour Institute, Government of India
- (xiii) A bottle containing 100 tablets (each of 5 grains) of aspirin
- (xiv) Ointment for burns
- (xv) A bottle of a suitable surgical anti-septic solution.

b) At every workplace where the number of workmen engaged does not exceed 50, there shall be maintained in a readily accessible place first aid box containing the following equipments:

- (i) 6 small sterilized dressings
- (ii) 3 medium size sterilized dressings
- (iii) 3 large size sterilized dressings
- (iv) 1 (30 ml.) bottle containing a two percent alcoholic solution of iodine
- (v) 3 large sterilized burn dressings
- (vi) 1 (30 ml.) bottle containing sal-volatile having the dose and mode of administration indicated on the label.
- (vii) 1 snake-bite lancet
- (viii) 1 (30 gms.) bottle of potassium permanganate crystals
- (ix) 1 pair scissors
- (x) 1 copy of the first aid leaflet issued by the Director General Factory Advise Service and Labour Institute, Government of India
- (xi) A bottle containing 100 tablets (each of 5 grains) of aspirin
- (xii) Ointment for burns
- (xiii) A bottle of suitable surgical anti-septic solution.

The appliances shall be kept in good order and they shall be placed under the charge of a responsible person who shall be readily available during working hours. Suitable transport / conveyance facility shall be kept readily available to take injured person(s) who suddenly fall seriously ill and shifting of urgent cases to nearest hospital. If required, initial first aid may be provided in Owner's hospital in emergency, but subsequent treatment is Contractor's responsibility in any other hospital.

8.4.2 *Accommodation for Labour:* The Contractor shall during the progress of the works provide, erect and maintain necessary temporary living accommodation and ancillary facilities for labour at his own expense and up to the standards as approved by the Engineer-in-Charge at a place outside the Owner's premises.

8.4.3 *Drinking Water:* In every workplace, there shall be provided and maintained at suitable locations, easily accessible to labour, a sufficient supply of cold water fit for drinking.

Where drinking water is obtained from public water supply, each work place shall be provided with storage where drinking water shall be stored.

Every water supply storage shall be at a distance of not less than 15 meters from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door, which shall be dust and waterproof.

A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

Washing and Bathing Places: Adequate washing and bathing places shall be provided separately for men and women. Such places shall be kept in clean and drained condition.

Standard number of Latrines and urinals: There shall be provided within the precincts of every workplace latrines and urinals in an accessible place and in the following scales: -

a) Where females are employed, there shall be at least one latrine / urinal for every 25 females.

b) Where males are employed, there shall be at least one latrine / urinal for every 25 males. Provided that where the no. of males employed exceeds 100, it shall be sufficient if there is one latrine for every 25 males up to first 100 and one for every 50 thereafter. In calculating the no. of latrines required, any odd no. of workers less than 25 or 50, as the case may be, shall be reckoned as 25 or 50.

Other specifications shall comply to the Odisha Factories Rules-1950.

Latrines and urinals: Except in workplaces provided with water flushed latrines connected with a water-borne sewage system, all latrines shall be provided with receptacles on dry earth system which shall be cleaned at least four times daily and at least twice during working hours and kept in a strictly hygienic condition. Receptacles shall be tarred inside and outside at least once a year.

If women are employed, separate latrine and urinals, partitioned from those for men and labeled with bold letters in both Oriya & Hindi, such as “ For Men” or “Women” shall be provided. A poster showing the figure of a man and of a woman shall also be exhibited at the entrance to latrines for each sex. There shall be adequate supply of water close to latrines and urinals.

- 8.4.4 *Construction of latrines:* Inside walls shall be constructed of masonry or other non-absorbent material and shall be cement-washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for the purpose and kept available for inspection. Latrine shall have at least thatched roof.
- 8.4.5 *Disposal of Excreta:* Unless otherwise arranged for by the local sanitary authority, arrangement for proper disposal of excreta by incineration at the workplace shall be made by the Contractor. Alternatively excreta may be disposed off by putting a layer of night soils at the bottom of pucca tank prepared for the purpose and covering it with a 15 cm layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn into manure).

The Contractor shall, at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of soil and other conservancy work in respect of Contractor's workmen or employees on the site. The Contractor shall be responsible for payment of any charges, which may be levied by municipal authority for execution of such work on his behalf.

- 8.4.6 *Provision of shelters during rest:* At every workplace there shall be provided free of cost four suitable sheds, two for meals and two others for rest, separately for use of men and women Labour. Height of each shelter shall not be less than 12' from floor-level to lowest part of roofs. Sheds shall be kept clean and the space provided shall be on the basis of at least 12 sq.ft. per head.
- 8.4.7 *Crèches:* At a place at which 30 or more women workers are ordinarily employed, there shall be provided at least one room for use of children under the age of 6 years belonging to such women. Rooms shall not be constructed to a standard lower than that of waterproof roof, smooth & impervious floor and wall with heat resistant materials / wooden planks. Rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean. There shall be two Dhais in attendance. Sanitary utensils shall be provided to the satisfaction of local medical, health

and municipal authorities. Use of huts shall be restricted to children, their attendants and mothers of children.

Where the number of women workers is more than 30 or more, the Contractor shall provide at least one hut and one Dhai to look after children of women workers.

Size of creche (s) shall vary according to the women workers employed.

Creche (s) shall be properly maintained and necessary equipment like toys etc. provided.

All other provisions shall comply to Odisha Factories Rules-1950.

8.4.8 *Canteen:* A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever 100 or more Contractor Labour are ordinarily employed and work continues for 6 months or more.

8.4.9 Planning, setting and erection of the above mentioned structures shall be approved by the Engineer-in-Charge, and the whole of such temporary accommodation shall at all times during the progress of the works be kept tidy and in a clean and hygienic condition to the satisfaction of the Engineer-in-Charge at the Contractor's expense. The Contractor shall conform generally to sanitary requirements of local medical, health and municipal authorities and at all times adopt such precautions as may be necessary to prevent soil, water & air pollution of the site.

On completion of the works the whole of such temporary structures shall be cleaned away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the whole of site left clean and tidy to the entire satisfaction of the Engineer-in-Charge at the Contractor's expenses.

8.4.10 *Anti-malaria precautions:* The Contractor shall at his own expense conform to all anti-malaria instructions given to him by the Engineer-in-Charge, including filling up any borrow pits which may have been dug by him.

8.4.11 *Enforcement:* The Inspecting Officer mentioned in the Contractors Labour Regulations at Clause 8.5.1(d) or any other officer nominated in his behalf by the Engineer-in-Charge shall report to the Owner all cases of failure on the part of the Contractor or his subcontractors to comply with the provision of these rules either wholly or in part and the Engineer-in-Charge shall impose such fines and other penalties as are prescribed in the conditions.

8.4.12 *Interpretations etc:* On any question as to the application, interpretation of effect of these rules, the decision of the Chief Inspector of Factories & Boiler, Labour Commissioner and Provident Fund Commissioner as the case may be shall be final and binding. Over & above the said provision, any court pronouncement having territorial jurisdiction shall be binding on both parties as the case may be.

8.4.13 *Amendments:* Government may, from time to time add to or amend Labour Laws and rules thereto and issue such directions as it may consider necessary for the proper implementation of these laws & rules or for the purpose of removing any difficulty which may arise in the administration thereof.

8.5 CONTRACT LABOUR REGULATION

8.5.1 *Definition:* In these regulations, unless otherwise expressed or indicated, the following words and expression shall have the meaning hereby assigned to them:

- (a) "Inspecting Officer" means any officer as mentioned below corresponding to different departments:

<u>Govt.Deptt.</u>	<u>Designation</u>
--------------------	--------------------

- | | |
|------|--|
| i) | Labour :
Rural Labour Inspector to Labour Commissioner |
| ii) | Factory: Inspector of Factories & Boilers to Chief Inspector of Factories & Boilers. |
| iii) | Provident Fund: Provident Fund Inspector to Provident Fund Commissioner |
| iv) | Any other person of above departments duly authorized by competent authority. |

Owner's Inspecting Officer means officers as mentioned below:

- | | |
|------|--|
| i) | Plant Manager |
| ii) | Engineer-in-charge |
| iii) | General Manager (P&A) or his authorized representative |
| iv) | Safety / Fire Officer |

8.5.2 Submission of information before commencement of work:

Contractor shall, before commencement of the work, furnish in writing to the Engineer-in-charge of the area concerned the following information:

- (a) Name and address of subcontractors as and when they are engaged.
- (b) Date of Commencement of the work.
- (c) Number of workers employed and likely to be employed.
- (d) Wages for different categories of workers.

8.5.3(i) Number of hours of work which shall constitute a normal working day:-

The number of hours, which shall constitute a normal working day for an adult, shall be eight hours including ½ hr. rest after five hours of work. The working day of an adult worker can be so arranged that inclusive of intervals, if any, for rest it shall not spread over more than ten / twelve hours on any day with prior approval of competent authority. If an adult worker is made to work more than nine hours on any day or for more than forty eight hours in any week he shall, in respect of overtime work, be paid wages at double the ordinary rate of wages.

- (ii) *Weekly rest:* Every worker shall be given a weekly day of rest which shall be fixed and notified in advance. A worker shall not be required or allowed to work on the weekly rest day unless he has or will have a substituted rest day, on one of the three days immediately before or after the rest day provided that no worker shall work for more than ten consecutive days without a full rest day.

8.5.4 Display of notice regarding Wages, Weekly Day of Rest etc.: The Contractor shall before he commences his work under Contract, display and correctly maintain and continue to display and correctly maintain in clean and legible condition in conspicuous places at site, notice in English, Oriya & Hindi giving the rate of minimum wages, the hours of work for which such wages are payable, the weekly rest days workers are entitled to and name and address of the Inspecting Officers.

8.5.5 Fixation of Wage Periods: The Contractor shall fix wage periods in respect of which wages shall be payable. No wage period shall exceed one month.

8.5.6 Payment of Wages:

- (i) Wages due to every worker shall be paid to him direct or to his authorized person. All wages shall be paid in current coins or currency or in both.

- (ii) Wages of every worker engaged under the Contract shall be paid where the wage period is one week, within THREE days from the end of the Wage period; and in any other case before the expiry of the 7th day or 10th day from the end of the wage period according as the number of workers does not exceed 1,000 or exceeds 1,000.
 - (iii) When employment of any worker is terminated by or on behalf of the Contractor, the dues of such worker shall be paid with immediate effect.
 - (iv) Payment of wages shall be made at the work site on a working day except when the work is completed before expiry of the wage period, in which case final payment shall be made at the work site within 48 hours of the last working day and during normal time.
- 8.5.7 *Register of Workman:* A register of workmen shall be maintained in the Form appended in Annexure-X and the relevant particulars of every workman shall be entered therein immediately on his employment and kept at the work site.
- 8.5.8 *Employment Card:* The Contractor shall issue an employment card in the Form appended in Annexure-XI to each worker on the day of work or entry into his employment. On termination of employment the Employment Card shall be retained by the Contractor and a service certificate shall be issued in Form X.
- 8.5.9 *Register of Wages etc:*
- (i) A Register of Wages-cum-Muster Roll in the Form appended in Annexure-XII shall be maintained and kept at the work site or as near to it as possible.
 - (ii) A wage slip in the Form appended in Annexure-XV shall be issued to every worker employed by the Contractor at least a day prior to disbursement of wages.
- 8.5.10 *Deductions, which may be made from Wages:*
- (i) Wages of a worker shall be paid to him without any deductions of any kind except the following:
 - (a) fines
 - (b) deductions for absence from duty. The amount of deduction shall be in proportion to the period for which he was absent.
 - (c) deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money which he is required to account for, where such damage or loss is directly attributable to his neglect or default.
 - (d) Rent of house accommodation / amenities
 - (e) Deductions for recovery of advances or for adjustment of overpayment of wages. Advance granted shall be entered in a register; and
 - (f) Any other deduction, which the Owner may from time to time allow.
 - (ii) No fines shall be imposed on any worker in respect of such acts and omissions on his part as have been approved by the Competent authority as in Clause 8.5.1.
 - (iii) No fine shall be imposed on a worker and no deductions for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deduction.
 - (iv) The total amount of fines which may be imposed in any one wage period on a worker shall not exceed an amount equal to 3% of wages in respect of that wage period.
 - (v) No fine imposed on a worker shall be recovered from him in installments, or after expiry of sixty days from the date on which it was imposed. Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

- (vi) The Contractor shall maintain in English, Hindi & Oriya a list approved by the Labour Commissioner, clearly stating the acts and omissions for which penalty or fine may be imposed on a workman and display it in good condition in a conspicuous place on the work site.
 - (vii) The Contractor shall maintain a register of fines and the register of deductions for damage or loss in the Forms appended in Annexure-XIII & XIV respectively, which should be kept at the place of work.
- 8.5.11 *Register of Accidents:* The Contractor shall maintain a register of accidents in Form 26 prescribed under Rule 105 of Odisha Factory Rules, 1950 but the same shall include the following particulars:-
- (a) Full particulars of the labours who met with accident
 - (b) Rate of Wages
 - (c) Sex
 - (d) Age
 - (e) Nature of accident and cause of accident
 - (f) Time and date of accident
 - (g) Date and time when admitted in hospital
 - (h) Date of discharge from the hospital
 - (i) Period of treatment and result of treatment
 - (j) Percentage loss of earning capacity and disability as assessed by Medical Officer.
 - (k) Claim required to be paid under Workmen's Compensation Act.
 - (l) Date of payment of compensation
 - (m) Amount paid with details of the person to whom the same was paid
 - (n) Authority by whom the compensation was assessed
 - (o) Remarks
- 8.5.12 *Preservation of Registers:* The Register of workmen and the Register of Wages-cum-Muster Roll required to be maintained under these Regulations shall be preserved for 3 years after the date on which the last entry is made therein Form IX.
- 8.5.13 *Enforcement:* The Inspecting Officer shall either of his own or on a complaint received by him carry out investigations, and send a report to the Engineer-In-charge specifying the amounts representing worker's dues and amount of penalty to be imposed on the Contractor for breach of these Regulations, that have to be recovered from the Contractor, indicating full details of the recoveries proposed and the reasons therefore. It shall be obligatory on the part of the Engineer-in-charge on receipt of such a report to deduct such amounts from payments due to the Contractor.
- 8.5.14 *Disposal of amounts recovered from the Contractor:* The Engineer-in-charge shall arrange payment to workers concerned at the earliest from receipt of a report from the Inspecting Officer except in case where the Contractor had made an appeal under Clause 8.5.15. In case where there is an appeal, payment of workers dues would be arranged by the Engineer-in-charge, wherever such payments arise, within THIRTY days from the date of receipt of the decision of the authority specified in Clause 8.5.1
- 8.5.15 *Appeal against decision of Inspecting Officer:* Any person aggrieved by a decision of the Inspecting Officer may appeal against such decision before the higher authority concerned within THIRTY days from the date of the decision, forwarding simultaneously a copy of his appeal to the Engineer-in-charge.

Inspection of Books and other Documents: The Contractor shall allow inspection of the Registers and other documents prescribed under these Regulations by Inspecting Officers

and the Engineer-in-charge/Owner/Owner's representative at any time on receipt of due notice at a convenient time.

Interpretation, etc.: On any question as to the application, interpretation or effect of these Regulations the decision of the Owner or his representative shall be final & binding.

Amendments: Government may, from time to time, add to or amend Labour laws and issue such directions if considered necessary for the proper implementation of Labour laws or for removing any difficulty, which may arise in the administration thereof.

REGISTERS TO BE MAINTAINED BY THE CONTRACTOR:

Factory Act 1948:

- | | | | | |
|----|------------------------------------|---|---------|---------|
| 1. | Register of Adult workers | : | | Form-12 |
| 2. | Register of leave with wages | : | Form-15 | |
| 3. | Register of Accident | : | Form-26 | |
| 4. | Register of over time | : | Form-10 | |
| 5. | Register of health | : | Form-31 | |
| 6. | Register for issue of PPEs | : | | |
| 7. | Register for compensatory holiday: | | Form-9 | |
| 8. | Muster Roll with Wages Register | | | |

Contract Labour (R&A) Act 1970

- | | | | | |
|-----|---------------------------|---|-------------------|--|
| 9. | Muster Roll | : | Form-XII | |
| 10. | Employment cards | : | Form-X | |
| 11. | Register of Contract Work | : | (Form VII)Part-II | |

Payment of Wages Act-1936

- | | | | | |
|-----|-----------------------|---|------------|--|
| 12. | Register of Fines | : | Form-XVII | |
| 13. | Register of Deduction | : | Form-XIV | |
| 14. | Register of Advance | : | Form-XVIII | |

Minimum wages Act

- | | | | | |
|-----|-----------|---|---------|--|
| 15. | Wage slip | : | Form-XV | |
|-----|-----------|---|---------|--|

Payment of Bonus Act

- | | | | | |
|-----|-----------------------|--|--|--|
| 16. | Consolidated Register | | | |
|-----|-----------------------|--|--|--|

PF Act

- | | | | | |
|-----|-----------------------|--|--|--|
| 17. | Contribution Register | | | |
| 18. | Inspection Register | | | |

Equal Remuneration Act 1976

- | | | | | |
|-----|-------------------|--|--|--|
| 19. | Form 'D' Register | | | |
|-----|-------------------|--|--|--|

Miscellaneous Register

- | | | | | |
|-----|----------------------------|--|--|--|
| 20. | Register for issue of PPEs | | | |
|-----|----------------------------|--|--|--|

End of Section-VIII

SECTION-IX

9.0 SAFETY PROVISIONS:

9.1 GENERAL:

It is the objective of OPGC to maintain excellence in safety & loss control performance by Contractors at all locations of ITPS. The Owner will provide the environment, encouragement and support to achieve this objective but is the Contractor's responsibility to establish, maintain, and manage its own safety & loss prevention programme.

Contractor shall adhere to safe work practice and guard against hazardous and unsafe working condition and shall comply with Owner's safety rules as setout herein. Prior to start of work, Contractor will be provided copies of Owners Health & Safety Manual for information and guidance.

The contractor is expected to exert primary control through their line supervision to obtain desired performance. Repeated poor safety performance shall lead to termination of Contract and shall be debarred from future participation in Contract for one year.

9.2 RESPONSIBILITY OF CONTRACTOR IN RESPECT OF SAFETY:

9.2.1 In respect of all labours, directly or indirectly employed in the work for the performance of Contract, the Contractor shall at his own expense comply all the safety provisions as per (i) Bureau of Indian Standards, (ii) The Electricity Act & Rules, (iii) Regulations adopted by Owner and other orders made there under and other acts as applicable.

9.2.2 The Contractor shall observe and abide by all fire/safety regulations of the Owner. Before starting of work, Contractor shall consult Engineer-in-charge and ensure that any loss or damage due to fire to any portion of the work under this Contract due to his fault shall be made good by the Contractor at his cost.

9.2.3 Before entry into the plant premises, all the Contractor labours shall be imparted safety training by Owner's Safety Officer / Fire Officer after which gate pass shall be issued.

9.2.4 The Contractor shall ensure that necessary skill in respect of various jobs is acquired by way of working & certificate to that effect is available, e.g. for riggers, fitter & other such workmen. Operators / drivers of various vehicles must have valid license from competent authority.

9.3 SAFETY RULES OF OWNER:

9.3.1 The Contractor has to strictly abide by the Safety rules & regulations enforced by Owner from time to time. The Contractor shall provide proper Identity Card to their employees, which shall be produced for verification on demand at security gate & in working areas. All the Contractor workers have to be provided with personal protective equipment as per the BISH duly certified by Owner's Safety Officer. The Contractor has to make provision of standard PPEs as laid down in Clause 9.13 and get it approved from Owner's Safety Officer before commencement of the work, failing which the Contractor & their workmen shall not be allowed to enter into the plant / work site.

9.3.2 Any Contract labour who shall be detected inside the plant without use of any of the PPEs shall not be allowed to continue in duty. On first occasion, he shall be sent back with warning and on second occasion, he shall be sent back & shall be debarred from duty for 3 to 5 days without pay. Repetition of the same shall constrain the management to advise the Contractor to remove such person from his employment under this Contract.

- 9.3.4 The Contractor workmen are restricted to go to any other department / work place during duty without permission of Engineer-in-charge.
- 9.3.5 Any Contractor workman detected on duty in drunken condition shall not be allowed to continue at the Owner's site.
- 9.3.6 Face mask & apron / flash suit of approved standard are to be provided by the Contractor to electrical workmen as and when required.
- 9.4 **COMPENSATION:**
For any accident of Contractor workmen while on work the Contractor shall pay compensation to their workmen, supervisor as per Factory / Labour Act. Owner shall not be liable for any such compensation.
- 9.5 **SAFETY IN OPERATION / MAINTENANCE:**
- 9.5.1 Contractor shall have to undertake any job as & when required at mutually agreed time with the concerned Engineer-in-charge and with proper work permit (PTW) for safety consideration & uninterrupted running of the plant.
- 9.5.2 No workman can be engaged in over time during night hours & on holidays without specific approval of Engineer-in-charge.
- 9.6 **FIRST AID AND INDUSTRIAL INJURIES:**
- i) Contractor shall maintain first aid facilities for his employees and those of his subcontractors in addition to the facility provided by the Owner.
 - ii) Contractor shall make outside arrangements for ambulance service for the treatment of industrial injuries. Names of those providing these services shall be furnished to Owner prior to start of work, and their telephone numbers shall be prominently posted in Contractor's field office.
 - iii) All necessary personal protective equipments as considered adequate by the Engineer-in-charge / Safety Officer shall be kept available for the use of persons employed at the site and maintained in good condition suitable for use. The standard of Personal Protective Equipments (PPE'S) to be provided by the Contractors to their employees shall be as furnished under 'standard' of Personal Protective Equipments as laid down in Clause No.9.13
 - iv) The Contractor shall report promptly to the Engineer-in-charge/his representative any injury, diseases, dangerous occurrence, near misses and shall cooperate with Engineer-in-charge and the Safety Officer in investigation process to establish basic causes and recommend appropriate improvements in control and remedial measures.
- 9.7 **NO SMOKING AREA:**
Smoking is strictly prohibited in plant premises in general & in the Battery Area, Hydrogen Area, tank farm, Diesel/petrol filling station & warehouse in particular. Violators of the "No Smoking" rules shall be removed from employment immediately. Smoking is prohibited in public place.
- 9.8 **NOTICES TO BE DISPLAYED:**
In addition to the duties imposed by statutory obligations, the Contractor shall notify on his work premises the following norms relating to safety, health and environment imposed by the Owner.

- ❖ Owner's Safety and Health Procedures & rules applicable to Contractor workmen in Owner's premises.

9.9 **BARRICADE:**

- i) Contractor shall erect and maintain barricades required in connection with his work to guard, protect & prevent accidents by others.:

Areas to be guarded

- a) Excavations
 - b) Hoisting areas
 - c) Areas considered hazardous by either Contractor or Owner.
 - d) Owner's existing property subject to damage by Contractor's operation.
 - e) Railroad / unloading spots.
 - f) Any other place as directed by Engineer-in-charge / Owner's Safety Officer.
- ii) Contractor's employees and those of his subcontractors shall abide by Owner's barricading practice and the provisions thereof.
 - iii) Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked by red flasher lanterns at nights.

9.10 **SCAFFOLDING:**

- i) Scaffolding shall be moved, erected and used adjacent to exposed high voltage line only in accordance with the Owner's Safety & Health Procedures and in compliance with the requirements imposed by the Engineer-in-charge. All scaffold structures shall bear the scaffold identification serial number, the safe working load of its platform, the signature of Engineer-in-charge and a clear indication of the safe access period of seven days. Incomplete scaffolds must bear a caution – "Scaffolding Incomplete" (both in Hindi & Oriya).

The Contractor shall maintain a register of all scaffolds erected, dates of erection and reports of inspection and certificate of fitness. No scaffolding new or modified shall be used by any one unless it has been inspected by Owner's Safety Officer / competent person for satisfactory condition before use and thereafter before every subsequent seven days. If scaffolding members are provided by Owner, the Engineer-in-charge must certify the members of the scaffold before use.

In case of any modification or alteration in scaffolding, the Contractor must display on the scaffolds as "DO NOT USE" sign until it has been inspected and accepted as a safe structure by Owner's Safety Officer.

None other than a skilled & experienced workman shall erect, alter, modify the scaffolding under supervision of a competent person.

Any Contractor wishing to make use of an erected scaffold must ensure that permission has been granted by the Engineer-in-charge / competent person for the purpose and that the structure is capable of taking the load required for the related work. The Contractor must also confirm to the management instructions applicable to scaffold work control.

For work at height, but for short duration, where provision of a full scaffold is not reasonably practicable, safety harness must be used as per direction of Engineer-in-charge. Walking over unguarded beam at height is strictly forbidden.

- ii) Suitable scaffoldings should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period works as can be done safely from ladders. When a ladder is used a Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footsteps and handrails shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical). No metallic ladder shall be allowed for use in work place.
- iii) Scaffolding or staging on more than 3.25 meters above the ground or floor shall swing or suspend from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise retarded at least one meter high above the floor or platform of such scaffolding or staging and extending along with the entire length of the outside and ends thereof with only such openings 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.
- iv) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or gangway or the stairway is more than 3.25 meters above ground level or floor level, they shall be closely & rigidly constructed, should have adequate width and be suitably fastened as described in (ii) above.
- v) Every opening in the floor of a building or in working platform should be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1.0 meter.
- vi) Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9.0 meter in length. The length of rung between the side rails of ladder shall in no case be less than 30 cm for ladder up to and including 3.0 meter in length. For longer ladders this length shall be increased at least 15 mm for each additional meter of length. Uniform step spacing shall not exceed 30 cms. Adequate precautions shall be taken to prevent danger from electrical power. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall bear the expenses of defense of every suit, action or other proceedings of 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 or action or proceedings to any such person or which may with the consent of the Contractor to compromise any claim by any such person.

9.11 EXCAVATION AND TRENCHES:

All trenches 1.2 meters or more in depth shall at all times be provided with at least one ladder for each 50-meter length or fraction thereof.

Ladder shall be extended from bottom of the trench to at least 1.0 mtr above the surface of the ground. The sides of the trenches, which are 1.5 meters 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 to collapse. The excavated materials shall not be placed within 1.5 meters of

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

9.12 SAFETY MEASURE IN DEMOLITION WORK:

- I) Before any demolition work is commenced and also during the process of the demolition work-
 - a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.
 - b) No electric cable or apparatus, which is liable to be a source of danger, shall remain electrically charged.
 - c) All practical steps shall be taken to prevent danger to persons deployed 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.
- II) All personal protective equipments as considered necessary by the Engineer-in-charge / Safety Officer shall be kept available for the use of the persons employed at the site and maintained in good condition suitable for use. The standard of PPEs to be provided by the Contractors to their employees should correspond to Clause 9.13 hereinafter.
 - a) Workers employed on mixing asphaltic materials, cement and lime mortars/concrete shall be provided with protective footwear, protective gloves, dust mask and goggles.
 - b) Those engaged in white washing and mixing or stacking of cement bags or any materials, which are injurious to the eyes shall be provided with protective goggles & dust mask.
 - c) Those engaged in welding and gas cutting works shall be provided with protective face and eye-shields / welding mask, hand gloves & leather apron etc.
 - d) Stonebreakers shall be provided with protective goggles, protective clothing, hand gloves & dust mask and seated at sufficiently safe distances.
 - e) When workers are employed in sewers and manholes which are in use, the Contractor shall ensure that the manhole covers are opened and are ventilated at least for one 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 board to prevent accident to the public. In addition, procedure to work in confined space shall be strictly followed.
 - f) The Contractor shall not employ men below the age of 18 years and women on the work of painting the products containing lead in any form. No female worker shall be allowed to work without tight apron near rotating machines. Wherever men above the age of 18 years are employed on the work of lead painting the following precautions shall be taken -
 - 1. No paint containing lead products shall be used except in the form of paste or readymade paint.
 - 2. Suitable facemasks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint, dry rubbed and scrapped.
 - 3. All the required PPEs shall be provided by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash them on cessation of work.
- III) When the work is subject to a risk of drowning all necessary safety equipments sufficient PPEs including lifebuoy & rope shall be kept for use and all necessary steps

shall be taken for prompt rescue of any person in danger and adequate provision shall be made for prompt first aid treatment of all injuries likely to be sustained during the course of work.

- IV) Use of hoisting machines and tackles including their attachment anchorage and supports shall conform to the following standard or conditions and must comply the provision of Factory Act.
 - a) These shall be of good mechanical construction, sound materials and adequate strength and free from inherent defect and shall be kept in good working order.
 - b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from inherent defects.
 - c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years shall be in charge of any hoisting machine including any scaffolding or give signals to the operator.
 - d) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load & date of testing shall be labeled on the equipment. Every hoisting machine and all gear referred to above shall be marked with the safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to shall be loaded beyond the safe working load except for the purpose of testing.
 - e) In case of department machines, the safe working load shall be displayed on the equipment by the Engineer-in-charge. As regards Contractor's machines, the Contractor shall obtain necessary test certificate from competent authority and inform the Engineer-in-charge for verification, whenever he brings any machinery to site of work. The safe working load and date of load testing & due date of testing shall be labeled on the equipment in both cases.
 - f) Length of chain used for lifting shall not be adjusted by putting knot or slashing under any circumstances.
 - g) The lifting area including winch and other such equipment shall be isolated by suitable barricade to prevent entry of other persons & animals.
- V) Motors, gears, transmission lines, electric wiring and other dangerous part of hoisting appliances shall be provided with efficient safeguards. Hoisting appliances shall be provided with such means as to reduce to the minimum the accidental descent of the load. Adequate precaution shall be taken to reduce to the minimum risk of any part or parts 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 workers shall not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.
- VI) All scaffolding, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffoldings, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near places of work.
- VII) These safety provisions shall be brought to the notice of all concerned by displaying on a notice board at a conspicuous place of worksite. The person responsible for compliance of the safety code shall be named therein by the Contractor.
- VIII) To ensure effective enforcement of the rules and regulations relating to safety, the arrangements made by the Contractor shall be open to inspection by the Engineer-

in-charge / Safety Officer of Owner or authorized representatives and the Inspecting Officers as defined in the Contract Labour (R & A) Act.

- IX) Notwithstanding the above clauses there is nothing to exempt the Contractor from the operations of any other Act or rules in force in the Republic of India. The works throughout including any temporary works, shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpaths at the site or in vicinity thereto or any existing works whether the property of the Owner or a third party is affected.
- X) Every Contractor's employee shall be at all times under the proper supervision when working in Owner's premises or outside working site under Contract. Where a Contractor / subcontractor himself works alone or with 2-3 persons and does not have specifically designated supervisors, the Contractor shall be treated as supervisor and ensure safety of self & his workmen.
- XI) The Contractor must ensure that all equipment brought to site are in good condition, maintained in good condition, complies with the requirements of the Factories Act and/or any other specific legislation and is used or erected safely. Minimum stock of PPEs must be maintained by the Contractor in site store to meet all times need at work.
- XII) Contractor workers engaged in areas involving coal dust must use dust mask in addition to safety shoes, hardhats & safety glasses.
- XIII) Contractor labour while working in heights or on utilities connected to moving equipments etc. must use safety belts / full body harness as per requirement.
- XIV) Contractor labours engaged in areas involving high noise such as crusher, grizzle feeder, traveling tripper & paddle feeders, locomotives, ball mill, FD, ID & PA fans, compressors, DG set, turbine hall etc. must use ear plug /ear muff.
- XV) The use of compressed air for cleaning of clothing and skin is forbidden.
- XVI) No source of ionizing radiation shall be brought to Owner's premises without the prior permission of the Engineer-in-charge.
- XVII) Ladders, long objects and cranes must not be used in the vicinity of exposed high voltage power line without permission of the Engineer-in-charge.
- XVIII) All site huts, storage facilities, shelters and the like shall be provided with fire extinguishers appropriate to the risk and with adequate means of escape which shall be kept clear at all times.
- XIX) Gas fires and radiant heaters are forbidden in site huts.
- XX) The Contractor may only use high-pressure water washing, on-line sealing and steam cleaning apparatus with prior permission of the Engineer-in-charge/his representative.
- XXI) **Overhead Crane:**
 - a) No work on overhead crane is permissible when persons are either working or otherwise available under the said work. Roadways must be barricaded when work is carried out on roofs having eaves (overhanging edges of roof) parallel to roadways.
 - b) All girders, beams & overhead surfaces shall be kept free from nuts, bolts, tools and other materials.
- XXII) **Electrical:**
 - a) Only authorized and qualified personnel shall work on the installations, wiring, trouble shooting or repair of electrical equipment.
 - b) All electrical work including temporary wiring shall be done in accordance with the current Indian Electricity Regulations and with the permission of concerned departmental electrical engineers/ competent authority.

- c) No ladders other than electrically insulated fiber ladder shall be used by workmen of the Contractor.
- d) All electrical equipments provided by the Contractor and any temporary supply installations shall comply with the provisions of the relevant Indian Electricity Regulations.
- e) Portable tools, headlamps and other portable apparatus should be identified by a serial number, registered and periodically inspected & tested. All such equipments used by the Contractor shall have a current test certificate of electrical safety.
- f) For tapping of power for temporary work, socket & adopter shall be used. Inserting wire in plug socket shall be liable for severe penalty.

XXIII) Crane:

- a) Cranes & other heavy equipment must be guided into and out of the plant by a person (pilot) walking in front of the vehicle at a SAFE distance.
- b) No person shall ride on a crane ball, cable or boom etc.
- c) Areas within the surrounding radius of the rear of the rotating super structure of the heavy crane shall be barricaded to prevent personnel from being struck or crushed by the crane while in operation at one place.
- d) Crane booms must not be operated within 3 meters of live electrical wires.
- e) *Light of Crane:* Head light & back light must be used irrespective of movement or working in a static condition.

XXIV) Vehicles:

- a) Contractors shall not be permitted to use company mobile equipment such as cranes, tractors, and industrial trucks, machinery etc. unless specifically authorized in writing to do so.
- b) Automobiles and other vehicles shall be parked only in designated areas.
- c) Maximum speed limits shall be as per the road signs inside factory premises.
- d) Vehicles traveling on plant roads at night must use headlights at low beam. All loads must be securely fastened.
- e) No Contractor labour shall sit on the open truck or tractor/trailer body etc.
- f) Nobody should enter or get out of any moving vehicles or equipments.
- g) Proper cover shall be provided for vehicles carrying dust-emitting materials.

XXV) Hot Work Permit:

- a) Contractor shall contact the Engineer-in-charge of the work to obtain a HWP before starting any flame cutting, welding, grinding or other hot work.
- b) The Contractor shall provide a fire watch if the hazard dictates the need for one.
- c) All compressed gas cylinders must be stored in upright position and properly secured with a valve cap.
- d) Ensure availability of approved extinguishers in good working order and properly filled before starting the job.
- e) Where cutting, burning or welding is to be done overhead, a person must be stationed below at a safe distance with an approved fire extinguisher. The area under overhead work shall be barricaded.
- f) Arc welding done at floor level must be shielded to protect personnel from welding area.
- g) Acetylene and oxygen welding / cutting must have approved back flow prevention check valves (i.e. Flash Back Arrestor). Cylinder must be closed / turned off after use.
- h) Tarpaulins used shall be fire resistant. The placement & use of tarpaulins shall be under strict supervision & control of company personnel.

- i) Fire hydrants and hoses are not to be used without written permission of Engineer-in-charge except to fight fires.
- j) No LPG shall be used for any industrial purpose.

XXVI) Compressed Gas Cylinder:

Compressed Gas Cylinder must be moved, stored or handled in an upright position. Transporting horizontally or by means of “barrel rolling” tactics is forbidden. No cylinder shall be moved with the protective cap off or regulator attached except when secured in an approved welding buggy. All cylinders whether charged or empty must be secured in an upright and approved manner remote from possible damage.

XXVII) Confined spaces:

No person shall enter a confined space (tank, vault, pit, sewer, or enclosed structure with restricted means of space) until such entry permit is issued and signed by the departmental Engineer-in-charge of the confined space work area.

XXVIII) General Practices:

Intoxicants:

- a) Possession of or drinking of alcoholic beverages is strictly prohibited on company premises. Violators will be immediately removed and permanently prohibited from entering the plant.
- b) Possession of drugs for other than medical reasons is forbidden on company premises.
- c) Contractor personnel must not enter any building or area not required by their work & wondering about the plant is prohibited.

XXIX) House Keeping:

- a) Good House-Keeping practices are to be followed and the work places kept clean and orderly. Rejects & scraps shall be deposited in proper waste containers / place as the case may be.

At no time shall any materials or equipment be placed so as to block the aisles & emergency exits from work place.

XXX) Machinery Guarding:

Machinery, tools and equipments must not be operated without guards.

XXXII) Fire Protection:

- a) Fire hydrants, extinguishers, hose racks and other emergency equipment shall not be covered or blocked and fire equipment lines must always be kept clear.
- b) All fire incidents must be reported to the Engineer-in-charge / Fire Officer / Safety Officer regardless of duration or extent and meticulously investigated.

XXXIII) Temporary Building:

Temporary building and material storage areas shall only be allowed on written approval of the Engineer-in-charge. They shall not be set up under power lines or over pipe ways.

XXXIV) Clearance Procedure:

Contractor must utilize the plant safety clearance procedure for performing work on process equipment, machines, and electrical equipment, as close supervisory coordination and control are needed on these jobs.

XXXV) Plant Utilities:

Plant air, water, gas, electricity, fuel etc are not to be used by the Contractor unless the source of supply has been designated and authorized by Engineer-in-charge.

9.13 MINIMUM QUALITY OF PERSONAL PROTECTIVE EQUIPMENT:

Standard of personal protective equipments to be provided by the Contractors to their employees are indicated here below.

NAME OF THE ITEMS WITH SPECIFICATION

1. Industrial safety helmet conforming IS:2925
2. Safety shoes conforming IS:9473-1993
3. Dust mask conforming IS:9473-1983
4. ~~Safety belt conforming IS:3521-1983~~ Full body Harness with fall arrest tested to 22KN and above.
5. Safety glasses for dust protection
Lightweight safety glasses with side shield to protect against wind & ultraviolet ray with adjustable side arms for personalized fit.
- 6.(i) Ear muff conforming IS:6229
(ii) Ear plug or Ear seal
Unique closed cell polyester from smooth tapered surface similar to ear canal, swells slowly to fit individual Ear canal.

(Any one item out of three types of ear protection device should be issued)
7. Flame-Water-Oil-Acids & alkali resistant work wear (made of 100% cotton fabric)
8. Safety gloves of Kevlar or equivalent (high temp. resistance)
9. Face shield (conforming IS:8521 part I type-I)
10. Electrical hand gloves 440v & 33 KV conforming IS:4770
11. Hand gloves for chemical laboratory made from pure latex Acid and Alkali proof
12. Hand gloves for concentrated chemicals made from superior PVC inside cotton reinforce for better grip
13. Split chrome leather hand gloves for handling rough object.
14. Canvas hand gloves for handling smooth object & doing light work with it.
15. Flip up goggles with stationery frame fitted with ophthalmic grade zero power toughened lens and fitting frame. Blue lens for furnace. Green shade No.4 for gas cutting, dark green No.11 for glasses for ARC welding whenever is required.
16. Panoramic type safety goggles for acid & alkali whenever is required. Contractor shall ensure proper use of personal protective equipment by their workmen and supervisor on duty.

Before issue of the above PPEs depending on the need of the area of work the sample of the same must be provided to Owner's Safety Officer for inspection & approval.

The Contractor shall be issued entry pass for their employees after due verification of the quality of the standard PPE's and imparting necessary training well in advance (i.e. before 7 days of commencement of work) by Engineer-in-charge / Safety Officer.

- a) None of the Contractor's employees shall be allowed inside the plant premises without valid gate pass, safety shoes, helmet (hard hat) & safety glasses.
- b) Contractor shall ensure that all his employees use proper PPE's inside the plant premises as per the work & site requirement.
- c) During the course of execution of the work the Contractor must ensure use of appropriate tested tools by their workmen. Safe working practice must strictly be followed, e.g. use of proper plug & socket for electrical connections, right size & standard spanner, right capacity and tested lifting & pulling equipment etc.

- d) The Contractor must ensure tidiness of the work place during & after completion of the work.
- e) In case of any doubt relating to safety guidelines, the Contractor should seek advice of the Engineer-in-charge / Safety Officer immediately for clarification.

ANY DEFICIENCY IN SAFETY ASPECTS SHALL BE VIEWED SERIOUSLY BY THE OWNER. THE CONTRACTOR WILL BE PENALISED UP TO THE EXTENT OF Rs.10,000/- (RUPEES TEN THOUSAND ONLY) PER EACH LAPSE AS DETERMINED BY THE ENGINEER-IN-CHARGE. OWNER RESERVES THE RIGHT TO TERMINATE THE CONTRACT AND DEBAR THE CONTRACTOR TO PARTICIPATE ANY FUTURE BIDDING IN CASE OF CONTINUED FLOUTING OF THE SAFETY NORMS PRESCRIBED BY THE OWNER.

9.14 CARE IN HANDLING INFLAMMABLE GAS:

The Contractor shall ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinder / inflammable liquids / paints etc as required under the law and/or as advised by the Owner's Fire Officer.

9.15 TEMPORARY COMBUSTIBLE STRUCTURE:

Temporary combustible structures shall not be built near or around work site.

9.16 PRECAUTION AGAINST FIRE:

The Contractor shall ensure availability of appropriate fire Extinguishers / Fire Bunkers and drums / fire buckets at work site as recommended by Engineer-in-charge.

9.17 EXPLOSIVE:

Explosive shall not be stored or used in the works or at site by the Contractor without the permission of the Engineer-in-charge in writing. The storage & use are also restricted to the extent & in the manner to which such permission is given. When explosives are required for the works they shall be stored in a special magazine to be provided at the cost of the Contractor in accordance with the Explosive Rules. The Contractor shall obtain necessary license for the storage and use of explosives and all operations in which or for which explosives are employed shall be at sole risk and responsibility of the Contractor and the Contractor shall indemnify the Owner against any loss or damage resulting directly or indirectly there from.

9.18 CONTRACTOR'S LIABILITY:

9.18.1 *Safety code:* The Contractor shall at his own expense arrange for the safety provisions as required by the Engineer-in-charge in respect of all labour directly employed for performance of the works and shall provide all facilities in connection herewith. In case the Contractor fails to make arrangements and provides necessary facilities as aforesaid, the Engineer-in-charge shall be entitled to do so and recover double the cost thereof from the Contractor.

9.18.2 Failure to comply with safety code or the provision relating to and report on accidents and to grant of maternity benefits to female workers or submission of materially incorrect statement shall make the Contractor liable to pay Liquidated damages an amount not exceeding Rs.500/- for each default. The decision of the Engineer-in-charge in such matters based on the reports from the Inspecting Officer or from representatives of Engineer-in-charge shall be final and binding and deductions for recovery of such liquidated damages may be made from any amount payable to the Contractor.

9.19 PRESERVATION OF PEACE:

The Contractor shall take requisite precautions and use his best endeavor to prevent any riotous or unlawful behavior by or amongst his workmen and other employed on the works and for the preservation of peace and protection of the inhabitants and security of property in the neighborhood of the work. In the event of the Owner requiring the maintenance of a special police force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the Contractor and if paid by the Owner shall be recoverable from the Contractor.

9.20 OUTBREAK OF INFECTIOUS DISEASES:

The Contractor shall remove from his camp such labour and their families who refuse protective inoculation and vaccination when required to do so by the Engineer-in-charge. Should Cholera, Plague or other infectious diseases break out, the Contractor shall burn the huts, bedding, clothes and other belongings of or used by the infected parties and promptly erect new huts on healthy site as required by the Engineer-in-charge failing which within the time specified in the Engineer's requisition, the said work may be done by the Owner and the cost thereof recovered from the Contractor.

9.21 USE OF INTOXICANTS:

The sale of dent spirits or other intoxicating beverages upon the work in any of the buildings, encampments or tenements owned, occupied by or within the control of the Contractor or any of his employee is forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.

In addition to the above, the Contractor shall abide by all provisions of Owner's Safety Code framed from time to time.

End of Section-IX

SECTION-X

10.0 PENALTY:

10.1 FOR NON-COMMENCEMENT OF WORK ON DUE DATE:

The execution of work shall commence from 15th day after the date on which the Owner issues written orders to commence the work. If the Contractor commits default in commencing the execution of work as aforesaid, Owner shall without prejudice to any other right or remedy be at liberty to forfeit the earnest money absolutely. In addition, Owner reserves the right to terminate the Contract without any further reference to the Contractor.

10.2 FOR NON-PERFORMANCE:

In case the performance is discontinued by the Contractor without any cause attributable to Owner, the Contract can be terminated with three days notice at the discretion of Engineer-in-charge and the security & all other dues of the Contractor shall be forfeited. This shall be in addition to other penalties.

10.3 FOR UNSATISFACTORY PERFORMANCE:

If the performance does not commensurate either to the standard of work as per BI Standard/standard specified by the Owner or the progress is not as per time schedule, the Contract shall be terminated with 30 days notice and security & other dues of the Contractor shall be forfeited.

10.4 FOR NON-PERFORMANCE DUE TO LABOUR STRIKE:

In case of labour strike, the Contractor shall continue the work or keep the work continued by alternate arrangement failing which Owner reserves all rights to get the work done otherwise at the risk and cost of the contractor. Also Owner reserves the right to terminate the Contract and impose penalty as in Clause 10.2

10.5 FOR NON-PAYMENT OF WAGES WITHIN SPECIFIED PERIOD:

For non-payment of wages to his labours within the specified period penalty shall be imposed on the Contractor as per clause No.8.1 (x)

10.6 FOR NON-COMPLIANCE OF OTHER STATUTORY OBLIGATIONS:

In case of non-compliance of statutory provision within stipulated period, the Contract is liable for termination at the discretion of Engineer-in-charge.

10.7 FOR NON-ADHERENCE TO SAFETY NORMS:

Penalty shall be imposed on the Contractor as per Clause No.9.13 for non-adherence to safety norms.

10.8 If generation loss contributes to the fault of Contractor, penalty to the tune of loss on account of disruption of generation or dues of Contractor including security, whichever is less shall be imposed. The Contractor shall also be debarred from participation in any future bidding for at least 3 years thereafter.

If Contractor disputes to the decision of Engineer-in-charge regarding his fault, the case shall be referred to Contract Review Committee. In such case the Contractor or his authorized representative shall be a member of the CRC for investigation and report. This joint report shall be final and binding on both parties.

10.9 Jobs asked by Engineer-in-charge subject to availability of related materials shall be attended with immediate effect. However, if the Contractor fails to do the work within reasonable hours or maximum within 48 hours as the case may be, the job may be done by engaging other agency at the cost & risk of the Contractor. In such an event, Owner may terminate the Contract & debar the party from future work for two years.

10.10 PENALTY FOR NON-RETURN OF EXCESS MATERIALS ISSUED BY THE OWNER.

The Contractor shall return all surplus materials, scraps, tools & plant if issued for the work to the warehouse in proper manner and obtain receipt to this effect before issue of

Completion Certificate by the Engineer-in-charge. If the same is not complied, the Contractor shall be liable for cost of the same and 20% additional charge over & above the value as per warehouse records and shall be recovered from Contractor's bills.

10.11 PENALTY FOR KEEPING IDLE MACHINERIES, EQUIPMENTS, T & P etc. HIRED BY OWNER:

In case of machinery, tools & plant and equipments arranged on hire by the Owner and provided to the Contractor for work, idle charges beyond reasonable period for such work shall be the liability of the Contractor.

10.12 LIQUIDATED DAMAGE (LD):

L.D. shall be imposed on Contractor as per clause No.6.9 for delay in completion of work.

10.13 In case of failure on part of Contractor to provide consumables or any other material under their scope & the work is affected on account of this shortfall, Owner reserves the right to arrange the same at the cost & risk of the Contractor. The amount so incurred by Owner with 25% additional charges shall be recovered from the Contractor.

10.14 For failure on part of the Contractor to meet the liability under W.C. Act, P.F. Act etc., penalty as per Clause 8.1 (viii) & 8.2.3 shall be imposed.

Notwithstanding any clause elsewhere in General Conditions of Contract, all the penalty on Contractor shall be deducted from Contractor's: -

1. Running Bill
2. Security deposit
3. Any other dues of Contractor

Or

In case the amount exceeds the dues of the Contractor in concerned Contract, the same shall be recovered from dues of other contract with Owner;

Or

If recovery shall not be possible from any of the aforesaid manner, the same shall be recovered as debt liability.

End of Section-X

SECTION-XI

11.0 Arbitration:

All disputes or difference in respect of which the decision is not final and conclusive shall, on the initiative of either party, be referred to the adjudication of a sole arbitrator, within thirty days of receipt of notice from the contractor of his intention to refer the disputes to arbitration or by Engineer-in-Charge, the MD or MD-in-charge of OPGC shall finalize a panel of three arbitrators and intimate the same to the contractor. The contractor shall within fifteen days of the receipt of this list select and confirm his acceptance to the appointment one from the panel as arbitrator. If the contractor fails to communicate his selection of the name within the stipulated period, the MD or MD-in-charge of OPGC shall without delay select one from the panel and appoint him as the sole arbitrator. If the MD or MD-in-charge of OPGC fails to send such a panel within thirty days, as stipulated, the contractor shall send a similar panel to the MD or MD-in-charge of OPGC within fifteen days. The MD or MD-in-charge of OPGC shall then select one from the panel and appoint him as the sole arbitrator within fifteen days. If the MD or MD-in-charge of OPGC fails to do so, the contractor shall communicate to the MD or MD-in-charge of OPGC the name of one from the panel who shall then be the sole arbitrator. The appointment of sole arbitrator so made shall be final and conclusive.

If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reasons whatsoever, sole Arbitrators shall be appointed as aforesaid by the MD or MD-in-charge, OPGC. The work under the contractor, shall, however continue during the arbitration proceedings.

The Arbitrator shall be deemed to have entered on the reference, the date he issues notices to both the parties fixing the date of the first hearing.

The Arbitrator may, from time to time, with the consent of the parties, enlarge time for making and publishing the award.

The Arbitrator shall give a separate award in respect of each dispute or difference and shall give a reasoned and speaking award/awards.

The venue of arbitration shall at Bhubaneswar only and jurisdiction for any proceedings arising out of or concerning or connected with such arbitration shall be of appropriate court at Bhubaneswar under the jurisdiction of Odisha High Court.

The fees, if any, of the arbitrator shall, if required t be paid before the award is made and published, be paid at half by each of the parties. The costs of the reference and the award including the fees, if any, of the arbitrator shall be in the discretion of the arbitrator who may direct to and by whom and in what manner. Such costs or any part thereof shall be paid and may fix and settle the amount of costs to be so paid.

The award of the arbitrator shall be final and binding on both the parties.

Subject to aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modification or re-enactment thereof and the rules made there under, and for the time being in force, shall apply to the arbitration proceeding under this clause.

Neither party is entitled to bring a claim to arbitration if the request for appointment of arbitrator has not been made within thirty days after expiration of warranty / guaranty period.

11.1 JURISDICTION / GOVERNING LAWS:

a) Jurisdiction

For all disputes, appropriate court at Bhubaneswar under the jurisdiction of Odisha High Court alone shall have exclusive jurisdiction in all matters arising under this contract.

b) Governing Laws

The Contract shall be governed by and constructed according to the laws in force in INDIA.

End of Section-XI

End of GCC Volume-II

SCHEDULE 'A'

REFERENCE TO GENERAL CONDITIONS OF CONTRACT

2.1	Accepting Authority	Authority who floats NIT
2.19	Market Rate- percentage addition to Cover overheads and profit	10 per cent
1.14	Earnest money	1% of the First Year quoted price
4.9	Security Deposit shall be calculated as under:	
	(i) Contract value up to Rs.1 crore	10%
	(ii) Contract Value more than Rs.1 crore but not exceeding Rs.5 crore	7.5% of contract value
	(iii) Contract value more than Rs. 5 crore	5% of contract value
	Schedule of Rates applicable	
		OPWD
3.25	Time allowed for execution of works or time schedule.	As per Tender
	Authority competent to decide if “any other cause” of delay is beyond Contractor’s control	OPGC
8.1(vii)	Duration of return of number and description by Fortnightly trades of workmen employed on works to be submitted to Engineer-in-Charge.	
	Authority competent to reduce compensation amount.	OPGC
5.11	Defects Liability Periods	As per Tender
5.12	Training of apprentices	Maximum number to be engaged as per the Apprentice Act.1961.
	Category	
	(a)	
	(b)	
	(c)	
	etc.	
6.3.1	Interim bills/running bill	Monthly in case of maint. Contract & after achieving Milestone as agreed in Schedule of work in construction contract.
11.1	Authority for appointing arbitrator	OPGC

SCHEDULE 'B'

MATERIAL FOR ISSUE TO THE CONTRACTOR

Sl.No.	Particulars	Rate at which material will be issued	Qnty.	Place of issue	Max. allowable %	
		Unit	Rs.		of wastage	
1	2	3	4	5	6	7
1	Cement if issued	MT			ITPS warehouse or nearest Railhead	3%
2	Reinforcement Steel					
	a) Mild steel 6 mm & above dia	MT			ITPS warehouse or nearest Railhead	5%
	(b) Tor steel rod of all dia	MT			ITPS warehouse or nearest Railhead	5%
3	Structural Steel (plates and rolled Sections only)	MT			ITPS warehouse or nearest Railhead	5%
4	All spares		NA		-do-	NA
5	Lubricant		NA		-do-	NA
6	Fuel Oil		NA		-do-	NA
7	Conveyor belt		NA		-do-	NA
8	Railway sleepers		NA		-do-	NA
9	Mill liner		NA		-do-	NA
10	Ball for Ball mills		NA		-do-	NA
11	Rails		NA		-do-	NA
12	Point & crossing		NA		-do-	NA
13	Fish plate		NA		-do-	NA
14	Module		NA		-do-	NA
15	Cards		NA		-do-	NA
16	Monitor		NA		-do-	NA
17	Recorder		NA		-do-	NA
18	Indicator		NA		-do-	NA
19	Gauges, pressure temp		NA		-do-	NA
20	Switches		NA		-do-	NA

Signature of Issuing Officer.....
Date.....

Signature of Contractor.....
Date.....

NAME OF THE BIDDER:

NAME OF THE WORK:

DETAILS OF WORKS AND SERVICES OF SIMILAR NATURE DONE BY THE PARTY DURING THE LAST THREE YEARS

Sl. No.	Name of Claimant	Description of work	Value of work	Period		The work is done directly or through sub contractor	Remarks
				From	To		

Note: Photocopy of Performance Certificate / Completion Certificate of Owner in Support of the work mentioned above is required to be enclosed.

SIGNATURE OF THE BIDDER

NAME OF THE BIDDER:

NAME OF THE WORK:

CONCURRENT COMMITMENTS

Sl. No.	Full postal address of client & name of Officer-in-charge	Description of the work done	Value of contract	Date of commencement of work	Scheduled/Revised completion period	% completion as on date	Expected date of completion	Remarks

SIGNATURE OF THE BIDDER:

NAME OF THE BIDDER:

NAME OF WORK:

DETAILS OF EQUIPMENTS, TOOLS & TACKLES

Bidder shall submit herein details of equipments, tools, tackles etc required to perform the work (a) already owned by Bidder and available for use in this contract (b) anticipated to be hired by contractor or (c) anticipated to be purchased by contractor. In case of (b) and (c) commitment of hirer or supplier shall be stated.

Category	Category-wise Sl.No.	Ownership status (a), (b), (c)	Description, make model & capacity	Quantity	Capacity	Year of manufacture	Location of availability	Remarks

Photocopy of correspondence between contractor & hirer and between contractor & supplier shall be furnished.

SIGNATURE OF BIDDER

NAME OF THE BIDDER:

NAME OF WORK:

ORGANISATION CHART SHOWING NO. OF QUALIFIED ENGINEERS & SUPERVISORY PERSONNEL ETC. IN THE EMPLOYMENT OF CONTRACTOR & TO BE EMPLOYED.

Sl.No.	Class of manpower/ engineer/supervisor	Details of Personnel to be deployed on this work		No.
		Available contractor	with To be employed	

Note: Names and short resume of their qualification & experience may also be given for key personnel.

The tentative chart of your site organization as above furnished by you shall be subject to variation to suit the construction / maintenance / operation programme requirement and as directed by Owner / Engineer-in-charge.

SIGNATURE OF BIDDER

NAME OF THE BIDDER:

NAME OF THE WORK:

INFORMATION ABOUT BIDDER

1. In case of proprietary firm:

- 1.1 Name of the business:
- 1.2 Whether his business is registered with appropriate authority. If yes, name of authority.
- 1.3 Date of commencement of business:
- 1.4 Whether he pays Income Tax over Rs.10,000/- per year

2. In case of partnership:

- 2.1 Name of the partnership with qualification:
- 2.2 Whether the partnership is registered with appropriate authority:
- 2.3 Date of establishment of firm:
- 2.4 How many of the partners of the firm pay Income Tax over Rs.10,000/- a year and if less, what is the amount paid by them. If all of them do not pay Income Tax, who of them is paying Income Tax.
- 2.5 Permanent Account No. under IT Act:

3. In case of Limited liability Company or Company Limited by Guarantee:

- 3.1 Amount of paid up capital:
- 3.2 Name of the Directors:
- 3.3 Date of incorporation with Registrar of Company.
- 3.4 Copies of balance sheet of the Company of the last two years:

Copies of audited profit & loss Account and the balance sheet shall be enclosed in case of individuals, partnership as well as limited companies for the last three years.

Signature of the Bidder

NAME OF THE BIDDER:

NAME OF THE WORK:

LIST OF ENCLOSURES

THE BIDDER IS REQUIRED TO ENCLOSE THE FOLLOWING DOCUMENTS AS PART OF HIS BID.

1. Photocopy of Power of attorney of the signatory of the tender
2. Income Tax / Sales Tax Clearance Certificate
3. Documents showing annual turnover for similar works or otherwise for the past two years such as annual report, profit and loss account etc.
4. Certificate by Nationalized / Schedule Bank/ Chartered Accountant Firm showing financial capacity.
5. Provident Fund No.
6. Bid Guarantee / E.M.D.
7. Letter of undertaking
8. Permanent Account Number of Income Tax

SIGNATURE OF BIDDER

NAME OF THE BIDDER:

NAME OF THE WORK:

EXCEPTIONS AND DEVIATIONS

Bidder may stipulate here exceptions and deviations to the tender conditions, if considered unavoidable.

Sl.No.	Page No. of tender document	Clause/Sub Clause of tender document	Subject	Deviation

SIGNATURE OF BIDDER

NAME OF BIDDER:

NAME OF WORK:

DETAILS OF PROPOSED ORGANISATION

The bidder shall submit herein details of Head Office and site organization proposal to be developed for execution of the work. Bidder shall also furnish the bio-data of the site-in-charge and key personnel to be deployed in the format provided in Annexure-IV.

Bidder agrees to augment the list in Annexure-IV with additional number/categories if required and if directed by Engineer-in-charge for smooth execution of work taken by the Contractor.

SIGNATURE OF BIDDER

LETTER OF AUTHORIZATION

(To be submitted on a non-judicial stamp paper of Rs.10 (Rupees ten) only)

Mr. / Mrs. _____ residing in
_____ and presently holding the position
_____ of the _____
_____ firm / Group / Individual, is duly authorized by the Firm / Group
/ Individual to sign and furnish all such information as desired by the OPGCL in this document in respect
of the work _____

Signature:

Date:

(Secretary / General partner / Individual / Contractor / Applicant)

SEAL

WITNESS:

- 1.
- 2.

SUPPORTING / ATTACHED DOCUMENT LIST

Annexure No.	Supporting document/ Additional Sheet	Document No.
I		
II		
III		
IV		
V		
VI		
VII		
VIII		
IX		
X		
XI		
XII		
XIII		
XIV		
XV		
XVI		
XVII		
XVIII		

NAME OF THE BIDDER:

NAME OF THE WORK:

ANNUAL TURNOVER STATEMENT

The bidder shall indicate herein his annual turnover during preceding 3 years based on the audited balance sheet / profit & loss account statement.

FINANCIAL YEAR	ANNUAL TURNOVER (Rs.)	NET WORTH (Rs.)
Previous to previous year		
Previous year		
Present year		

NOTE: 1. Copies of audited balance sheets with profit and loss account of 3 years shall be submitted along with the Technical bid in support of above entries.

2. Bidder shall work out Net worth on the following basis:

Net worth: Reserve + Capital – Accumulated loss.

SIGNATURE OF BIDDER

REGISTER OF WORKMEN

- (i) Name and address of Contractor
- (ii) Name and address of establishment in/under which contract is carried on.....
- (iii) Nature and location of work.....
- (iv) Name & address of Principal Employer

Sl. No	Name & surname of	Age & Sex	Father's/ Husband's	Nature of employments /Designation	Permanent home address of workman (Village, & Taluk/Taluk &	Local address	Date of commencement of	Date of termination of employment	Signature or thumb impression of	Reason for termination	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

EMPLOYMENT CARD

(a) Name and address of Contractor _____

(b) Name and address of establishment in/ under which contract is carried on: _____

(c) Nature and location of work:

(d) Name and address of Principal Employer:

Name of the workman	Sl. No. in the register of workman employed	Nature of employment / designation	Wage rate (with particulars of unit, in case of piece work)	Wages period	Periods of employment	Remarks	Signature of contractor
1	2	3	4	5	6	7	8

REGISTER OF WAGES-CUM-MUSTER ROLL

- (i) Name and address of the contractor.....
- (ii) Name and address of establishment in/under which contract is carried on.....
- (iii) Nature and location of work.....
- (iv) Name and address of Principal employer.....
- (v) Wage period..... from.....to.....

Sl.No.	Serial number in Register of workmen employed by	Name of employees	Designation / Nature of work	Daily attendance / No. of units worked	Total attendance / units of work done	Daily rate of wages / piece rate	Basic wages	D.A.	Overtime	Other cash payments (nature of payment to be indicated)	Total deduction	Net amount paid	Time & date of payment	Place of payment	Signature or thumb impression of workmen	Initials of contractor or his authorized representative	Initials of authorized or Principal employer	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

REGISTER OF FINES

(b) Name and address of Contractor _____

(b) Name and address of establishment in/ under which contract is carried on: _____

(c) Nature and location of work:

(d) Name and address of Principal Employer:

Sl.No.	Name workman / woman	Father's / husband's name	Designation	Act / omission for which fine imposed	Date of offence	Whether employer showed cause against fine	Name of person in whose presence employee's explanation was heard (in case of contractor)	Rate of wages	Date of wages	Amount of fine imposed	Date on which fine realised	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13

REGISTER OF DEDUCTIONS FOR DAMAGES OR LOSS

(c) Name and address of Contractor _____

(b) Name and address of establishment in/ under which contract is carried on: _____

(c) Nature and location of work:

(d) Name and address of Principal Employer:

Sl. No.	Name of workman	Father's/ husband's name	Designation	Particulars of damage / loss	Date of damage	Whether worker showed cause against deduction	Name of person in whose presence employee's	Amount of deduction imposed	Number of instrument	Date of recovery		Remarks
										1 st installment	Last installment	
1	2	3	4	5	6	7	8	9	10	11	12	13

WAGES SLIP

Name & address of Contractor:

Name & address of establishment in/under
Which Contract is carried on:

Nature and location of work:

Name and address of Principal Employer:

Name and father's / husband's name of the workman:

For the week/fortnight/month ending:

Sex and identification token/ticket No.:

1	2	3	4	5	6	7	8	9
No. of days	Rate of daily wages/ piece rate	No. of units worked in case of piece rate	Dates on which overtime worked	Overtime hours and amount of overtime wages	Gross wages payable	Deductions, if any	Actual wages paid	Signature of the contractor or his representative

PROFORMA BANK GUARANTEE IN LIEU OF DD FOR EARNEST MONEY
(on Non Judicial stamp paper of Appropriate value)

(Applicable to Bid value more than Rs.25 lakh only)

Ref:

Date:

Bank Guarantee No.

To

Odisha Power Generation Corporation Ltd.,
1b Thermal Power Station,
At/Po- Banharpali,
Dist-Jharsuguda-768234.

Dear Sir,

In consideration of Odisha Power Generation Corporation having its Registered office at 7th Floor, Module – A, Fortune Towers, Chandrasekharapur, Bhubaneswar-751 023 (hereinafter called the "Owner" which expression shall unless repugnant to the subject or context include its successors and assigns) having issued Tender Specification Against NIT No _____ dt. _____ to M/s _____ having its Registered / Head office at _____

(hereinafter called the Bidder) who wishes to participate in the said tender for and you, as a special favour, have agreed to accept an irrevocable and unconditional Bank Bid Guarantee for an amount of Rs. _____ valid up to _____. On behalf of the Bidder, as a condition for participation in the said tender.

We, the _____ Bank incorporated under _____ law and having one of our branches at _____ and having our Registered office/Head office at _____ do here by unconditionally and irrevocably guarantee and under take to pay to the "Owner" immediately on demand without any demur reservation, protest, contest and recourse to the extent of the said sum of Rs. _____ (Rupees _____ only). Any such claim/demand made by the said "Owner" on us shall be conclusive and binding on us irrespective of any dispute or differences raised by the Bidder.

This guarantee shall be irrevocable and shall remain valid upto _____. If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instructions from M/s _____ on whose behalf this guarantee is issued.

We, the said Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the owner in writing and agree that any change in the constitution of the said tenderer or the said Bank shall not discharge our liability. In witness where of the Bank, through its authorised officer, has set its hand and stamp on this _____ day of _____ 20_____

Witness:

(Signature)

(Signature)

Name

Official Address

Name

(Designation with Bank stamp)

Attorney as per Power of Attorney

No. _____

Date _____

FORM OF BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT

(On Non-Judicial Stamp Paper)

(Applicable to Bid of value more than Rs.25 lakh)

To

Odisha Power Generation Corporation Ltd.,
Ib Thermal Power Station,
At/Po-Banharpali,
Dist-Jharsuguda-768 234.

In consideration of the Odisha Power Generation Corporation Ltd. (Ib Thermal Power Station) having registered office at 7th Floor, Module – A, Fortune Towers, Chandrasekharpur, Bhubaneswar-751 023 (hereinafter called the “Owner / OPGC” which expression shall unless repugnant to the subject or context include its administrators successors and assigns) having agreed to the price, terms and conditions of Tender and Letter of Intent bearing no. _____ dated _____ issued which has been unequivocally accepted by the Contractor M/s _____ for the work of _____ (hereinafter called the said contract) to accept a performance Guarantee as herein provided for Rs. _____ (Rupees _____ only) from a Nationalized bank in lieu of the security deposit to be made by the contractor or in lieu of the deduction to be made from the contractor’s bills, for the due fulfillment of the terms and conditions contained in the said contract by the said contractor, We the _____ Bank (hereinafter referred to as “the said Bank” and having our registered office at _____ do hereby undertake and agree to indemnify and keep indemnified OPGC from time to time to the extent of Rs. _____ (Rupees _____ only) against any loss or damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by OPGC by reason of any breach or breaches by the said Contractor of any of the terms and conditions contained in the said contract and to unconditionally pay the amount claimed by OPGC on demand and without demur to the extent aforesaid.

2. We _____ Bank, further agree that OPGC shall be the sole judge of and as to whether the said Contractor has committed any breach or breaches of any of the terms and conditions of the said Contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by OPGC on account thereof and the decision of OPGC that the said contractor has Committed such breach or breaches and as to the amount or amount of loss, damage, costs charges and expenses caused to or suffered by or that may be caused to or suffered by OPGC from time to time 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 during the period that would be taken for the performance of the said Contract and till all the dues of OPGC under the said Contract or by virtue of any of the terms and conditions governing the said Contract have been fully and properly carried out by the said contractor and accordingly discharges this Guarantee, subject, however, that OPGC shall have no claim under the Guarantee after 90 (Ninety) days from the date of expiry of the Defects Liability period as provided in the said Contract i.e. (Date) or from the date of cancellation of the said contract, as the case may be, unless a notice of the claim under this Guarantee has been served on the Bank before the expiry of the said period in which case the same shall be enforceable against the Bank notwithstanding the fact, that the same is enforced after the expiry of the said period.

4. OPGC shall have the full liberty without affecting in any way the liability of the Bank under this Guarantee or indemnity, from time to time to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract and either securities available to OPGC and the said Bank shall not be released from its liability under these presents by any exercise by OPGC or of the liberty with reference to the matters aforesaid or by reason of time being given to the said Contractor or any other forbearance, act or omission on the part of OPGC or any indulgence by OPGC to the said Contractor or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so releasing the Bank from its such liability

5. It shall not be necessary for OPGC to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank notwithstanding any security, which OPGC may have retained or obtained from the Contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

6. We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the prior consent of OPGC in writing and agree that any change in the Constitution of the said Contractor or the said Bank shall not discharge our liability hereunder. If any further extension of this Guarantee is required the same shall be extended to such required periods on receiving instructions from M/s _____ on whose behalf this guarantee is issued.

In presence of
WITNESS

- 1.
- 2.

For and on behalf of (Bank)

Signature _____

Name & Designation _____

Authorisation No. _____

Date and Place _____

Bank's Seal _____

NOTES:

FOR PROPRIETARY CONCERNS:

Shri _____ S/o _____ resident of _____ carrying on business under the name and style of _____ at _____ (hereinafter called "the said Contractor" which expression shall unless the context requires otherwise include his heirs, executors, administrators and legal representatives).

FOR PARTNERSHIP CONCERNS

M/s _____ a partnership firm with its office _____ (hereinafter called "the said Contractor" which expression shall unless the context requires otherwise include their heirs, executors, administrators and legal representatives); the names of their partners being (I) Shri _____ S/o _____ (II) Shri _____ S/o _____ etc.

FOR COMPANIES

M/s _____ a company registered under the Companies Act, 1956 and having its registered office in the state of _____ (hereinafter called "the said Contractor" which expression shall unless the context requires otherwise include its administrators, successors and assigns).

PERFORMANCE BANK GUARANTEE FOR LUMPSUM ADVANCE
(On Non-Judicial Stamp Paper of Appropriate Value)

To
Odisha Power Generation Corporation Ltd.,
1b Thermal Power Station,
At/Po-Banharpali,
Dist-Jharsuguda-768 234.

In consideration of the Odisha Power Generation Corporation Ltd. (1b Thermal Power Station) having registered office at 7th Floor, Module – A, Fortune Towers, Chandrasekharpur, Bhubaneswar-751 023 (hereinafter called the “Owner” which expression shall unless repugnant to the subject or context include its successors and assigns) having agreed under the terms and conditions of the Letter of Intent bearing no. _____ dated _____ issued by the Owner which has been unequivocally accepted by _____ in connection with the work of _____ Specification No..... (Hereinafter called the said contract) to make at the request of the Contractor a lump sum advance of Rs. _____ (Rupees _____ only) for utilizing it for the purpose of the Contract on his furnishing a guarantee acceptable to the Owner . We, _____ Bank incorporated under _____ and having one of our branches at _____ (hereinafter referred to as “the said Bank” do hereby guarantee the due recovery by the Owner of the said advance with interest thereon as provided according to the terms and conditions of the Contract. If the said Contract fails to utilise the said advance for the purpose of the contract and / or the said advance together with interest thereon as aforesaid is not fully recovered by the Owner, we, _____ Bank here-by unconditionally and irrevocably undertake to pay to the owner on demand and without demur to the extent of the said sum of Rs. _____ /- (Rupees _____) only any claim made by the Owner on us for the loss or damage caused to or suffered by the owner by reason of the owner not being able to recover in full the said sum of Rs. _____ /- (Rupees _____) only with interest as aforesaid.

2. We, _____ Bank further agree that the Owner shall be the sole judge of and as to whether the said Contractor has not utilized the said advance or any part thereof for the purpose of the Contract and the extent of loss or damage caused to or suffered by the Owner on account of the said contractor as to the amount or amounts of loss or damage caused to or suffered by the Owner 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 during the period that would be taken for the performance of the said Contract and till the said advance with interest has been fully recovered and its claim satisfied or discharged and till Owner certifies that the said advance with interest has been fully recovered from the said Contractor, and accordingly shall have no claim under this Guarantee after 30 (thirty) days from the date of satisfactory completion of the said contract (as per the mutually agreed work schedule) i.e. up to and inclusive of (date) unless a notice of the claim under this Guarantee has been served on the bank before the expiry of the said period i.e. _____ (date) in which case the same shall be enforceable against the Bank notwithstanding the fact that the same is enforced after the expiry of the said period.

4. The owner shall have the full liberty without effecting in any way the liability of the Bank under this Guarantee of Indemnity, from time to time vary any of the terms and conditions of the said Contract or the advance or to extend time of performance by the said 'Contractor or to postpone for any time and from time to time any of the powers exercised by it against the said contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or the advance available to the owner and the said Bank shall not be released from its liability under these presents by any exercise by the Owner of the liberty with reference to the matters aforesaid or by reasons of time being given to the said contractor or any other forbearance act or omission on the part of the owner or any indulgence by the owner to the said Contractor on any other matter or thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of so releasing the Bank from its such liability.

5. It shall not be necessary for the Owner to proceed against the Contractor before proceeding against the Bank and the Guarantee here in contained shall be enforceable against the Bank not with standing any security, which the Owner may have retained or obtained from the contractor shall at the time when proceedings are taken the Bank hereunder be outstanding or unrealized.

6. We, the said Bank lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Owner in writing and agree that any change in the Constitution of the said contractor or the said Bank shall not discharge our liability hereunder.

If any further extension of this Guarantee is required the same shall be extended to such required periods on receiving instructions from M/s _____ on whose behalf this Guarantee is issued.

Notwithstanding anything contained herein before our liability under this Guarantee is restricted to Rs. _____/- (Rupees _____ only) together with interest. Our undertaking shall commence from the date of execution and shall remain in force up to _____

Dated this _____ day of _____

In presence of _____

For and on behalf of (the Bank)

WITNESS

Signature _____

1.

Name _____

2.

Designation _____

Authorisation No _____

Seal of the Bank _____

The above guarantee is accepted by the Owner

For and On behalf of the
Ib Thermal Power Station

NOTES

For Proprietary Concerns

Shri _____ Son of _____

Resident of _____ carrying on business under the name and style of _____ at _____ (hereinafter called "the said Contractor" which expression shall unless the context requires otherwise include his heirs, executors, administrators and legal representatives) .

For Partnership Concerns

M/s _____ a partnership firm with its office _____ (hereinafter called " the said Contractor" which expression shall unless the context requires otherwise include their heirs, executors, administrators and legal representatives) the name of their partners being (I) Shri _____ S/o _____ (ii)Shri _____ S/o _____ etc.

For Companies

M/s _____ a company under the Companies Act 1956 and having its registered office _____ in the State of _____ (hereinafter called "the said Contractor" which expression shall unless the context requires otherwise include its administrators, successors and assigns).



ODISHA POWER GENERATION CORPORATION LIMITED

1b Thermal Power Station, Banaharpali

Name of the work:

“AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit”

SPECIAL TERMS & CONDITIONS OF THE CONTRACT

ANNUAL MAINTENANCE CONTRACT FOR MECHANICAL MAINTENANCE WORKS

A) Contract period & Quantities:

1. The contract shall be for a period of 01(One) year from the date of start of execution of contract. However, extension for the further one year shall be based upon satisfactory performance of immediate preceding year. The party has to quote the rate for first year only.
2. However, the contract shall be extended further period of one year at same terms & condition and the **escalation rates applicable shall be 8% per year.**
3. OPGC however reserves right to terminate the contract any time before its scheduled completion date by giving 30 day's advance notice.
4. This is a rate contract. Quantities mentioned in the Schedules against each item are indicative only. During actual execution, the quantities of the items may vary in the plus or minus side depending upon exigencies of work. The contractor shall not have any extra claims over the agreed rates on account of increase or decrease in quantities during the contract period. Also execution of all items and their respective quantities are not binding on OPGC.

B) Familiarization:

1. Bidder shall make himself familiar with the equipment and system of the Main plant, Balance of Plant and auxiliaries, amount of work involved, etc. under the scope of subject contract. If the contractor needs any technical details or additional information regarding equipment or work procedure in relation to the proposed work, he should do so before submitting the bid to OPGC
2. It is imperative on each bidder to fully acquaint himself of all local conditions & factors, which may have effect on the execution of the work covered under the specifications. OPGC shall not entertain any request for clarifications from the bidder regarding such local conditions post-bid.
3. OPGC shall entertain no claim, whatsoever, nor any change in the time schedule of the contract thereof which arise on account of clear information or its effect on the cost of works to the bidder.
4. In case of the minimum wages revision there will not be revision in the contract price during the currency of the contract and the contractor shall pay the wages accordingly. How ever if wage hike is abruptly high (beyond 10% in a year), the difference may be considered with sufficient justification from vendor.

C) Type of work:

1. The plant area consists of 2 x 210MW coal fired Power plant. The area of work shall be Mechanical Work pertaining to Boiler, Turbine and their Auxiliaries, Ash Handling plant, Balance off plant, Fuel handling/storage tank areas, etc.
2. Contractor shall be responsible for all Preventive and Break down maintenance work of Mechanical equipments as mentioned in BOQ and to be executed as directed by Engineer-in- Charge. All manpower

and tools required for the execution of the jobs are to be arranged by the contractor and is a part of the contract. In addition to these the contractor has also to arrange for necessary & sufficient manpower for carrying out other related plant/township jobs and emergency jobs.

3. Contractor may also be required to carry out works on Sundays and holidays, at odd hours, even in shift hours i.e. morning/ evening and night. The maintenance works do not have any limitation of day and time and requirement may arise any time depending upon emergency of work to be attended. This will be at discretion of OPGC.

4. All the waste material generated has to be handled /disposed as per the instruction of the Engineer-in-charge.

5. The contractor and his employees shall co-operate with all other agencies working at site.

6. All damaged and replaced materials or scrap generated during maintenance work shall be kept in safe custody and shall be handled / shifted and returned to OPGC Store/department/ Scrap yard as directed by Engineer-In-Charge.

7. If the scaffolding is required for the execution of the work that shall be carried out by the party, however the scaffolding material shall be given by OPGC.

8. Diesel Generator welding set shall be arranged by the party at their own cost for the maintenance works where no power supplies condition and remote locations.

9. The contractor has to be keep one Mahindra Pick up van (Camphor Gold) for the transportation of man power, welding machine, gas cylinders & cutting set etc for the maintenance works and round the clock patrolling of the ash disposal pipeline from main plant to ash pond. Mobilization of manpower and tools & tackles to Ash pond site & Ash disposal line maintenance shall be the sole responsibility of Contractor.

D) Manpower:

1. The contractor shall deploy skilled, semiskilled and unskilled manpower as per requirement to attend jobs.

2. The contractor shall deploy one Site-in-charge, one numbers of supervisors in each area like Boiler, Turbine, Milling System, Ash Handling Plant & BOP Area.

3. Qualified Safety supervisor shall be deployed for overseeing the safety requirements of the works under the scope.

4. The contractor shall be capable of mobilizing additional manpower on short notice if required.

5. Only experienced, qualified and medically fit persons shall be deployed for specified jobs including working at height/ confined spaces, operators for Forklift & EOT cranes.

6. Experienced, qualified and medically fit persons shall be deployed to operate departmental vehicles like Mobile Crane, Tata Tipper & Tata Ace Mini Truck/ Pick up van for round the clock basis requirement.

7. Agency to deploy man power for the patrolling of ash slurry discharge pipe line from ash handling plant to ash pond on round the clock basis by own conveyance/ patrolling vehicle.

8. EIC shall be the final authority in deciding the competency of the deployed persons.

9. The contractor may have to deploy the manpower round the clock to meet the job requirement and as instructed by EIC. He shall deploy sufficient skilled & unskilled manpower as per requirement on emergencies on short notice.

E) Safety:

1. The Contractor shall ensure that Permit-to-work is available for the equipment and the necessary isolations, electrical and process, have been done before proceeding for the work

2. The contractor is fully responsible for the safety of his workmen especially during working at height and shall provide necessary safety appliances to them and also shall comply with all safety rules and regulations coming under the purview of statues and OPGC rules.

3. The contractor shall ensure use of properly protected good quality electric cables for the purpose of lighting, welding and other requirements so as to avoid current leaking, shorting or other unsafe working conditions. He should strictly use 24V transformer as power source for lighting and similar purposes inside confined spaces. In case of any failures or additional requirements the contractor has to mobilise the same immediately.
4. The contractor has to take special precaution to ensure that the personnel under his control do not carry any combustible materials such as matchbox, cigarettes, etc. Smoking is strictly prohibited inside plant premises.
5. The people on job should have all personnel protective equipments like Safety shoes, helmets, dust mask, ear plug ,hand-gloves, goggle, aprons and boiler suit etc as required for the job. These are necessarily to be arranged by the agency. Special protective equipments like breathing apparatus, etc. shall be issued by OPGC free of cost.
6. Party shall ensure that the tools and tackles used for lifting/pulling are tested and certified by competent person before deployment on job and re-certified annually.
7. Any incident occurring to the Contractor workman at the site has to be taken care by Contractor. OPGC in no way will be liable for the same.

F)GENERAL:

1. After any major jobs in Boiler and systems coming under purview of IBR, the contractor shall assist in getting statutory clearance from the Boiler inspector after completion of inspections and tests like Hydro Test etc. in coordination & liaison with Boiler Inspector by delivering all assistance throughout so as to ensure clearance from boiler authorities.
2. The contractor or his authorized representative shall report to EIC in the morning in timely and shall remain available at site and shall give work progress and completion report on daily basis. The Site-in-charge should have mobile phone for better communication and to facilitate the day-to-day work.
3. As the work area under the scope is very vast, it is mandatory for the contractor to keep one vehicle for the movement of their personnel from one site to another.
4. Any fault in the equipment, which is attributable to the poor workmanship of the contractor has to be borne by the contractor free of cost & no extra payment will be made for the work.
5. The contractor and his labours should maintain the cleanliness of the equipment and their surroundings and no material, waste items, lubricants etc. can be left at site.
6. A weekly level meeting will be held with EIC for reviewing progress for the previous week and scheduling programme for the next week.
7. OPGC will provide electricity, compressed air, water, etc. free of cost and at specific locations to facilitate maintenance.
8. Contractor shall be responsible for safe custody of all materials, consumables, spares, tools & tackles, special tools etc. issued to him by OPGC. OPGC will provide one room for storage of material and T&P. The contractor, however, shall provide boxes, lockers, locks etc. to his staff for staff custody of the items.
9. Receipt, storage, handling and shifting of all materials, consumables, spares, tools & tackles, special tools etc. which are to be supplied by OPGC as per conditions of contract, is in scope of contractor, for which no additional amount shall be payable to the Contractor.
10. Necessary entry gate pass for plant Premises will be required for the contractor employees as per rules pertaining at the time of contract. Contractor shall sufficiently in advance, complete the necessary formalities required to get the gate pass.

G)Terms of Payment:

1. The contractor shall comply with all the statutory requirements covered under Minimum Wages Act, PF, Safety, Insurance, ESI etc. He should have a valid labour license.

2. Contractor may raise RA bills once in a month against work executed in a month through work measurement record duly certified by the section engineer, along with certified wage sheet of the month, PF & ESI statement of the previous month after depositing in the individual accounts.
3. The contractor shall comply with all rules and regulations of local authorities during the performance of the contract. He shall comply with minimum wages act and the payment of wages act and the rules made under in respect of any employee or workmen employed by him and he has to keep the all necessary records with him as required under different labour laws and if required, he has to produce the same to OPGC.
4. The contractor shall have the Employee State Insurance for the working manpower at site looking the scope of work and as per the statutory rules for the complete period of contract.

SCOPE OF MATERIALS

LIST OF TOOLS & TACKLES, MEASURING INSTRUMENTS, CONSUMABLES TO BE ARRANGED BY THE CONTRACTOR

A. TOOLS & TACKLES (including but not limited to the following):

1. DE spanners (both mm and inches) – Normal size upto – 50 mm, Min. 04 sets.
2. Ring spanners (both mm and inches) – Normal size upto 50 mm, Min 04 sets.
3. Box spanners (both mm and inches) – Normal size upto 50 mm, Min 04 sets.
4. Socket spanners (both mm and inches) – Normal size upto 50 mm, Min 04 set.
5. Hammering /slogging Wrenches (both mm and inches) – Normal size up to 50 mm, Min 01 set.
6. Allen key set (both mm and inches) – Normal size, Min 02 sets.
7. Lifting and pulling mechanism complete with accessories including chain pulley blocks, hooks, pullers, D-shackles, slings, etc. in sufficient numbers. CPB with accessories: 5T (03nos.), 3T (03 nos.), 2T (03nos.), 1T (04 nos.) (All with long lifting chains). The wire rope sling upto 10 T capacity shall be available for the work.
8. Welding generator set/ welding transformer set with electrode holders, argon gun & set, adequate length of cable, accessories, etc. (Minimum 3 sets + 1 portable welding generator))
9. Portable electrode oven (02 nos)
10. Hydraulic Jacks & pumps 10 T , 20 T , 50 T (2 set each) .
11. Gas cutting set with sets of nozzles torches of adequate length of hoses for cutting/ brazing purposes. 04 sets min of 20 ms length each.
12. Aragon hose set for TIG welding – 02 nos. min
13. Portable drilling machines-02nos min
14. Portable grinding machines- 04 Nos.,
15. General file set, needle file set, etc.
16. Chisel set, Hacksaw frame with sufficient qty of blades (03 sets min)
17. Centre and hole punch set, letter and number punch set, etc.
18. Air hoses of different sizes and length 50-mtr minimum. (02 sets min)
19. Special brushes for condenser cleaning.
20. Flaring and cutting tools.
21. Flood lights, hand lamps (of both AC and 24 V DC in sufficient qty), torch light, etc.
22. Manila ropes of different sizes.

B. MEASURING INSTRUMENTS (including but not limited to the following):

1. Measuring tapes of 3m (05 set), 5m (02 set), 10m (01 set)
2. Dial gages with stand / other fixtures- 6 sets
3. Divider / Cutters- 5 sets
4. Protractors- 2 sets
5. Feeler gages- of inch & metric- 2 sets each
6. Outside & inside Micrometers / Vernier calipers of various sizes up to 500mm
7. Other measuring instruments as per requirement

C. CONSUMABLES (including but not limited to the following):

1. DA & Oxygen gas in cylinders- 10 sets minimum.
2. Welding electrodes , 6013/ 6018 /7018
3. Cotton waste, Markin cloth, etc. as per requirement
4. General purpose cleaning & washing agents, Liquid soap for leak tests, etc as per requirement
5. Teflon tapes, emery sheets, cutting & grinding wheels, wire brushes, hacksaw blades, burr cutters, conical cutters, etc. of various sizes
6. Lapping paste, oil stones for lapping purpose- 3 sets minimum of various grades and sizes
7. Die penetration (DP) Kit.

D. SAFETY ITEMS to be provided to the workmen at job (including but not limited to the following):

1. Safety helmets, safety shoes, safety belts, safety goggles, earplugs ,dust mask etc, of good quality.
2. Welder Aprons, Leather gloves, welding goggles, boiler suit etc.

NOTE: If EIC or OPGC safety officer feels that any of the tools or equipments being utilized for any work is of poor quality and may cause incident/accident, the contractor shall replace the same immediately.

LIST OF OWNER ISSUE MATERIALS – FREE OF COST

The following items shall be issued by OPGC on free of cost - returnable basis

1. Forklift if available on free of cost basis.
2. Flood lights if available
3. Scaffolding materials, like pipes, clamps, metallic planks, etc,
4. Special tools available for Turbine, BFP, CEP, etc.
5. Special equipments like Breathing apparatus shall be provided free of cost, if available.

The following items shall be issued by OPGC as consumables as required

1. Structural steel (beams, angles, channels, plates, sheets, etc.) and pipes.
2. All spare parts
3. Lubricants
4. Gland packing's, gaskets, seal rings
5. Fasteners
6. Paints, thinner, primer.
7. Special compounds like steel putty, anti-seize, etc.
8. Special electrodes other than that for MS applications.
9. Nitrogen Gas for pressure testing/ purging/ etc.

TERMS AND CONDITIONS FOR AOH OF MILL:

- 1.0 The work as defined in Scope of work is to be carried out during the AOH period. Contractor will be intimated in 15 days advance and party has to mobilise the additional manpower and Tools&
- 2.0 Time and Quality is the essence of the contract .The Contractor shall ensure that the repair work covered in scope of work will be conducted on time with best of the skill and the knowhow available with the contractor and will be carried out in conformance with the clearance and adjustment set forth in the manufacturer drawing / quality requirement and other information.
- 3.0 The contractor shall furnish the Bar chart for the work to be carried out. Daily monitoring of the work progress shall be done. In case the work progress is not as per the schedule, contractor has to deploy the personnel to work round the clock, weekends and holidays. The contractor has to deploy two equal parallel strength of groups in 12 hrs shift with equal T&P for all the jobs so as to complete the work in stipulated period or earlier.
- 4.0 In case contractor fails to execute the job in accordance to the agreed programme, OPGC reserves the right to get it done through other party at risk and cost of the Contractor.
- 5.0 For the contractor executing mills and fans work has to deploy qualified and experienced people.
- 6.0 No contractor personnel shall be deployed for more than 12 hrs. / day for the work at site.
- 7.0 Guarantee/Warranty- The work carried out shall be guarantee for 3 months from the date of commissioning of the system. If any defect is observed in the equipment which can be attribute to poor workmanship, it has to be attended free of charge. For that contractor has to mobilize the manpower when the shutdown is available.
- 8.0 Contractor has to keep their key personnel during the start up/ commissioning of the system /equipment and shall attend the defect, if observed due to poor workmanship. The contractor key personnel shall remain at site for minimum three days after the commissioning of the system.
- 9.0 All the Work is to be carried out as per the instruction and the satisfaction of EIC.
- 10.0 It is responsibility of the contractor to maintain the housekeeping of the plant, equipment and the surrounding during and after the work.
- 11.0 The name of the working personnel deployed by the contractor like Site-in charge, MWF , Fitter ,Rigger during the job with full detail has to be submitted stating their area of work and experience and specialization of work to EIC before the start of the work. OPGC reserves the right to ask to change the people if not sound suitable for the work at any point of time during execution of the job.
- 12.0 Scrap and damaged parts taken out from the machine is to be shifted to scrap disposal area as indicated by EIC on regular basis.
- 13.0 The contractor shall be responsible for shifting of the material /spares from the stores to the site and return of the damaged spare /scrap to designated place. The contractor has the responsibility of making own arrangement for the same i.e. the lifting & shifting equipments like Truck and Hydra will be under the scope of the contractor.
- 14.0 The scaffolding installation /removal if is required for the execution of the work , same is to be carried out by the party . OPGC shall provide the scaffolding material free of cost.

- 15.0 Party has to make the arrangement for the illumination at the work place . Party has to arrange lights and also the certified electrician for making the connections.
- 16.0 Party has to be mobilised minimum one week in advance before the actual start of the work for completion of process like Gate pass, scaffolding installation, site store fabrication etc. Fabrication of the Temporary site store at site is to be done by the party; only suitable area will be allocated.
- 17.0 All the required tools & tackles , measuring instruments and other accessories like 24 V electrical hand lamp etc for execution of the work as per scope of work are to be arranged by the contractor. The 24 V lamps should have protective mesh. The indicative list of the tool is enclosed in Annexure-I which contractor shall bring to the site .If OPGC provides the tool in case of non availability of the general tools, the rental cost will be charged. Welding machine should be with VOLATAGE REDUCING DEVICE (VRD) fitted, if not fitted machine will not be allowed inside the plant.
- 18.0 The contractor has to abide by Safety Procedures enforced at OPGC. Each contractor personnel shall use PPE like Safety Shoes , Safety Helmet , Safety Glasses , Face shield ,Ear Muff/Plug ,Dust mask, Welding Helmet ,Cover all (Boiler suit) ,REFLECTIVE VEST . Non compliance of above is liable for removal of the personnel from the site.
- 19.0 When the work is carried out at height Full Body harness is to be used, the Full body harness shall be arranged by the contractor.
- 20.0 The contractor has to deploy their SAFETY OFFICER/SAFETY SUPERVISOR to ensure the compliance of the safety procedures during the execution of the work. If the contractor is found not complying / adhering to the safety procedures in spite of repeated reminders, the contract can be terminated.
- 21.0 The contractor has to arrange the consumables like Diesel , CTC , Waste Cloth, Markin cloth , Cutting wheel , Grinding wheels , Rotary cutter , Emery papers , cutting electrode , welding electrode 6013, 6018 (other special electrode shall be provided by OPGC) ,Argon gas , DA & Oxygen , DP Kit etc . The mentioned items are the indicative; however party has to arrange all consumables for completion of job as per scope of work.
- 22.0 The contractor shall submit following documents before the start of work to EIC
- Valid Test Certificate of pulling & Lifting equipment with proper colour coding
 - Details of workers to deployed with name and the work experience and the assigned nature of work
 - Healthiness of all electrical operated hand held machines and welding machines.
 - List of T&P to be brought inside the plant
 - Labour Licence specific to the contract
 - ESI Registration Certificate for all deployed personnel
- 23.0 Safety Violation
- In case of any violation of safety rules, the appropriate action like removal from work place, warning & monetary penalty will be imposed.

MAJOR T&P LIST FOR MILL AOH

Sl.no	Description	Qty
01	Welding Generator /Rectifier upto 320 Amps with VRD	2 Nos
02	Spanner A/F Size 5 mm to 56 mm Box socket with T Handle & Ratchet DE Spanner Ring Spanner	2 set 2 set 2 set
03	Brass Rod/Mallet/Nylon Hammer	1 each
04	Hammer 1.2 Kg to 5 KG	10 Nos
05	Screw Jack : Upto 100 MT	1 set
06	Hydraulic Jack: 5 MT TO 50 MT with hydraulic pump	1 set (2 each type)
07	Welding cables and accessories (including equal length earthing cable , cable length minimum 50 mtr)	50 mtr each
08	Gas cutting set with 50 Mtr hose : 2 sets	2 Set
09	Grinding Machine GQ-4/AG-7/AG-4:	1 each
10	FF2 & Pistol grinder	1 each
11	Magnetic base drill machine , Hand Drill Machine	1 each
12	Vernier Calliper upto 300 mm, Inside micrometer – 1.0 mtr Outside micrometer- 500 mm Feeler gauge – Dial Gauge with magnetic stand – 5 sets	1 each
13	Chain Pulley Block/pulling devices 1 Ton to 5 Tons	4 Nos.
14	Wire Rope Sling up 10 MT CAPACITY IN PAIR	2 sets foe each category
15	Non metallic flat belt sling up to 5 MT capacity in pair	3 sets for each category
16	Level gauge , Steel Ruler, Files	4 sets for each category
17	Slugging Spanner	2 sets

The list is only indicative party has to arrange other T&P if required to complete the job.

EVALUATION OF BIDS

1.0 Opening of Bids

The Techno-Commercial bid shall be opened at a predetermined time, venue & date in presence of the Bidder(s) or their authorized representative(s) who may like to be present. Partner, Director or permanent employee of the firm duly authorized only can be the authorized representative. Price bid shall be opened at a future date under intimation to all technically qualified Bidders and in presence of them or their authorized representatives who shall participate.

2.0 Preliminary Examination of Proposals

OPGC will examine the Proposals to determine whether they are complete, whether required EMD have been furnished, whether the documents have been properly signed, and whether the Proposals are generally in order. If a Proposal is not substantially responsive, it shall be liable for rejection by OPGC. OPGC's determination of Proposal's responsiveness will be based on the contents of the Proposal itself and any written clarifications, if sought for by OPGC and submitted by the Bidder.

3.0 Evaluation & Comparison of Bids

3.1 Basis for Technical Evaluation

OPGC will carry out a detailed evaluation of the bids previously determined to be substantially responsive, in order to ascertain whether the technical aspects are in accordance with the requirements set forth in the Bid Document. OPGC will examine and compare the technical aspects of the bids on the basis of the information supplied by the bidders. OPGC reserves the right to do due diligence and take customer feedback in order to verify the document submitted by the bidders.

The evaluation committee, appointed by OPGC as a whole, evaluates the proposals on the basis of their responsiveness to the Mandatory Requirement criteria as stipulated in section "Instructions to the Bidder" of this Bid Document. Proposal shall be rejected at this stage if it does not respond to mandatory requirements criteria. Only those bidders, who meet all the mandatory requirements, shall be considered for e-Reverse Auction and/or price bid opening. OPGC reserves the right to do due diligence and take customer feedback in order to verify the document submitted by the bidders if OPGC feels to do so. OPGC reserves the right to check the past performance of the participated bidders at OPGC and may accept or reject the bid based upon such if the past performance found not meet to the standards of OPGC.

3.2 Basis for Price Evaluation:

The Techno-commercially qualified bidders will participate in the Reverse Auction through MSTC Limited. The price may be finalized based on Reverse Auction or Sealed Price Bid. OPGC reserves the right to go for reverse auction after opening of sealed Envelope price bid, submitted by bidder. This will be decided after techno-Commercial Evaluation. All Bidders have to give their acceptance for participating in Reverse Auction as per "Rules and Regulations of the e-Reverse Auction" which shall be binding on the bidders. Non Acceptance to participate in Reverse Auction may result in non-consideration of their bids, in case OPGC decides to go for reverse auction.

OPGC will examine the Price Proposals to determine whether any arithmetical errors have been made, whether the documents have been signed, and whether the Proposals are generally in order. Arithmetical errors will be rectified on the following basis.

- a) If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between subtotals and the total price, the unit or subtotal price shall prevail, and the total price shall be corrected.

b) If there is a discrepancy between words and figures, the amount in words will prevail. If a Bidder does not accept the correction of errors, its Proposal will be rejected and its bid security may be forfeited.

3.3 The evaluation shall be based on the evaluated cost of completing the contract in compliance with all commercial, contractual and technical obligations under this Bid including taxes, duties & levies etc. The rates of taxes, duties and levies as applicable on seven (7) days prior to the date of Techno-commercial bid opening shall be considered for the purpose of evaluation.

4.0 Price Loading:

All the bidders should quote as per tender terms and conditions without any deviation. OPGC reserves the right to reject the bid in case of any deviation taken by the bidder or ask to withdraw such deviation or appropriately load the component on the quoted price.

5.0 Award Criteria

OPGC will award the contract to the successful bidder whose bid has been determined to be substantially responsive and to be economically advantageous, which will be established by Lowest Price basis (L1) amongst the qualified bidders in Techno-Commercial evaluation as per **Clause No. 13 of "Rules and Regulations of the e-Reverse Auction"**.

6.0 Negotiation & Award

The selected bidder will be notified in writing by OPGC inviting him for further negotiations. Negotiations will be held only at ITPS, Banaharpali. On finalization of negotiation, to the mutual satisfaction of both the parties, OPGC shall award the Work order to the selected bidder.

THE VENDOR SHALL SIGN ON EACH PAGE OF THE SPECIAL CONDITIONS AND RETURN THE DOCUMENT ALONG WITH THE OFFER AS A TOKEN OF ACCEPTANCE TO ALL TERMS AND CONDITIONS WRITTEN HEREIN.

Rules and Regulations of the e-Reverse Auction

Buyer's Name/Owner	Ib Thermal Power Station (A Unit of Odisha Power Generation Corporation Limited)
Auction To Be Conducted By	MSTC Limited
Name of the work	AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit
Reference	NIT No. ITPS/CC-22/2020-21/08, Date: 05December 2020, SL No. 07
Date & Time Of Auction	Auction Date: [To be intimated later] Online e-Reverse Auction Time : [To be intimated later] URL: www.mstcecommerce.com/eprochome/opgc
Special Instructions	Bidding in the last minutes and seconds should be avoided in the bidders own interest. Neither the Service Provider nor OPGC will be responsible for any lapses /failure on the part of the vendor, in such cases.
Auto Extension of Closing Time	5 minutes NB: If any bidder quotes 5 minutes before closing time, the closing time will be extended automatically for another 05 minutes and so on till 05 minutes idle time between the bids.
Decremental Value	Minimum decrement is to be intimated later
Start Price	The start price shall be confirmed before start of the e-RA by OPGC.

1. For the proposed e-Reverse Auction, techno-commercially qualified bidders only shall be eligible to participate.
2. Bidders must be a registered user to bid for Buyer ("OPGC") in MSTC portal www.mstcecommerce.com/eprochome/opgc. Bidders need to have their Login ID and Password prior to e-Reverse Auction.
3. Bidders have to participate as per the e-Reverse Auction time and date communicated to them & based upon e-Reverse Auction invitation for particular Auction.
4. Quotation once submitted through e-Reverse Auction cannot be withdrawn /deleted. Otherwise, the EMD submitted by the bidder shall stand forfeited.
5. Buyer reserves the right to ban the bidder from participating in e-Reverse Auction without any explanation/reason at any stage of e-Reverse Auction.
6. Buyer reserves the rights to extend / cancel the e-Reverse Auction.
7. E-Reverse Auction shall be conducted in Indian Rupees only.
8. All prices submitted by Bidder in e-Reverse Auction shall be as per Tender's Terms & Conditions.
9. Validity of bids: As mentioned in Tender Document.
10. Written Confirmation shall be taken in advance regarding participation in the e-Reverse Auction to buyer along with the Authorized person name and details.
11. Buyer reserves the right to award the Purchase Order / Service Order as per buyer's discretion irrespective of Live Auction Rank.

12. Buyer reserves the right to repeat the e-Reverse Auction of same package.
13. **The manual price bids submitted by techno-commercial qualified bidders shall open before reverse auction. After opening of manual price bid E-RA shall be conducted. After completion of e-Reverse Auction, the lowest evaluated bid of all the bids submitted in manual and e-Reverse Auction process shall be considered for award of the Purchase order / Work order.**
14. The bidders shall quote from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.
15. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, OPGC at its own discretion shall debar the bidder from the e-Reverse Auction/Tender and future participation also.
16. OPGC reserves the right to cancel the e-Reverse Auction process/ tender at any time, before ordering, without assigning any reason and may go for finalization based upon manual opening of price bids as per standard practice.
17. OPGC shall not be liable for any interruption or delay in accessing the MSTC portal irrespective of any cause. In such cases, the decision of OPGC shall be binding on the bidders.
18. Other terms and conditions shall be as per NIT, bidder's techno-commercial Bid and other latest correspondences/ final confirmations, (if any) against the NIT.
19. If any item is not quoted by a bidder, the maximum price quoted by the other participated bidders for that item shall be considered for arriving evaluated price of that bidder.
20. The total L1 Price obtained through e-Reverse Auction shall be proportionately distributed among each line item inline with the price quoted and evaluated in the hard copy price bid.
21. The price quoted in e-Reverse Auction is the total price for all the items and quantity as per Price Schedule of NIT irrespective of any omission by the bidder in the hard copy price bid.
22. In case, the L1 Bidder in e-Reverse Auction and manual Tender happens to be the same bidder, then minimum price among both shall be considered as L1. If the bidder disagrees to accept the said condition, then his EMD shall be forfeited. Apart from this the bidder will be debarred from participating in future e-Reverse Auction/Tender of OPGC.
23. Each Bidder shall get the final loading factor (%age of the quoted price) from OPGC before e-Reverse Auction for the deviations, if any, taken by them in the techno-commercial bid.
24. The Price quoted in the e-Reverse Auction shall be inclusive of all applicable taxes, duties and levies, deviations considering the loading factor (got from OPGC/Tender Condition as mentioned in above clause) on his quoted price. However, the GST shall be paid extra as applicable and not included in the loading factor as well as total price.

UNDERTAKING

I hereby undertake that I agree to the **"Rules and Regulations of the e-Reverse Auction"** mentioned herein.

Signature:

Name:

Date:

Company Name:

Seal:

Integrity Pact

Between

Odisha Power Generation Corporation Ltd. (OPGC), a company registered under the Companies Act 1956 and having its registered office at Zone-A, 7th Floor, Fortune Towers, Chandrasekharpur, Bhubaneswar- 751023, Odisha (India) hereinafter referred to as “Principal”, which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

And

_____, description of the party along with address), hereinafter referred to as “Bidder/ Contractor” which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

(The Principal and the Bidder/ Contractor together are collectively referred to as the “Parties” and individually as a “Party” in this Pact).

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for... (“Contract”) The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal enter into an Integrity Pact (“Pact”) with the Bidder(s)/ Contractor(s) for the tender process and execution of the Contract and will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the Contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - 1.1.1 No employee/Director/management representative of the Principal, personally or through family members or through third party, will in connection with the tender process 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.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s)/ Contractor(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information (other than the clarifications sought for by the Bidder(s)/Contractors with respect to the bidder specific information required to be provided only to the concerned Bidder(s)/Contractor(s),) and will not provide to any Bidder(s)/Contractor(s) confidential / additional information through which the

Bidder(s) /Contractor(s) could obtain an advantage in relation to the tender process or the contract execution.

- 1.1.3 The Principal will exclude from the tender process or execution of the Contract all known prejudiced persons including those employees/ Directors/management representatives of the Principal who have family relationships with the employees or Directors of the Bidder(s)/Contractor(s).
- 1.2 If the Principal obtains information on the conduct of any of its employees/ Directors/ management representative which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Chief Vigilance Officer for further enquiry and initiation of disciplinary actions against the person(s) concerned.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit itself to take all measures necessary to prevent corruption. The Bidder(s) / Contractor(s) commits itself to observe the following principles during its participation in the tender process and during the contract execution.
 - 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees/ Directors/ management representative involved in the tender process or the execution of the Contract or to any third person any material, immaterial or any 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.
 - 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act and any other such similar applicable Acts; 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.
 - 2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
 - 2.1.5 The Bidder(s) / Contractor(s) will not, directly or through any other person or firm, approach any Government officials, ministers, political persons public servants, or any external agencies in an effort to influence the bidding decision making process or to attain any undue favours to the Bidder(s) / Contractors(s).
 - 2.1.6 The Bidder(s)/Contractor(s) shall exclude, from the tender process or execution of the Contract all known prejudiced persons including those employees / Directors /management representatives of the Bidder(s) / Contractor(s) who have family relationships with the employees or Directors of the Principal.
 - 2.1.7 The Bidder(s)/Contractor(s) shall disclose the circumstances, arrangements, undertakings or relationships that constitute, or may reasonably be considered to constitute, an actual or potential conflict of interest with its obligations specified in the tender process or under any contract which may be negotiated or executed with the Principal. Bidder(s)/Contractor(s) and their employees, agents, advisors and any other person associated with the Bidder(s)/Contractor(s) must not place themselves in a position which may, or

does, give rise to conflict of interest (or a potential conflict of interest) between the interests of the Principal or any other interests during the tender process or through operation of the Contract.

- 2.1.8 The Bidder(s)/Contractor(s) will not indulge in any corrupt, fraudulent, coercive undesirable or restrictive practice in the tender process or the execution of the Contract.
- 2.2 The Bidder(s)/ Contractor(s) or its sub-contractors or its agents will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process, termination of the Contract and exclusion from future contracts

If the Bidder(s)/ Contractor(s), during the tender process or before award of the Contract or during the execution of the Contract has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put its reliability or credibility in question, the Principal may disqualify the Bidders(s)/ Contractor(s) from the tender process or decide not to award the Contract or terminate the awarded Contract or blacklist the Bidder(s)/Contractor(s). I and seek damages as specified in Section 4.

Section 4 – Compensation for Violations

- 4.1 If the Principal has disqualified the Bidder(s)/ Contractor(s) from the tender process prior to the award of the Contract according to Section 3 or 5, the Principal is entitled to demand and recover the damages by encashment of the Earnest Money Deposit/ Bid Security deposited by the Bidder(s)/ Contractor(s) while making submission in the tender process.
- 4.2 If the Principal has terminated the Contract according to Section 3 or 5, or if the Principal is entitled to terminate the Contract according to section 3 or 5, the Principal is entitled to demand and recover from the Contractor liquidated damages equivalent to __% of the Contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher, in addition to the Liquidated Damages already agreed to by the Bidder(s)/ Contractor(s) in the Contract.

Section 5 – Previous Transgression

- 5.1 The Bidder(s)/ Contractor(s) declares that no previous transgressions occurred in the last three (3) years with any other organization in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify its exclusion from the tender process or the execution of the Contract.
- 5.2 If the Bidder/ Contractor has made incorrect statement/disclosure on this subject or hides such information, the Principal is entitled to disqualify the Bidder/Contractor from the tender process or the execution of the Contract, if already awarded, may terminate the Contract and claim compensation as mentioned in section 4.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

- 6.1 The Bidder(s)/ Contractor(s) undertake(s) to demand from his sub-contractors a commitment consistent with this Integrity Pact. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal.
- 6.2 The Principal will enter into individual Integrity Pacts with identical conditions as this one with all Bidders and Contractors for the tender process.
- 6.3 Only those Bidder(s)/ Contractor(s) who have entered or expressed intention of entering into Integrity Pact with the Principal shall be eligible to participate in the tender process or execution of the Contract.

- 6.4 The Principal will disqualify the Bidder(s)/ Contractor(s) from the tender process who do not execute the Integrity Pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders/ Contractors/ Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office of the State in which the Principal has its Registered Office.

Section 8 –Independent External Monitor(s)

- 8.1 The Principal will appoint one or more competent and credible Independent External Monitor(s) (“**Monitor**”) for monitoring the implementation of this Pact. The task of the Monitor will be to review independently and objectively, whether and to what extent the Parties comply with the obligations of the Integrity Pact.
- 8.2 The Monitor shall not be subject to instructions by the representatives of the Parties and shall perform his functions neutrally and independently. The Monitor shall report to the OPGC Board.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all the document related to the tender process or the execution of the Contract of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) shall grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to the document in its possession related to the tender process or execution of the Contract. The same is applicable to Sub-contractor(s) of the Bidder(s)/ Contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Subcontractor(s) with strict confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the Parties related to the tender process or the execution of the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Bidder/ Contractor. The Parties shall offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to have noticed, a violation of the Integrity Pact, he will so inform the Managing Director of the Principal and request him to take corrective action, or heal the situation, or to take other relevant action. The Monitor may in this regard submit non-binding recommendations. Beyond these actions, the Monitor shall have no right to demand from the Parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 If the Monitor reports to the Managing Director of the Principal, a substantiated suspicion of an offence under relevant IPC / PC Act, the Managing Director of the Principal shall within reasonable time, taken visible action to proceed against such offence.
- 8.7 The number of Independent External Monitor(s) shall be decided by OPGC.
- 8.8 The word ‘Monitor’ would include both singular and plural.

Section 9 – Pact Duration

- 9.1 This Pact shall become effective from the date when both the Parties have executed it or the Parties have shown their intent to enter into the Pact, whichever is earlier. This Pact will expire for the Contractor after it meets all the obligations of the Contract and for all other Bidders 6 months after the Contract has been awarded.

9.2 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 as above, unless it is discharged/ determined by the Principal

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. Bhubaneswar.

10.2 Changes and supplements to the Pact as well as notices of termination of the Pact to be sent to any Party shall be made in writing by mutual agreement between the Parties.

10.3 If the Bidder/ Contractor is a partnership or a consortium, this Pact shall be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those Bidder(s)/ Contractor(s) who have expressed their intention through submission in the tender process or have entered into this Pact with the Principal will be eligible to participate in the bidding.

**For & On behalf of the Principal
(Office Seal)**

**For & On behalf of the Bidder/ Contractor
(Office Seal)**

Place: _____

Date: _____

Witness: _____

Witness: _____

(Name & Address): _____

(Name & Address): _____



ODISHA POWER GENERATION CORPORATION LIMITED(OPGC)

IB THERMAL POWER STATION,

BANAHARPALI, JHARSUGUDA

ODISHA

EM-4/61 (Part-B)

SAFETY, HEALTH & ENVIRONMENT (SHE)

RULES & REGULATIONS FOR CONTRACTORS

Revision- 01, Dtd 26.08.2019

CONTENTS

Sl. No.	Subject	Page No.
1.	Introduction	4
2.	Scope	4
3.	Objective	4
4.	Environment, Health & Safety Policy of OPGC	4
5.	Responsibilities	4
6.	Definition and Interpretations	5
7.	Program Requirements & Important General Safety Instructions	6
8.	Essential Duties	8
9.	OPGC Safety Cardinal Rules / Zero Tolerance Issues	8
10.	Hygiene, General Practices / Utilities for Rest & Food Intake	9
11.	Site Entry Procedure	9
12.	Project safety plan & Daily job safety plan	10
13.	Health & Fitness	10
14.	Work Permit	10
15.	Housekeeping & clean site	11
16.	Site Office & Stores	11
17.	Safety equipment, PPEs	11
18.	Training	16
19.	Competency of Contract Employees	16
20.	Restricted Areas	17
21.	Alcohol & Drugs	17
22.	Driving & Parking	17
23.	Safety Meetings	18
24.	Safety Inspection/ Audit	18
25.	Reporting and Investigation	18
26.	Injury Management	18
27.	Job Safety Analysis (JSA) & Job Safety Briefing (JSB)	19
28.	Emergency procedures	19
29.	Safety Supervisor	20

30.	Communications	21
31.	Equipment Certification	21
32.	Restricted Articles	21
33.	Prohibited Materials	21
34.	Hazardous Substances	21
35.	Smoking	22
36.	Sub-Contractor	22
37.	Lifting Machinery and equipment	22
38.	Hand tools	26
39.	Portable Electrical Appliances	27
40.	Temporary Wiring	28
41.	Fall Protection	29
42.	Scaffolding	31
43.	Access to Transformers / MCCs / Switchyard & Other Restricted Areas.	34
44.	Fire Protection.	35
45.	Hot Work	35
46.	Confined space	36
47.	High pressure water/ service air cleaners	37
48.	Scrap / Waste Disposal	37
49.	Gas cylinders	37
50.	Radiography & radioactive substances	39
51.	Excavation	40
52.	Surplus Materials	41
53.	Suspension of work and limitation of liability	41
54.	Temporary Building	41
55.	Unsafe and / or Inappropriate Behavior, Disciplinary Action	41
56.	General Guidelines Environmental Protection	43
57.	Appendices 1, OPGC EHS Policy	47
58.	Appendices 2, OPGC High Risk Activities	48
59.	Appendices 3- Undertaking against Contractor Safety rules & regulations	49
60.	Appendices 4-Contractor's Violation Record & OPGC EHS Policy	49

1. INTRODUCTION

The purpose of this standard is to specify the requirements for managing safety when contracting work. This safety standard is based on the best practices for managing contractor safety in the utility industry. CONTRACTOR shall perform all work required by his Contract in a safe, healthy and environment friendly manner. During work, the CONTRACTOR is directly responsible for; shall comply with; and enforce all laws, rules; regulations of OPGC are relevant to the work being performed. CONTRACTOR will manage all subcontractors on site and will be accountable for subcontractor performance with respect to Environment, Health & Safety and (EHS).

Prior to the start of any work, the Contractor shall survey and plan the work. The contractor shall review Contractor's SHE Program and submit their safety plan to the OPGC's concerned Project Manager.

2. SCOPE

This program lays down the SHE related requirements and guidelines and provides advice based on local experience and legal requirements for safe working practices for all activities of the project involved with high risks. This SHE management program also applies to all personnel involved in Company projects. All parties are required to comply with this safety program as well as all National, State and Local regulatory guidelines.

3. OBJECTIVE

This procedure has been developed to assist both OPGC and Contractor Managements to control these hazards and ensure that high standards of safety have been maintained at OPGC's work site. The procedure shall be provided at a minimum to all high contractors with other bid documents. Contractors participating in the bidding shall go through the procedure carefully & submit an undertaking in the format given as in **Appendix-2**.

4. ENVIRONMENT, HEALTH & SAFETY POLICY OF OPGC:

Contractor (s) shall strictly follow OPGC EHS Policy guidelines. The spirit of the EHS Policy shall be reflected during contract execution by implementing the minimum EHS expectation of OPGC as declared in the Policy objective. Refer OPGC EHS Policy as enclosed as enclosure.

5. RESPONSIBILITIES

OPGC Project Manager - OPGC personnel directly responsible for the project work execution and implementation of applicable EHS rules and regulations on the project involved.

OPGC Site Safety Manager - Person designated to coordinate and support Project Managers to enforce safety policies of OPGC on the project.

Contractor's Site Manager - Person designated as the senior site manager by the Contractor chosen for the project.

Contractor's Safety Manager/Officer/Supervisor - person designated to carry out, monitor, and enforce agreed safety rules and regulations. policies of the Contractor on the project, in compliance with the project agreements OPGC policies.

Supervisor - Lead field labor supervisor or foreman for the Contractor/Subcontractors.

Personnel – Individuals performing the labor tasks for the Contractor/Subcontractors.

6. DEFINITIONS AND INTERPRETATIONS

In the Contract, the following words and phrases have the meaning hereby assigned to them, except where the context otherwise requires.

Contractor – A person or company contracting with OPGC to provide services.

Sub-Contractor - A person or company employed by the prime or general contractor who is contracting with OPGC to provide r services.

Contractor Pre-qualification – This process is an assessment of contractors wishing to work OPGC.

The process is independent of individual contracts and is carried out to ensure that only contractors with acceptable past safety performance and appropriate safety programs are awarded work.

Contract Administrator – An OPGC person assigned responsibility for administering contracts, including preparation of the contract tender or request for proposal (RFP) documents, arranging pre-bid meetings, coordinating the bid/ proposal evaluation process and recommending the awarding of the contract.

Project Manager – An OPGC person who is given the overall responsibility and authority for the successful completion of a project. His/ her responsibilities include the assignment of the contract monitor, conducting the pre-construction site meeting, resolving contractor safety performance issues, final inspection of the work, conducting the closing meeting with the contractor and completing the contractor evaluation.

Contract Monitor (Engineer In Charge/EIC) – An OPGC person who reports to the Project Manager and is responsible for monitoring the contractor's safety performance and providing feedback to the Project Manager. The Contract Monitor will compare the contractor's work and work methods with the standards and expectations defined in the contract.

OPGC Contact Person- The EIC of the Contract is termed as the OPGC contact person for that contract only.

Contractor Safety Orientation – A meeting at the start of each contract involving all contractor employees to discuss AES safety standards and the specific safety requirements for the contracted work.

High-Risk Work – Refer OPGC’s list of high-risk activities (Appendices-1). Work that exposes people to hazards that, should an incident occur, may result in a lost time injury (LTI), fatality or permanent disability.

Low-Risk Work – Work that exposes contractor’s employees to hazards that, should an incident occur, may result in a minor injury but not a lost time injury; examples include but are not limited to, training, consulting, office equipment maintenance, office cleaning.

Hazard Assessment – An assessment of the contracted work to identify and document the hazards inherent to the work site and facility. The hazard assessment is provided to the bidders as part of the bid/request for proposal documents.

Daily Job Safety Plan – A process that individual employees and working crews must follow to assess and document the critical safety issues pertaining to the day’s work. That can be JSA/Method Statement/SOP/SMP

Shall/Will: The word 'shall' be understood as mandatory

Should: The word 'should' be understood as strongly recommended

May: The word 'may' be understood as indicating a possible course of action

Restricted Areas: A Restricted area is defined as that area over which OPGC exercise control of all movements and operations and where entry is granted only with permission from OPGC.

Hazardous Areas: An area in which there exists or may exist flammable or other hazardous atmosphere.

7. PROGRAM REQUIREMENT & IMPORTANT GENERAL SAFETY

INSTRUCTIONS:

The goal of this program is to complete the project with zero incidents. This goal can only be achieved when everyone commits to error-free performance. The commitment to achieve this goal will result in increased productivity and the prevention of job-related losses.

Active participation and personal cooperation of all supervision and employees, and a positive coordination of their efforts carrying out the following:

- Stop Work Authority program. It is both the right and responsibility of all EMPLOYEES, be they OWNER, CONTRATOR or SUB-CONTRACTOR to stop any work activity that currently has or has the potential to develop into an unsafe situation. Work must stop immediately after an unsafe situation is identified, regardless of the job’s priority or importance. Work shall resume only when the unsafe situation has been remediated. Never hesitate to stop work – it doesn’t matter if it’s later determined that invoking the work stoppage was an error. A person will not suffer retribution or negative consequences of any sort for stopping work for safety reasons. Establish and maintain a system for early detection and correction of unsafe practices and conditions.

- Contractors on OPGC site must obey OPGC safety rules, signs and instructions.
- All contract employees have a responsibility for their own safety and the safety of others.
- The Contractor shall not charge or back charge OPGC for any delays, work stoppage, or scheduling issues resulting from enforcement of the OPGC Safety Rules.
- Contractors are responsible for establishing control measures to protect employees under their control from exposure to hazards.
- Contractor shall furnish, erect, and maintain warning notices, signs, signals, lights, protective guards, enclosures, platforms, barricades and other devices as necessary to adequately protect all personnel on site; including but not limited to employees, subcontractors, other contractors, OPGC people and the public.
- If the scope of work requires the removal of existing guardrails, handrails, floor grating or other physical barrier, contractor shall have written permission from OPGC Project Manager/EIC. Barriers that have been removed to facilitate work must be properly replaced as soon as the work is completed. Unguarded openings must be attended always.
- If covers are required to protect floor openings, excavations, trenches, pits, then the contractor must ensure the cover can support, without failure, at least twice the weight of any employee, equipment and/or material that may be imposed on the cover at one time.
- Chemicals must be handled in authorized manner. Handling of chemical must be carried in accordance with Material Safety Data Sheet (MSDS) regulation and EIC /Officer In charge/supervisor's guideline.
- Establish and implement safety education programs designed to stimulate and maintain the interest and active participation of all personnel involved with the project. Such programs should include:
 - Safety meetings and safety communications;
 - Use of incident trends and causal analysis to preclude reoccurrence of similar incidents;
 - Use of proper work procedures, personal protective equipment, and mechanical guards;
- Safety instruction to individual employees and group safety training programs; and managing records, incidents, claims, losses, and development of incidence/loss experience summaries.

ESSENTIAL DUTIES:

- (i) Use effective verbal and written communication skills.
- (ii) Listen to directions and suggestions from Project Manager/EIC/Supervisor/EHS officers regarding safe and proper work practices.
- (iii) Work up to a 12-hour shift. Never work beyond 12 hours unless otherwise OPGC Project Manager/EIC allows to do so.
- (iv) Climb and maintain balance on steel framework, stairs, ladders and scaffolds.
- (v) Identify workplace safety hazards and take all necessary corrective action to eliminate or minimize them.
- (vi) Understand and respond appropriately to all safety hazards and warning devices (i.e. back-up alarms, smell of smoke, different colored warning tags, warning sirens).
- (vii) Understand and implement lockout/tag out procedures in a safe manner.
- (viii) Participate in the jobsite Safety meetings as required.

8. OPGC SAFETY CARDINAL RULES/ZERO TOLERANCE ISSUES:

“Cardinal Safety Rules” are OPGC rules that, if violated, have a high probability of resulting in a serious adverse outcome. Contractors must ensure that employees working under their control do not violate these Cardinal Safety Rules. Failure to comply with Cardinal Safety Rules will result in immediate corrective action for the employee and, if OPGC determines it appropriate, the Contractor, up to and including termination from the current job and removal from consideration for future OPGC contracts. The OPGC Cardinal Safety Rules are:

- (i) Personal Protective Equipment (PPEs) as applicable to a given task must be used at all times.
- (ii) All high or medium risk jobs must be performed with valid Job Safety Analysis (JSA) followed by pre-job briefing.
- (iii) No entry to ITPS plant premise or no permission to do any work at ITPS under the influence of alcohol or drugs.
- (iv) Do not walk or work under a suspended load & use only tested & certified lifting tools & tackles on the job.
- (v) Do not handle and operate equipments unless authorized & licensed to do so.
- (vi) Do not tamper or remove guards, hand rails and other safety systems unless authorized to do so.
- (vii) Ensure energy isolations, lock-out-tag-out (LOTO) and strictly follow work permit instructions.
- (viii) Never work of & above 06 feet (1.8 meters) without fall protection.
- (ix) All injuries & near misses must be reported.

(x) Illegal handling or disposal of hazardous materials not allowed.

(Note: - Deviation/lapses from the above cardinal rules but not limited to these are treated as major safety violation.)

9. HYGIENIE, GENERAL PRACTICES / UTILITIES FOR REST & FOOD INTAKE:

The Contractor shall ensure that its personnel shall maintain the highest standards of hygiene in connection with the performances of any contract for works or services it may have with OPGC.

The only safe source of drinking water is a drinking fountain/taps. Other sources shall not be used.

- Do not use air, gas, water, electricity, fuel or other site facilities/utilities unless the source of supply has been designated & authorized by OPGC.
- Contractor personnel must not enter any building or area not required by their work. Wandering about the plant is prohibited.
- Contractor personnel are permitted for taking food in designated places either in OPGC Canteen or in any other designated site.
- Contractors shall take rest in designated rest sites. Taking rest in work places is prohibited.
- Taking rest & food in unauthorized sites will be treated safety rule violation;

11. SITE ENTRY PROCEDURE

The Contractor must comply at all times with the requirements of OPGC Site Security rules. The contractor for all personnel requiring admission to the Site, a Security gate pass request must be processed in advance.

11.1.“Gate Entry Pass” will be issued by the OPGC site administration and contractor person/people need to proceed to the OPGC contact person directly to follow the safety induction procedures. Gate Pass will be issued after site safety induction/training and fulfillment of other statutory requirements and duly certified by EIC on the gate pass entry request application. After imparting safety trainings, the gate passes will be stamped/ marked as ‘Safety training imparted’. No contractor and their employees shall be allowed to enter inside the Plant for carrying out jobs unless the safety training has been given to them and duly stamped as above

OPGC may issue to the Gate Entry Passes” for the admission of contractors and “Visitor Gate Passes” to the normal visitors.

These passes are to be returned on the demand of OPGC and in any case at the completion of the contract.

All Contractors’ staff must enter and leave the site via the Security Gate.

All Contractors' staff will have to produce their gate entry pass if asked by Security when entering AND leaving site. .

If any of the Contractor's or Sub-contractor's staff is found unjustifiably outside the working areas, then they will be removed from Site.

Ensure your name is recorded on the appropriate Contractors daily attendance page.

11.2. The contractor shall furnish to EIC the list of materials such as lifting tools and tackles, power tools, T &Ps (testing status to be maintained), gas cylinders, and any hazardous chemicals along with MSDS to be mobilized before commencement of work. All these materials shall be checked at Plant gate by Security, EIC & EHS for no objection. Contractor at no situation shall enter untested or substandard or unapproved tools, equipment or vehicles. Tested and approved tools, equipment & vehicles only can be entered into Plant Premises. Unauthorized entry of hazardous substance is strictly prohibited from Plant gate. Contractor materials shall be entered inside Plant with valid Security Certification on recommendation of EIC. Violation of the OPGC site entry rule shall be treated major safety violation. Strong disciplinary step will be booked against the violation.

12. PROJECT SAFETY PLAN & DAILY JOB SAFETY PLAN:

After knowing the detail hazard information of high-risk jobs, contractor shall provide a comprehensive project safety plan fulfilling minimum Safety expectation of OPGC. This is applicable for construction of new projects or prolonged outages (> 20 days) or complex works.

Daily Job Safety plan shall be prepared by the Contractor in advance before commencement of a particular day's job in consultation to concerned OPGC EIC. Work Permits, Resource Planning & JSA all together can be considered as daily job safety plan.

The project safety plan & its suitability/ appropriateness for the Contract job shall be verified & approved by the Project Manager. This is one of the important Contractor's job planning activity.

13. HEALTH & FITNESS

The Contractor shall ensure that all its employees engaged in the work are medically fit and healthy. Any medical disabilities including such disabilities which Contractor may consider will not adversely influence the employee's ability to perform his role in the work should be reported to OPGC prior to the start of the Work. Contractor shall provide health certificates in compliance with Odisha Factory rule for their personnel at the time of applying gate entry pass. No contractor personnel will be issued gate entry pass without the submission of health & fitness certificate in the prescribed form.

Contractors will closely monitor the requirement of health checkup at a maximum interval of one year or less for their employees in line with Odisha Factory Rules and based on their employees prevailing health condition.

14. WORK PERMIT

Work Permits will be issued in accordance to OPGC PTW procedures before performing any activity/function such as entry inside confined space, inside tank/vessel, excavation, work involving radiation sources etc, work at height, working with machineries & equipment's. Specific permit for hot work e.g. cutting, welding, grinding, chipping or sand blasting shall also be issued. During such activities the contractor shall ensure that a fire watch is deployed, and the person must clearly understand his duty & responsibility. Project manager/ EIC or his authorized representative supervising the job shall be responsible for obtaining & clearing the permit with the knowledge and consent of the contractor or his representative. It shall be the responsibility of the contractor to see that none of his employees start the job until, an appropriate permit has been issued with proper isolations followed by Pre-job briefing and job safety awareness by the EIC and the contractor or his safety coordinator.

15. HOUSE KEEPING & CLEAN SITE

The Contractor shall ensure that the site of the works is kept free of surplus, waste or redundant materials or items and shall maintain a clean and tidy site throughout the duration of the work. Access ways and emergency exits shall be kept clear from obstruction at all times. Combustible scrap and debris shall be removed at regular intervals during the course of project. All solvents shall be kept in approved, properly labeled containers. Contractors' bill payment will be held up unless otherwise housekeeping of their job site is maintained.

16. SITE OFFICE AND STORES

The Contractor will be allowed a working area on the site which shall be maintained by the Contractor for his site offices etc and on completion of the contract shall reinstate this area at his own expense, to the satisfaction of OPGC. The Contractor will also be given access to any reasonable area around the site.

17. SAFETY EQUIPMENT

The Contractor shall, at its own expense, provide adequate safety equipment of an approved type and amount as is required for the execution of the contract works. The Contractor shall maintain this equipment in a professional manner as dictated by legal and industry standards. In addition, the Contractor shall keep up-to-date records of all said equipment.

17.1. PROTECTIVE PERSONNEL CLOTHING AND EQUIPMENT

The Contractor shall, at its own expense, supply its personnel employed at the site of the works with adequate protective personal clothing and other protective equipment which shall be maintained in good condition or replaced, and shall be worn on all relevant occasions as specified by OPGC and good practice. It is the responsibility of the contractor to provide adequate instruction/training for the correct usage and maintenance of these equipment & PPEs, inspection & suitable storage of their

Personal Protective Equipment. The Contractor is also responsible for ensuring that the PPE is used and maintained in accordance with the manufacturer's specifications.

In the event that the Contractor fails to supply or provide adequate safety equipment or PPE, OPGC reserves the right to issue such safety equipment/PPE to the workforce provided by the Contractor and back charge the same from the Contractor with one and half times of the cost of item as administration fee and penalty for every item issued.

PPEs shall meet the following minimum standard and shall be maintained in good condition to give desired level of protection to wearer. Contractor has to assess the quantity of PPE required considering the job hazard and nature of job.

SPECIFICATION & SELECTION OF PPES:

A. SAFETY HELMET/HARD HAT-

IS/ CE/ ANSI certified

Material- HDPE and ABS Plastic

Colour- **DARK YELLOW** with name of contractor mentioned in front portion.

All safety helmets shall have textile chin strap, padded head band & of Plastic or Cotton cradle.

Make & Brand- Karam/ MSA/Venus/ Udyogi/ or any other equivalent brand approved by OPGC EHS

B. SAFETY GLASS/ SAFETY GOGGLES - IS/CE/ANSI certified

Polycarbonate, UV protected, Anti scratch, Anti fog

Colour- Colourless for all time and strictly in low light areas and night time. Grey may be used in day time within areas with adequate visibility.

Make & Brand- 3M/ Uvex/ Udyogi UD 61/ Karam-ES005/Venus- G-203-CHC or any other equivalent brand approved by OPGC EHS

Prescription glasses users shall use cover the glass.

C. SAFETY SHOE:

IS/ CE/ ANSI certified

Leather with Steel Toe

Anti-Static, Anti Skit, Anti Shock, Oil & Acid resistant with shock absorber

Make & Brand- Bata / Liberty/ Jaypee 1217/ SG Security- Concord or Black night/ Udyogi-

Tango, Mallcom- Tiger/ ACME Fabrick- Atom/ or any reputed brand approved by OPGC EHS

D. DUST MASK-

IS/ CE/ ANSI certified

Venus V4 20 SLV- FFP2/ 3M with Fine particle filtration efficiency greater than 94%.

E. EAR PLUG/EAR SEAL/EAR MUFF-

IS/CE/ ANSI certified

3M/ Venus/ Karam/ Equivalent

F. HAND GLOVES -

IS/ / ANSI certified

Material (Heavy Duty)- Finger Chome leather, 05 fingers provision

Material (Light Duty)- PVC dotted type of reputed brand

Make- Kaybee/ Udyogi/ Karam/ any reputed brand

Besides the above, for electrical, chemical handling or for any other special type activity, appropriate rating IS/CE/ANSI certified hand gloves shall be used.

G. WELDING FACE SHIELD ATTACHABLE TO HELMET -

IS/ CE/ ANSI certified /UV & IR protected, Superior quality

Make- Karam -ES 71, Unicare, Udyogi/ any other reputed brand

H. FALL ARREST SYSTEMS (SAFETY HARNESS, ANCHORS, FALL ARRESTORS, LIFELINES ETC)

Shall be IS/EN/ ANSI Certified with CE marking. Make- Karam/ Udyogi/MSA or any reputed brand finally approved by OPGC Safety Officer.

Life lines shall be EN 795, Class B of Karam Polyester webbing type or Polypropylene 16mm dia synthetic rope or 8mm standard wire rope 5000lbs (22KN) rating.

Refer section-41 (Fall Protection) for details.

Rest of the PPEs as appropriate to a particular hazard or as mentioned in MSDS (Material Safety Data Sheet) shall be provided to the persons engaged for the job by the Contractor in accordance with relevant BIS/ANSI/EN standards.

17.2. PPE ZONES & PPE EXCUSE ZONES

SI No	PPE type	Area of Use	Excuse areas/locations
1	Helmet	Compulsory from Plant Gate. Two-wheeler riders & pillion riders must use crash helmet while driving	Offices, Office Corridors, Control rooms, Canteen,
		Compulsory while working in other facilities outside plant viz, Ubuda Coal loading point, Ash Pond, Ash brick plant, Sewage Treatment Plant and Colony premise.	hospital & Service Building front while people are with no work or with office work activities with no risk to head from external source.

2	Safety Shoe	Compulsory from Plant Gate	Places other than the areas specified.
		Compulsory while working in other	
		Facilities outside plant viz, Ubuda Coal loading point, Ash Pond, Ash brick plant, Sewage Treatment Plant and Colony premise.	
3	Safety glass	Compulsory in all work areas	Main road from Plant Gate to CHP Track hopper, Other roads except the roads inside Boiler area, Offices, Office Corridors, Control rooms, Canteen, Hospital while people are with no work or with office work activities with no risk to eye from external source.
		Compulsory while working in other facilities outside plant viz, Ubuda Coal loading point, Ash Pond, Ash brick plant, Sewage Treatment Plant and Colony premise.	
4	Ear Plug/Seal/ Ear Muff	In all high noise areas greater than noise level 85 dBA	Places other than high noise areas
5	Hand Gloves	Compulsory during all field works, material handling, working where risk of injury to hand prevails	Office activities
6	Dust mask	In all dust generating areas (ESP hopper cleaning, Dry Ash handling, Cleaning, Sweeping, Soil excavation, Asbestos/Asbestos containing material handling, Coal Handling Plant, Painting work, visible fugitive emission in Boiler and other areas etc)	Excuse for non-dust generating Areas
7	Welding face shield	During welding operation only	Non-Specified activities
8	Cutting glass	During cutting operation only	

9	Chemical respirators	During fuming Chemical handling or hazardous gas handling. Atmosphere with Chemical fumes, hazardous gas fumes. During welding operation.
10	Chemical Suit/Apron	During hazardous Chemical/ substance handling, Lead acid Battery maintenance
11	PVC/Rubber hand gloves	During hazardous chemical/substance/waste handling & Lead Acid battery maintenance.
12	Chemical Goggle/ Face shield	During hazardous chemical/substance/waste handling & Lead Acid battery maintenance.
13	Encapsulated suit for Chlorine	In Chlorine atmosphere greater than 50 PPM
14	Self-Contained breathing apparatus	Toxic gas atmosphere (Chlorine, Ammonia, Carbon monoxide, Acid fumes) where chemical respirator is not recommended, Confined Space with hazardous fume or gases
15	Arc flash Suit with boot and hood of suitable rating	During Electric Panel Breaker & MCC modules Operation
16	Electrical hand gloves of suitable rating	Working with live electrical power sources
17	High temperature hand gloves & jacket	Working with Steam lines
18	Hard toe rubber gumboot	Working in Mud, Sludge, Water, dense wild grass areas, other place taking Safety Officer's approval
19	Lead laminated coverall	Working with radiographic substances
20	Reflected jacket	As advised by OPGC Project Manager/EHS

21	Cotton Boiler Suit	Working inside Boiler / and as advised by OPGC Project Manager/EHS	
22	Full body harness	Working above 5.9 ft without fall protection	
23	Welding jacket/suit & hand gloves	Standard flame-resistant welding jacket/suit & heat resistant leather hand gloves	

17.3. CONTROL ON PPE: The samples of PPE to be used by contractor at site shall be submitted to OPGC Safety Officer in advance for approval. On approval, the Safety officer will retain the sample. The approved quality PPE (Make/Brand and colour) shall be used by contractor at worksite throughout the job. Any unauthorized change of model/ brand/ colour of PPE from the sample shall be considered as Safety violation and may lead to disciplinary action. On completion of work, the sample shall be returned to the contractor. The specification given above for different types of general PPEs is minimum quality standard. Contractors are free to provide better quality PPEs but such PPEs quality shall be approved from OPGC Safety Officer prior to use inside OPGC premises.

18. TRAINING

18.1. SAFETY ORIENTATION

The Contractor shall ensure that all its personnel have been given the necessary safety and job related training required by OPGC regulations and good practice prior to starting work.

Contractors will be responsible for providing their employees and any subcontract employee with all safety information provided to it by OPGC including, but not limited to:

Project-specific occupational health and safety expectations;

Exposure to atmospheric health, serious physical or chemical hazards; and Precautionary measures and procedures for performing the work.

18.2. PRE- JOB BRIEFINGS

Contractors shall conduct pre-job briefings and toolbox talk/ safety talks with employees under their control prior to work each day. Additional job briefings shall be held if significant changes occur during the course of the work that might affect the safety of the employees.

19. COMPETENCY OF CONTRACT EMPLOYEES.

Contractor shall assign competent employees as per the requirement of the job. Supervisors should be so qualified that he can clearly communicate with his team members. Besides, Supervisors shall be able to communicate in English. All high skilled & semiskilled employees must have job specific competence. OPGC will evaluate/verify competence and will reject employees who are not found with inadequate competency.

20. RESTRICTED AREAS

All Contractors must receive authorization from the OPGC Contact Person before performing work in areas posted “DANGEROUS” or “HAZARDOUS” or “RESTRICTED” or some other warning signs. Contractors shall install warning tape for areas that require additional warning because of the work being performed there.

21. ALCOHOL AND DRUGS

The Contractor shall ensure that its personnel do not at any time, during the performance of the work, partake of or be under the influence of any alcohol, drug or other intoxicating substance, while on duty, other than for bonafide medical reasons certified by qualified medical practitioner. Person found with violation of this rule will be immediately removed out of OPGC site and appropriate disciplinary action will be imposed to the contractor.

22. DRIVING & PARKING

All heavy vehicles and other related machinery required in connection with the work shall be fit for purpose, prior to and during the period of the work.

The Contractor shall ensure that only permitted personnel (by way of valid OPGC Driving License) are able to operate vehicles as per the classification of vehicle.

Contractor shall strictly comply with Speed limit of 20Kmph in all areas inside the plant for passenger vehicles. Heavy vehicles speed shall not exceed 10kmh at any point of time.

Parking of Vehicle is allowed only in the designated areas. Deliveries of materials, tools and/or equipment shall be coordinated with OPGC contact person and Security. After the delivery is made to the job site, the delivery vehicle must be parked in the designated parking area or must exit the job site.

Operators of mobile equipment must wear hard hats and safety glasses unless the equipment has a fully-enclosed cab. Seat belts must be worn when operating equipment. No Contractor shall permit earthmoving or compacting equipment that has an obstructed view to the rear to be used in reverse gear unless the equipment has in operation a reverse signal alarm distinguishable from the surrounding noise level or unless a contractor-designated employee signals that it is safe to do so.

The Contractor undertakes to ensure that all drivers comply with the following basic rules:

- Always wear a seat belt;
- Always observe traffic rules, especially speed limits;
- Never drive after consuming alcohol/drugs;
- Never drive when very tired;
- Never overload the vehicle;

- Drive carefully;
- Be sure that before starting the vehicle the area near and under the vehicle/trailer is free from persons asleep.
- Vehicles are PUC certified with validity of expiry.
- Heavy vehicles are provided with fire extinguishers

CRASH HELMET USE – Riding two wheelers without the use of crash helmet from plant gate is prohibited. Contractor shall ensure, the crash helmet is all times being used by his people riding two-wheeler.

23. SAFETY MEETINGS

The Contractor shall be responsible for maintaining and enhancing the safety awareness of its personnel including arranging its own safety meetings and participating as appropriate in safety meetings held by OPGC.

24. SAFETY INSPECTION / AUDIT

The Contractor shall inspect the work site, equipment and tools on regular basis for compliance with these rules and regulations, and shall be obliged to take the necessary measures to correct unsafe conditions and unsafe practices.

The Contractor shall allow OPGC representative access at any time to plant, equipment, personnel and records when requested, to enable OPGC to inspect aspects of Contractor's operations relevant to safety and working environment.

25. REPORTING AND INVESTIGATION

The Contractor shall report all near misses, incidents or accidents to OPGC contact person or central control room immediately.

The Contractor shall allow OPGC representative access at any time to plant, equipment, personnel and records when requested, to carry out formal investigations to find out the root causes and there by identify the required corrective actions to avoid the reoccurrences.

Upon completion of the Work under contract and/or on a monthly basis, whichever is more frequent, the Contractor shall prepare a summary report of its safety performance together with accident statistics and submit to OPGC.

26. INJURY MANAGEMENT

Basic Life support facility (first aid) is available in OPGC. Contractor supervisors should be trained with first aid.

In case of an injury to some contract worker, please inform immediately available OPGC personnel or first aid center or central control room using **(phone 248/222/06645 222222)**.

Only trained and certified people shall provide first aid to the injured.

In case of doubt, injured personal shall not be moved or transport improper vehicles because it may complicate the injury more and some cases may lead to death.

Only Designated vehicles (Ambulance) shall be used for transportation of patients.

27. JOB SAFETY ANALYSIS (JSA) & JOB SAFETY BRIEFING (JSB)

- The Contractor shall adopt the OPGC JSA & JSB practice/advice.
- The Contractor shall ensure that its supervisors and are fully conversant with OPGC JSA & JSB Process/ System.
- Under no circumstances must work be started until the appropriate JSA has been prepared and complete the Pre-job briefing.
- Competent person from the contractor and in-charge of the work from OPGC shall conduct the Pre-job briefing to all members.
- Competent person from the contractor and in-charge of the work from OPGC shall make available a copy of the safety document at site.
- Sample Job Safety analysis in prescribed format is furnished in appendix below.

28. EMERGENCY PROCEDURES

The Contractor shall follow the OPGC Emergency Response Plan (ERP) during the period of the work and shall ensure that its staff are fully familiar with the actions to be taken in case of an emergency.

28.1. EMERGENCY PLANNING:

Contractors must inform his people on the actions to be taken in the event of fire, explosion, personnel injuries or other emergencies. The contractor shall also keep abreast & acquaint of his persons regarding “Emergency Response Plan” of ITPS, assembly points, DO’s & DON’Ts during emergencies at regular intervals in monthly EHS meeting.

28.2. EVACUATION PROCEDURE:

Identify the escape routes available to you before you commence work. Know the assembly points and directions to reach there in case of emergency.

When the emergency siren sounds, immediately leave the area by your nearest evacuation route to Emergency Assembly Point. If you are using power equipments or vehicles you must switch it off and make it safe before evacuating.

DO NOT RUN AND DO NOT STOP TO COLLECT YOUR BELONGINGS.

Report to the emergency assembly Points as per the instructions given on loud speakers/ public address system.

Obey instructions given by the OPGC contact person staff and assembly point coordinator.

Remain at the assembly point until instructed otherwise. Do not re-enter evacuated areas until the ‘**all clear**’ announcement is made by the Main Control Room.

Emergency Siren test is carried out every Saturday at 11:00 hours for two minutes and require no action.

28.3. REPORTING EMERGENCY:

If you discover a fire, or any other serious incident/emergency phone **222/233/244** using the site telephones, this will connect you to the **Plant Main Control Room. Other**

	Emergency Contacts are-	Intercom	P&T
Fire Station	777	06645222257	
Ambulance	277/248	06645222216	
Hospital	666	06645222243	

Give your name, location, and the details of the emergency. Follow any instructions given.

Only take emergency action if competent to do so, e.g. resuscitation, first aid, firefighting etc.

If safe to do so remain in the vicinity to give relevant information to the assistance when it arrives.

Never endanger **your** safety.

29. SAFETY SUPERVISOR

If the numbers of contract workers are more than or equal to 50 (fifty), the Contractor shall be required to provide full time safety supervisor who will be responsible for ensuring the work is performed in accordance with the applicable safety requirements. For every 50(fifty) employees thereafter there shall be one Safety Supervisor/Officer. The On-Site Contractor Safety supervisor/officer(s) must have appropriate knowledge and skills, to ensure job site safety. For contractor worker less than 50(fifty) in job, the work supervisor can be utilized for safety supervision but in case the Project Manager find ineffective supervision, the contractor may be asked to provide independent safety supervisor.

Contractor Safety Supervisors should be qualified & experienced enough to deliver their assigned jobs effectively as per expectation of OPGC Project Manager/EIC & EHS. Before their work assignment, Contractor has to provide the list of their safety professional along with Safety In charge stating name, qualification, and experience & contact number to the Project Manager & EHS. The supervisors’ competency will be evaluated by OPGC EHS prior to issue of gate pass. Only OPGC EHS competence certified Safety supervisors will be permitted for Safety Supervision at Contractor work sites.

Competency certification may vary depending on the nature & risk level involved with the contracted job. Contractors are not permitted to execute job without deployment of Safety Supervisor(s) as specified under this condition. Contractor Safety Supervisors performance will be monitored by OPGC EIC & EHS and the instruction & advice of OPGC shall be implemented promptly. OPGC will impose appropriate penalty if the Contractor fails to implement OPGC’s safety expectation satisfactorily.

30. COMMUNICATIONS

30.1. COMMUNICATIONS WITH OPGC

The Project Manager or his authorized persons (EIC) and OPGC EHS shall be the point of communication for all EHS issues arising under this contract.

30.2. COORDINATION WITH OTHER OFFICIALS

Contractor is fully responsible for coordinating with the proper authorities for moving heavy equipment, location of underground utilities, erecting barricades, traffic control, and other safety measures, unless otherwise specified.

30.3. COMMUNICATIONS WITH MEDIA RESTRICTED

In the event of an accident or other condition on site, contractor shall not communicate with the media or any other entity without the expressed consent of OPGC.

31. EQUIPMENT CERTIFICATION

The Contractor shall, at its own expense, ensure that all Portable electrical appliances, lifting equipment or other equipment required inspection or calibration has been inspected/ certified by an authorized and a liable inspection/certification authority/company prior to its use in the works.

32. RESTRICTED ARTICLES

The Contractor shall be required to ensure that written approval signed by OPGC contact person has been obtained prior to taking dangerous items such as drugs, knives, radioactive, corrosive, poisonous or toxic materials onto OPGC premises.

33. PROHIBITED MATERIALS

Contractor is strictly prohibited from using any of the following types of materials in performance of the work:

- Asbestos, Asbestos Containing Material (ACM).
- Mercury containing material.
- Surface coating systems that contain lead, cadmium, chromium, barium or mercury.

34. HAZARDOUS SUBSTANCES

- Before delivery of any hazardous materials to OPGC site, Contractor shall provide Material Safety Data Sheets for all anticipated hazardous materials.
- All containers containing hazardous materials must be clearly labeled indicating their contents and appropriate hazard warning information.
- Hazardous materials must be stored in a secure location agreed with the **OPGC Contact person**.
- Don't dispose hazardous substances into drainage system and please inform any spill on the floor or on any personnel.

All operatives must understand the hazards of the materials they have to handle before use, some can be dangerous when used carelessly or when safeguards are overlooked. If in doubt, consult your own supervisor or OPGC Contact person for the relevant Hazard Data Sheet for specific health & safety information.

- Hazardous waste must not be dumped in general waste bins and the hazardous waste bins are provided around the plant premises.

35. SMOKING

Plant premises are no smoking zone. Smoking is prohibited inside plant premises. Persons observed smoking inside Plant will be removed from job with immediate effect. Smoking is permitted inside declared/authorized smoking zone(s).

36. SUB CONTRACTOR

The Contractor should ensure that sub-contractors shall be responsible for safety requirements as specified by OPGC. The Contractor shall regularly check sub Contractor's compliance with safety requirements

37. LIFTING MACHINERY AND EQUIPMENT

37.1. LIFTING TACKLE (ALSO KNOWN AS LIFTING/ LOOSE GEAR)

Any item used to connect a load to the lifting appliance, but which is not in itself, capable to lift, lower, transport or suspend the load, such as; Chain, wire rope and webbing slings, Rings, links, hooks, shackles, eye bolts, swivels, blocks, snatch blocks, Beam clamps and plate clamps, Lifting beams, frames, baskets, Waste bins, tool boxes, cargo nets, containers, pallets, etc.

37.2. STANDARD REQUIREMENTS

- All lifting tackle shall be tested and certified by approved competent person.
- The Contractor shall make available, as necessary, any certificates and inspection records.
- Lifting tackle shall not be issued or used without a current test certificate.
- All lifting tackles shall be visually inspected before use to identify any damage. Damaged or defective equipment shall be immediately removed from service.
- Only equipment, which has been properly tested and is clearly marked/labeled/coded, may be used. The SWL (Safe Working Load) or WLL (Working Load Limit) must be clearly marked on all equipment and must be adhered to.
- Makeshift lifting devices formed from bolts, rods or reinforcing steel shall not be used.
- Slings shall not be shortened with knots, bolts or other makeshift devices.

- Synthetic web slings shall be marked or coded to show the manufacturer, the rated capacities for each type of hitch and the type of material.

Synthetic web slings shall be immediately removed from service if any of the following conditions are present:

- Acid or caustic burns
 - Melting or charring of any part of the sling surface
 - Snags, punctures, tears or cuts
 - Broken or worn stitches
 - Distortion of fittings
- No heavy loads or excessive strain may be placed on ropes.
 - Rope should not be driven over, ground into cinders or mud, wrapped around sharp or abrasive objects or burned by “snubbing off” too fast.
 - Wire ropes or wire slings, shall not be used for raising, lowering or as means of suspension if any fraying, kinking or broken wires are apparent.

37.3. LIFTING EQUIPMENT OR APPLIANCES

Is a generic term - “Lifting equipment “shall mean any machine, driven by manual or mechanical power which is able to raise, lower, suspend or transport loads and includes the supporting structure and all Plant, Equipment appliance, structures. This may include but not limited to Continuous mechanical handling devices (i.e. conveyors). Cranes (mobile, tower, pedestal, etc.), Wall/pillar cranes, derricks, Runway beams, pad eyes, gin pole and gin wheels Winches, hoist (air and electric), crabs, teller hoists, Powered working platforms, Elevators and Lifts, overhead cranes.

37.4. STANDARD REQUIREMENTS

- **At no circumstances, rear seated hydra crane shall be used for any sorts of OPGC activity irrespective of site locations (inside or out side plant premises)**
- Lifting machinery and equipment shall be retested by an approved competent person after any major alteration or repairs thereto.
- Lifting machinery and equipment shall not be issued or used without a current test certificate.
- EOT crane operation shall be carried out by personal with valid rigger certificate with familiarization to operate the EOT cranes.

➤ All lifting operations are to be suitably planned and carried out with trained and qualified personnel. It shall be the duty of the Contractor to ensure that all employees under its control know and are able to apply hoist signals and their uses.

➤ One qualified person shall direct the rigging operation. This person shall give signals for the group. No crane operation will take place without an appointed and identifiable "SIGNAL MAN".

➤ All lifting equipment shall be visually inspected before use to identify any damage. Damaged or defective equipment shall be immediately removed from service.

Only equipment, which has been properly tested and is clearly marked, may be used. The SWL (Safe Working Load) or WLL (Working Load Limit) must be clearly marked on all equipment and must be adhered to.

➤ All lifting operation should be carried out in the barricaded area; no one should be allowed to walk underneath of suspended load.

➤ It is the Contractors responsibility to satisfy the OPGC Contact Person that all lifting equipment and machinery conforms to the relevant statutory provisions.

➤ All lifting machinery and equipment and all parts and working gear thereof, both fixed and mobile shall be of good construction, sound material and free from patent defect and shall be maintained and operated to comply with OPGC standards.

➤ Every dangerous moving part of lifting machinery should be guarded.

➤ The hoisting mechanism of a crane shall not be used for any purpose other than lifting a load vertically.

➤ Cranes shall not be used to transport loads, unless specifically designed for this purpose. The hook of a crane shall be secured to prevent it swinging when the crane is in "Transit".

➤ Mobile Jib Cranes, side booms and "A" frames shall not work in the vicinity of overhead Power lines unless a safe working distance of total Length of the Jib + 10 feet is maintained.

➤ Cranes with more than one ton lifting capacity shall be fitted with a safe working load indicator, and a crane capacity chart displayed inside the operator's cabin.

➤ Contractor shall not operate the cranes of OPGC without permission from OPGC Contact person.

➤ Critical lift plans must be developed by a qualified person, and then submitted to the OPGC Contact person for review and approval.

- Contractor shall designate a person to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- Cranes with fixed or derricking jibs should be fitted with effective automatic safe load indicators which should be provided with appropriate visual and audible signals, properly maintained and tested by a competent person after the erection or installation of the crane.
- Vehicular equipment, if provided with outriggers, shall be operated with the outriggers extended and firmly set as necessary for the stability of the specific configuration of the equipment. Before lowering outriggers, the contractor must verify the surface is firm and will support the weight of the equipment and operation to be performed. The Contractor shall place outrigger pads if conditions require.

While extending, lowering outriggers and retracting the outriggers, the operator shall visually inspect the area to verify it is clear of all personnel and obstacles.

- Instructions issued by the manufacturer, specifying weather and wind speed conditions which would be likely to affect the safety of the operation, lifting appliance should either not be used or used subject to limitations, should be followed.

37.5. MULTIPLE LIFTS

The simultaneous use of more than one lifting appliance to raise, suspend, support or lower a single load should be avoided. Where the simultaneous use of more than one lifting appliance is unavoidable; contractor shall perform the lifting only with OPGC approved Risk assessment, Method statement and Rigging plan.

37.6. PERSONNEL BASKETS AND MAN HOIST

- Personnel baskets should be of good design construction, sound material, and adequate strength, free from obvious defect and certified and clearly marked with the maximum number of persons permitted.
- Where a man hoist is operated by means of a winch, or where person is carried in a cage, skip or similar plant or equipment designed to lift persons, the winch should be so constructed that the brake is automatically applied at all times except when the controls are in the operating position.
- No winch should be fitted with a pawl and ratchet gear on which the pawl has to be disengaged before the platform or cage can be lowered.

37.7. INDUSTRIAL FORK LIFT

- Industrial fork lift trucks shall not be used to lift a load greater than the maximum safe working load permitted for the truck.

- Passengers are forbidden to ride on vehicles, mobile plant or forklift trucks not specifically designed or fitted out for passengers use.
- The Forklift operator shall have a valid operating certificate from a recognized authority and a valid OPGC driving license.

37.8. CONTAINERS

- Every container for raising, suspending, supporting or lowering articles, tools, equipment, and other materials should be of good construction, sound material, and adequate strength, free from obvious defect and suitable for the purpose for which it is required.
- Provided with adequate and suitable arrangements for securing the container to the lifting appliance or to lifting gear, as appropriate;
- Marked with its tare weight and the weight of the load which it may carry with safety;
- So constructed as to prevent the accidental displacement of its load.

Loose materials or articles that could be displaced should be secured or covered to prevent such displacement.

38. HAND TOOLS

- Tools shall not be placed on any type of energized equipment or where a tool might fall and become a hazard.
- Unacceptable placement includes on ladders, stairs, railings, mobile equipment, lying on the floor, on the scaffold, in walkways or cluttering work benches.
- Tools shall not be placed next to open trenches, manholes or vault openings.
- Tools, materials and parts used in elevated work locations shall be tied in place or kept in containers secured so that nothing can accidentally fall.
- Select the right tools for the job.
- Train your workers to select the right tools for each job and ensure that the tools are available.
- Inspect the tool and ensure that it is in good condition and keep it in good condition.
- Unsafe tools include wrenches with cracked or worn jaws; screwdrivers with broken tips, or split or broken handles; hammers with chipped, mushroomed or loose heads and broken or split handles; mushroomed heads on chisels; dull saws; and extension cords or electrical tools with broken plugs, improper or removed grounding systems, or split insulation.
- Use all tools correctly.

- Keep tools in a safe place.
- Carry the tools to and from the work site in a tool box, cabinet, or other appropriate tool holder or pouch.
- Store the tools in the proper storage area.
- Tools should not be carried up or down ladders by hand. Appropriate pouches shall be used. Where pouches are not available, tools shall be lifted and lowered by hand lines.
- Tools should not be thrown from one level to another, nor should they be thrown from one location to another on the same level.
- Spark proof tools should be inspected regularly to ensure that there are no steel splinters.

39. PORTABLE ELECTRICAL APPLIANCES.

- All appliances should be tested and identified; records of test/re-test dates should be available.
- Equipments which do not have the test detail label will not permitted inside OPGC Premises.
Any equipment which is in poor condition will not be permitted inside the OPGC premises.
- Where any portable hand tool requires a supply above 110Volts A.C obtain permission from your OPGC Contact Person. If permission is granted, a residual current device (RCD) must be connected in the circuit.
- Joining of cable is allowed only with industrial male and female sockets of IP67 rating. No twisting or taping of conductors is allowed.
- Bare cable/ conductors shall not be inserted to sockets.
- Contractors must ensure that electric equipment connected by cord and plug in good condition.
- Each employee must be properly trained before using tools or equipment requiring special instruction or training (e.g., power tools, vacuum equipment, etc.).
- Extension cords used with portable electric tools shall be of the 3-wire type unless the tool or appliance is double-insulated or operated from an isolated power service. The ground wire must either be permanently connected to the tool frame for grounding means.
- Extension cords lay across walkways or driveways must be covered by protection or warning devices to prevent pedestrian or vehicle hazards.
- Ground Fault Circuit Interrupters (GFCIs) are to be used whenever a portable electric tool is used.
- Electrically-powered tools may not be used on energized conductors.

- Compressed air hose connections shall be secured with a safety clip or retainer before use.
- If a machine guard is removed in order to work on equipment, it shall be replaced before the equipment is placed back in service. Lockout/Tagout procedures shall be followed.
- Power tools should be used, in accordance with the manufacturer's instructions.
- Where sparking or heat generated by the use of pneumatic tools, an approved coolant shall be used.
- Only patent pneumatic hose, couplings and fittings of the correct rating shall be used when using pneumatic tools.

40. TEMPORARY WIRING

These provisions apply to temporary electrical power and lighting wiring methods. Temporary wiring shall be removed immediately upon completion of construction or the purpose for which the wiring was installed.

40.1. TEMPORARY POWER PROGRAM PROCEDURES

- i. Only authorized and qualified people for electrical work shall work on the installation, wiring, troubleshooting or repair of electrical equipment.
- ii. All persons dealing with & handling electrical equipment shall be trained to apply the correct treatment for electric shock.
- iii. All portable tools, hand lamps & other apparatus must be connected to the system by means of appropriate rating plugs & sockets type.
- iv. All joints must be both electrically & mechanically sound. No twisting of conductors or tapping is permitted.
- v. Supplies to welding equipment must be specially arranged & the connections must be sufficient in size for the duty to be performed & properly protected against mechanical damage & electrical hazards.
- vi. All lamps for general illumination shall be protected from incidental contact or breakage. Metal-case sockets shall be grounded. Damaged cages/lamps shall be corrected upon notice.
- vii. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this mean of suspension.
- viii. Portable electric lighting used in wet and/or other conductive locations, for example drums, tanks, and vessels shall be operated at 24 volts or less. However, 120 volt lights may be used on approval if protected by a GFCI.

- ix. Flexible cords and cables shall be protected from damage. Sharp corners and projections shall be avoided. Flexible cords and cables may pass through doorways or other pinch points, if protection is provided to avoid damage.
- x. Extension cord sets used with portable electric tool and appliances shall be of three-wire type and shall be designed for hard or extra-hard usage. Flexible cords used with temporary and portable lights shall be designed for hard or extra hard usage.
- xi. Electrical equipment shall not be opened, adjusted, repaired, or otherwise handled until it is de-energized and locked-out according to the lock-out policy.
- xii. De-energized equipment shall be tested before anyone works on it.
- xiii. All metal panels, boxes, covers, conduit, etc., that are part of electrical system shall be grounded.
- xiv. All splices and repairs shall be made inside an approved box or approved splice kit. Tape alone is not acceptable.
- xv. Metal ladders shall not be used for electrical work.
- xvi. All electrical equipment that is exposed to flammable gases or vapors, combustible dust, or ignitable fibres must meet hazardous location requirements in order to prevent explosions.
- xvii. Extension boards must have GFCI/RCCB protection with main power on/off switches. GFCI/RCCB should not be used as power on/off switching.
- xviii. Circuit breakers that protect hand tool receptacles shall have a maximum rating of 20 amps. Waterproof connectors shall be used as necessary.
- xix. All holes in panel boxes and gaps where circuit breakers are missing shall be securely plugged with a fireproof material.
- xx. Circuit breakers shall be matched as closely as possible to the electrical needs they supply.

41. FALL PROTECTION

All persons, on any project that requires them to wear a personal fall arrest or restraint system, will follow these guidelines. A full body harness will be used whenever there is the potential for a fall from a height of 6 feet or more.

41.1. PERSONAL FALL ARREST SYSTEMS (PFAS) & FULL BODY HARNESS:

A personal fall-arrest system is generally required whenever an individual is at risk of falling 1.8 meter or 5.9 ft or more ft from an elevated position. A properly designed system should include three components:

- A. An **anchor points** capable of supporting a minimum of 5,000 lbs (22.2 kN) per attached worker; will serve as a secure connection point for lifelines, lanyards or deceleration devices.
- B. A **full-body harness** designed to distribute fall-arrest forces over thighs, pelvis, waist, chest and shoulders; if a fall occurs, D-ring located in centre of the back will hold worker in an upright position until rescued.
- C. A **connecting device** such as a lanyard, deceleration apparatus, lifeline or a combination of these items with locking snap hooks. Must have a minimum breaking strength of 5,000 Lbs.

WARNING:

The maximum arresting force an individual is permitted to sustain while wearing a harness is limited to 1,800 lbs (8kN). To stay below this impact force, workers should keep the free fall distance as short as possible (max. 1.8 meter) and consider the use of deceleration devices or shock absorbing lanyards.

During fall, the worker shall not come in contact any lower level and bring the worker to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m).

Each worker shall be attached to a separate lifeline and lifelines shall be protected against being cut or abraded.

FULL BODY HARNESS APPLICATION GUIDELINE-

Deceleration apparatuses (shock absorbers) attached double lanyard type harnesses shall be used only at height with fall distance of 6 meter or more.

For fall distance of less than 6 meter or more than 06-meter, self-retractable type full body harness shall be used.

Full body harness after one free fall shall not be used again, it shall be condemned.

Harness shall be checked/ inspected for wear/tear or any damage or expiry before use.

41.2. ANCHORAGE CONNECTORS AND POINTS

An anchorage connector or point must be capable of supporting 5000lbs. per attached worker. This can be accomplished in a number of ways and must be engineered to ensure the point has that capability.

Only anchorages designed by a fall protection equipment manufacturer must approved by OPGC.

Anchorage Points in concrete or attached to wooden structures must be approved by both the Contractor's Qualified Person & EIC.

The anchorage point must be installed at dorsal D-ring (shoulder) height or higher. An anchorage point at feet level is unacceptable for fall arrest application and will not be allowed.

41.3. AUTHORIZED FALL PROTECTION SYSTEMS/EQUIPMENT

Only fall protection equipment approved by the OPGC will be used on OPGC projects.

STORAGE

The equipment should be stored and hung up freely by the back D-ring in a cool, dry place until needed. If materials appear to be faded or if tags and labels are illegible, consult the equipment manufacturer to determine if replacement is necessary.

41.4. TIPS FOR FALL PROTECTION

- Make sure the harness fits snugly. Tighten all straps.
- Use an anchorage point above your head. Do not tie-off at your feet unless there is no other place to tie-off.
- Use two lanyards for 100% tie-off. One lanyard must be attached at all times and when moving from position to position.
- Never hook two lanyards together to get extra reach.
- Except with specific lanyards, hooks may not be tied back into the lanyard itself.
- Use cheaters only when your lanyard will not reach a tie-off point. Cheaters will not be used while tied off to the inside of a man basket.
- Shock absorbing lanyards may not be used in conjunction with retractable lanyards.
- Never tie a knot in your lanyard to reduce its length

41.5. ACCESS

Stairways and stair towers with complete hand and guardrails do not require fall protection.

Fall protection is not required while using a ladder as a means of access as long as the climbing distance is less than 10 feet. Once a worker has climbed 10 feet a ladder climbing device is required or an enclosed cage must be present.

If the worker stops at any point to conduct work from a ladder, and the worker's feet are more than 6 feet above the adjacent surface, fall protective equipment is required. A three-point contact must be maintained with a ladder regardless of the height a worker is above an adjacent surface.

42. SCAFFOLDING

All scaffolds and staging shall comply with OSHA standards. Prior to using any scaffolding, it shall be approved by OPGC. A "GREEN SCAF-TAG" indicating OPGC acceptance will be attached to the

scaffolding, the scaffolding is not to be used until the approval is given. The scaffolding shall meet the following minimum requirements:

- Timber uprights and ledger shall not be used.
- Metal parts used for scaffolds shall be in good condition and free from corrosion.
- All poles, planks and general materials, used for scaffoldings, shall be kept in good condition and be inspected by a competent person appointed by the Contractor on each occasion before being used for erection.
- No materials, other than those specifically designed for the purpose, shall be used for scaffolding.
- A scaffold shall be erected only by men trained and certified in the job, working under the immediate supervision of a competent foreman, who knows the purpose of the scaffold and how it should be constructed to carry the loads which will be placed upon it.
- Scaffolds shall be securely supported or suspended and where necessary braced to ensure stability. Unless constructed as an independent scaffold, it shall be rigidly connected to the building or structure.
- In the case of partially erected or dismantled scaffolds still capable of being used, access thereto should be effectively blocked, and prominent warning notices shall be posted with a "RED SCAF-TAG".
- All platforms, scaffolds and other workplaces, from which persons may fall more than 1.8m (6 ft) shall have edge protection which consist of an upper rail not less than one meter (3 ft 3 inches) in height above the walkway and have at least one intermediate rail.
- Toe boards shall be fitted to all scaffolding.

When permanent hand rails have to be removed from elevated platforms, rope or wire hand rails shall be fitted in their place.

- Any load-bearing scaffolding should be constructed to a design previously submitted to and approved by an OPGC contact person.
- Parts of staging, tools and other articles and materials shall be properly lowered and shall not be thrown down from a height. They shall be raised by rope or other suitable means and not carried on the person.
- The Contractor's Representative shall ensure that no loose articles and materials are left lying about in any place from which they may fall on persons working, or passing beneath.

- While erecting the scaffolding a RED SCAFF-TAG need to be hung until erection is finished

42.1. REQUIREMENTS FOR BOARDS AND PLANKS

- Boards of 51 mm (2 inch) minimum thickness shall be used. These shall be at least 210 mm (8 inches) wide.
- The spacing of board supports shall depend on the thickness of the boards used and the load to be carried. There shall be at least three supports. Support for 51 mm (2 inch) boards shall not be more than 2.5 m (8 feet 6 inches) apart. All boards shall be supported at the ends.
- Boards shall be end-butteted and close boarded throughout. Overhanging of boards of any thickness shall not exceed four (4) times their thickness and not less than 50 mm.

42.2. WORKING PLATFORM

- All working platforms should be close boarded, and all boards should be lashed or secured.
- Widths of platforms vary according to scaffolds purpose.
- As a general rule, if the platforms are to be used only as a footing, they shall be at least 610 mm (24 inches) wide. If small quantities of materials have to be put on them, the platform width shall be increased to 813 mm (32 inches) wide.

42.3. MOBILE TOWER

- The height of a mobile tower should never exceed three times the length of the shortest side.
- There should be only one working platform on a mobile tower.
- Mobile scaffolds should only be used on ground which is firm and level.
- Moving the tower should only be done by pushing or pulling the base.
- The working platform must be clear of men and materials when the tower is being moved.
- Wheels should be turned outwards and brake must be on and locked before use.
- It is advised to tie the tower to the structure whenever possible.
- Never ride on a scaffold that is being moved.

42.4. INDEPENDENT TOWERS

- The tubular scaffold used most often is the independent tower. The independent tower apart from necessary ties stands completely free from buildings or structures and is used mainly for access pipe bridges or high maintenance jobs where only a small working area is required.
- The foundation must be capable of carrying the weight of the tower, equipment and men.

- Base plates must be placed under all standards and if there is any danger of lateral movement they must be securely fixed, substitutes must not be used.
- Special precautions must be taken to provide stability on soft soil, or surfaces likely to be damaged.
- Standards must be vertical and joints must be staggered. The distance between standards must be no more than 2.5 m (8 feet 6 inches).
- Ledgers must be horizontal and fixed to the standards with load bearing clips.
- Generally, ledgers will be vertically spaced at about 2 m centers for easy erection; also providing ample headroom if an intermediate working platform is required.
- Diagonal bracings must be fitted on all lifts on all sides and a cross bracing should be fitted at the base and at other levels where necessary to keep the tower rigid, but at least every alternative lift.
- If the height of the tower is more than 3 1/2 times the length of the shortest side it must be adequately tied.
- It is good practice to tie scaffolds to the adjacent structure whenever possible irrespective of height.

42.5. LADDERS

- All ladders used in the plant except in scaffoldings shall be made of Glass Reinforced Plastic (GRP) / FRP. No metallic / wood ladders are allowed in OPGC premises.
- Shall be factory made and shall be of sound construction.
- No ladders with treads nailed to the stringers or which are in any other way faulty or unsound shall be used.
- Unless OPGC has granted prior written consent, no ladder shall exceed 3.7 m (12 ft) in height.
- Ladders shall not be painted. Clear varnish or polyurethane is acceptable.
- All ladders shall only be used for the purpose for which they were designed.
- The Contractor shall ensure all ladders under their control are inspected for safe, clean and proper working parts before they are used.
- Defective ladders shall not be used, but instead shall be tagged and made inaccessible for use.
- Ladders should be placed upon a level, firm, solid and safe base and leaned against or hung from a solid, safe structure.

- When it is necessary to place a ladder on a non-level, smooth or slick surface, the base of the ladder shall be tied, blocked in place or held by another worker.
- The base of a straight or extension ladder shall be placed back from the wall at a distance equal to one-fourth of the ladder's working length.
- The top of an extension ladder shall be tied off when possible.
- No one shall go up or down a ladder without the free use of both hands.
- If material must be lifted, a hand line must be used.
- Employees shall face a ladder while ascending or descending.
- A ladder used to transfer to a landing must have side rails that extend at least 3 feet above the landing.
- Contractors shall ensure employees under their control are properly trained in ladder safety.
- Where ever the chance hitting ladder with moving traffic or some other equipments exists, adequate protections to be provided with warnings

43. ACCESS TO TRANSFORMERS / SWITCH GEAR ROOMS/SWITCHYARD AND OTHER RESTRICTED AREAS

Contractor will remain outside of all fenced electrical transformer, switchgear rooms, switchyard or any other high voltage areas and restricted areas unless authorized by the OPGC Contract person to enter. If it becomes necessary to enter these areas, the Contractor must notify the OPGC Contract person so that arrangements can be made to secure a safe work area.

44. FIRE PROTECTION:

Fire hydrants, extinguishers, hose racks, and other emergency equipment shall not be covered or blocked, and fire equipment lanes must always be kept clear.

All fires must be investigated and reported to OPGC regardless of duration or extent.

All contractor persons should know the method of raising alarm & operation of first aid firefighting appliances. Nobody should misuse the fire appliances, extinguishers etc.

45. HOT WORK

Any activity which involves naked flames or can produce heat energy or spark shall be considered as Hot Work. e.g. Welding, Burning, Grinding, Cutting.

- The Contractor must coordinate hot work activities with the OPGC Contact person.
- All welding, burning, or other hot work will be carefully planned and safely executed by completion of a Hot Work Permit from OPGC.

- Welding machines and its accessories must be approved type & safe to use. Power supply cable should be of proper rating, joint free, copper and cut resistance type.
- When 'Hot Work' is in progress precautions must be taken as per the Hot Work Permit issued by OPGC to minimize the risk to other persons, particularly from fire.
- Appropriate fire extinguishers shall be made available for the duration of the specific activities as mentioned in the Hot Work permit.
- ***The Contractor shall provide fire watches during hot work activity & shall ensure firewatchers are trained on the use of fire extinguishers and other appropriate fire fighting gear. Fire watchers during fire watching cannot be assigned with other task.***
- The Contractor shall ensure that firewatchers are equipped with appropriate equipment and dedicated only to the duties of the fire watch.
- The Contractor shall ensure that adequate guards and barriers (fire blanket, fire proof sheets) are used to ensure sparks and hot slag are confined to the immediate area and do not contact flammable or combustible materials.
- All open areas and floor grating/ wall openings shall be protected so that sparks or slag cannot reach flammable or combustible materials at any lower level.
- Hot work areas must be barricaded to prevent people from coming into contact with sparks and slag from hot work activities.
- The Contractor must store flammable and combustible chemicals where they are not subject to hot work or other sources of ignition.
- Use appropriate PPE for the job.

46. CONFINED SPACES:

A *Confined Space* is any space of an enclosed nature which is not designed for continuous human occupancy and presents a risk of death or serious injury from hazardous substance or dangerous conditions.

- The Contractor must coordinate Confined Space Entry work activities with the OPGC Contract person.

Confined Space Entry Permit shall be obtained to enter any Confined Space for any kind of work inside.

- Contractor shall perform no duties that might interfere and disturb the accepted safe working conditions in a confined space.

- Contractor shall maintain all safety barriers around the *Entry Point*.
- Appropriate PPE as per the Confined Space Entry Permit shall be used.
- Appropriate dust mask shall be worn by the *Entrant* if significant quantities of dust are present within the *Confined Space*.
- Head and eye protection shall be worn at all times by the *Entrant* unless specified otherwise by the *Control Room Engineer*.
- A body harness may be required by the *Entrant* if work is to be performed above ground level. An air purifying respirator and cartridge or Self Contained breathing Apparatus (SCBA) shall be used by the *Entrant* if *Entry* into a *Confined Space* containing a *Hazardous Atmosphere* is required and it is not physically possible to entirely remove the *Hazardous Atmosphere*.
- Contractor shall use the safety equipment as per the Confined Space Entry Permit.
- Fire extinguishers suitable for the type of fires those are appropriate to the hazards that may be present in the *Permit Required Confined Space*.
- ***Contractor shall deploy trained Confined Space Watcher/Hole Watcher to take control over the Confined Space entry & exit points during the period of work. Confined space opening either will be closed or entry prohibited through warning tape or barrier while no work is taking place inside the confined space. Contractor will not assign task other than Confined space watching to the watchers as long as they are performing the watching.***
- Contractor shall comply strictly with the following **Electrical safety precautions**
- Electrical equipment supplied from the mains should only be used where there are no practicable alternatives. Battery powered electrical equipment or pneumatic powered equipment shall be used whenever possible.
- If there are no practicable alternatives to using electrical equipment supplied from the mains, then they should be 24V. If this is not possible then they should be 110V supplied through a centre tapped transformer with the centre tap earthed.
- Electrical equipment supplied from the mains should contain Ground Fault Circuit Interrupters / Residual Current Devices.
- Electrical equipment supplied from the mains shall have a valid test certificate.

47. HIGH PRESSURE WATER/ SERVICE AIR CLEANERS

Improper use of water jets/ Service Air can cause serious injury. The contractor may only use high pressure washing apparatus with the permission of the OPGC Contact Person.

The contractor must satisfy the OPGC Contact Person as to the training of the operators, the arrangements for the place of work and a safe system of work.

48. SCRAP/WASTE DISPOSAL:

Waste Bins are provided on site for General Housekeeping materials, metal scrap, Hazardous and Oily wastes and Chemical Wastes. Special or Hazardous Materials must not be dumped in general housekeeping bins and metal scrap bins. Please consult with OPGC Contact person for more details.

49. GAS CYLINDERS

The following regulations apply to all industrial transportable gas cylinders including containers for dissolved acetylene.

49.1. CYLINDER IDENTIFICATION

Gas cylinders shall be colour coded in accordance with relevant BIS code or applicable Gas Cylinder rule.

Full and empty cylinders must be clearly distinguished and stored apart.

49.2. STORAGE OF CYLINDERS

- No flammable materials shall be stored on the site with them, or in the immediate vicinity. Cylinders must be kept at a safe distance from any heat source.
- Cylinders shall be stored in such a manner that they can be readily removed in the event of fire.
- They shall be adequately secured to prevent falling over.
- Cylinders shall be stored vertically and secured.

49.3. HANDLING AND MOVEMENT OF CYLINDERS

- Cylinders shall not be subjected to rough usage, or excessive shock, or used as rollers, or supports.
- Cylinders shall not be dropped from a height.
- A proper carriage, or platform and not a sling, shall be used for moving cylinders, whether empty or full.
- When cylinders are being transported, they shall be loaded and firmly wedged to prevent violent contact when the vehicle moves.
- On no account shall cylinder trolleys be towed by motor transport. The transportation of any gas filled cylinder shall always be in a proper rack, regularly maintained and properly inspected at least biannually.

The Contractor shall ensure that cylinders with faulty valve joints, immovable valve spindles, or valve leakage are immediately removed from the site.

- Only standard valve keys shall be used.
- Only standard automatic pressure regulators and pressure gauges shall be fitted to cylinders.
- Regulators and gauges shall be checked to ensure they are functioning properly and damaged gauges or regulators shall be removed from service.
- RED hose shall only be used for Acetylene and BLACK hose shall be used for Oxygen and Nitrogen.
- Hoses shall be pressure tested and examined to ensure that they are free from cuts, cracks, burns and excessive wear.
- Only secured hose connectors shall be used.
- It is strictly prohibited to bind hose connections with wire.
- All Oxy-acetylene sets which are portable shall be wheeled on a trolley.
- When not in use, blow-pipes and hoses shall not be left in confined spaces or enclosed areas.
- Where this cannot be done, the Oxygen and Acetylene connections shall be disconnected at the cylinders situated outside. Merely closing the valve is not a disconnection.
- Empty cylinders and cylinders no longer required shall be removed from the Site as soon as practicable, caps shall be in place.
- Flashback arrestors (ESAB or any other ISI approved type) shall be fitted at the outlet of the regulator and at inlet of the cutting torch.
- When not in use, all cylinders shall have protecting caps screwed on.
- Cylinder valves shall be closed immediately when gas is not required, or when the cylinder is empty and the hose depressurized.

50. RADIOGRAPHY AND RADIO ACTIVE SUBSTANCES

- Radiography shall be done only after achieving a valid safety document. Proper barricading of the area and paging on the loud speakers should be done
- All operations involving the use of radioactive substances shall be supervised by the Contractor to ensure that protective measures are properly maintained and to check the extent of the protection afforded in practice.

- The Contractor is required to provide OPGC with a list of radioactive sources held by the Contractor and all employees who use or store these radio-active sources on OPGC's property.
- The Contractor shall be responsible for the supply, operation and regular testing of all necessary monitoring equipment and to ensure that all protection barriers are placed and altered as a result of survey radiation level readings in accordance with internationally acceptable levels.
- All radioactive substances not in use shall be kept securely in a dedicated storage place. The storage place should be clearly marked with the warning sign and the wording: "DANGER - RADIOACTIVE MATERIAL" in clear and indelible print. Its access hatch or door should be provided with a lock, the keys of which should be kept by the authorized radiographer.
- Only authorized personnel should handle radioactive sources.
- Before any radiography work is started, the Contractor shall be required to establish procedures dealing with accident/incidents and foreseeing an emergency.
- The procedure shall clearly define responsibilities and actions/measures to be implemented.
- The emergency procedures shall be submitted to OPGC Contact person for review and approval.
- The Contractor shall also ensure that all personnel involved have been carefully instructed.

50.1. During transport, radioactive substances should be kept in sealed sources for radiography with the exposure container should be kept inside a lead-lined box which has the radiation warning sign on the outside.

50.2. HANDLING PROCEDURE AND PERSONAL PROTECTION

- Keep maximum distance from the source.
- Provide maximum shielding
- Keep exposure time down.
- A radiography permit shall be obtained on each occasion radiological work is carried out.
- A barrier shall be erected around each area where the source is exposed so that the level of radiation at the barrier does not exceed 0.75 Micro Seiverts per hour in air.
- Suitable warning notices for display at barriers shall have the wording "*RADIATION - DO NOT ENTER*". The notices shall also include the radiation symbol.
- All persons using radioactive substances shall be trained and certified in the use of such substances.

- The perimeter of the area shall be patrolled during the period of source exposure.
- An exposed source must be immediately returned to its safe container on the request of the operating personnel, or in the event of a fire or other emergency occurring

Any worker liable to be exposed to ionizing radiation shall wear on the appropriate part of his body a film badge to measure the amount of radiation accumulated.

51. EXCAVATION

- The Contractor shall ensure that no Excavation work shall be carried out without the issue of an appropriate Safety Document.
- Any buried cables or pipelines unexpectedly encountered during excavation work shall be reported immediately to the OPGC Central Control Room and the work shall cease.
- Where, because of the nature, shape and slope of the excavation, material is liable to fall more than 1.3 meters (4 ft.) onto a person working, the sides of the excavation must be adequately shored.
- Shoring shall be rigid and without holes or opening and be properly braced with support structure.
- The shoring of every excavation where men are to work shall be examined each day by the Contractor's Representative.
- Excavated earth shall not be stored close to the trench edges and a minimum distance of at least one and a half times the depth of the trench shall be observed.
- No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause the collapse of the side of the excavation.
- Excavations in which persons are working and into which a person is liable to fall shall be suitably or protected by a barrier.
- If the excavation is to remain open after dark, warning lights shall be placed around the excavation to warn others of its presence.
- Temporary crossings over the trench shall be at least 609 mm (2 feet) wide and sufficiently strong with a railing on one side.
- The Contractor shall be responsible for the provision of all barricades, roping off and the provision of flashing lights as is required for the safety of persons and vehicles.

52. SURPLUS MATERIALS

Unless otherwise directed through written instructions issued by OPGC, Contractor shall promptly remove all excess surplus material from the jobsite. Final payment for performance of the work shall not be due and payable until such materials are removed from the jobsite. If surplus materials are not removed from the job site within fifteen (15) days of completion of the Work, OPGC may dispose of the materials and offset the cost associated with disposal against the unpaid balance of the Contract Price.

53. SUSPENSION OF WORK AND LIMITATION OF LIABILITY

OPGC reserves the right through the project contact to suspend all or any portion of the work being performed in violation of these provisions. OPGC shall not be liable in contract, tort (including without limitation negligence and strict liability) warranty or under any other legal theory for damages, costs or expenses related to any suspension or stoppage of work, loss of business, or other special, incidental, consequential or punitive damages in connection with any failure on the Contractor's part to establish, enforce, or adequately monitor its Health and Safety Program.

54. TEMPORARY BUILDING:

Temporary buildings and material storage areas shall only be allowed upon written approval of the concerned Project Manager/EIC. They shall not be set up under power lines or pipe ways.

55. UNSAFE AND/OR INAPPROPRIATE BEHAVIOR, DISCIPLINARY ACTION

Any Contractor employee who appears unable to perform his job in a safe manner or exhibits any type of behavior inappropriate for the work place will be reported to the Contractor's on-site supervisor for evaluation and possible removal from the site. OPGC will not tolerate at any time any conduct that threatens, intimidates or coerces an OPGC person, another Contractor or any member of the public.

55.1. DISCIPLINARY ACTION AND PENALTY AGAINST SAFETY RULES VIOLATION

- Unsatisfactory safety performance will go against the contractor in future bids.
- OPGC reserves the right to even terminate unsafe Contractor from Contract with notice.
- In addition to the above disciplinary action, additional penalty for Safety Violation shall be applicable.
- The penalty system is divided into two categories, Minor and Major. OPGC EHS shall decide about the minor or major safety penalty based on type of violations & risk involved with the violations

55.2. EXAMPLES OF SAFETY VIOLATIONS

- Not wearing / improper wearing of personal protective equipment (PPE) as per OPGC PPE rule. Example- Safety Shoe, Helmet, Safety glass, Earplug, Hand gloves and other PPEs.
- Using grinder without wheel guard

- Taking electrical connection without using ELCB.
- Using damaged welding cable, faulty joints in cable
- Non-use of flash back arrester in oxy acetylene cutting set
- Non-availability of standby person (hole watch) on man hole during entry into
- Confined space
 - Not responding to emergency sirens as per emergency handling procedure.
- Working overhead on road/ pathway without barricading
- Dumping excavated earth on edge of excavation
- Non-reporting of Near Miss, accident, fire and/or explosion and property damage incident.
- Improper housekeeping. Leaving work area with debris/ waste/ scrap material haphazardly
- Unauthorized disposal of hazardous substance (waste Oil, Grease, Chemical, Toxic Substance)
- Leaving excavated soil on road
- Spillage of waste on roads & work places
- Smoking inside plant premises.
- Unauthorized carrying of weapon inside Plant Premises. Working without valid work permit.
- Not complying with written instruction on the work permit
- Working without Job Safety Analysis(JSA) for high & medium risk jobs
- Working without Job Safety briefing for high & medium risk jobs Not providing fire extinguisher for hot work and fire watch.
- Use of none testing/ certified lifting machine, tools and tackles
- Use of substandard scaffold (such as substandard platform in terms of access, guard rail, toe guard & gaps on platform surface, non-use of soleplate/base plate, sagging scaffold etc.)
- Use of above 24V light fittings in confined space without approval
- Working above 5.9 ft height without fall protection
- Working without rigging & slinging safety measure Persons working under suspended load in barricaded area Abuse of safety equipment/ facility/ emergency equipment.
- Blocking access of emergency equipment or exits.

- Mishandling of gas cylinders
- Handling & disposal of hazardous substances in unauthorized manner.
- Violating OPGC any of the environmental guideline attached in separate sheet.

The following penalties shall be imposed on the contractor with the charge of safety violation by OPGC and shall be deducted from the Contractor's running/ final bill. Penalty can be imposed by E-I-C/Dept Heads & TIs/ Safety Officer/ EHS Manager/Safety Rovers or any officer authorized by the OPGC management.

- For first instance of Safety rule violation, counseling and verbal warning with punching of yellow spot on I Card
- On observation of second instance of Safety rule violation, counseling and strong verbal warning with punching of blue spot on I Card
- On observation of 3rd Safety rule violation, punching of red spot on I Card with duty suspension or permanent removal from site
- For major Safety Violation for one instance also, there may be direct punching of red spot in I card with permanent removal/ termination of the Contractor employee(s) responsible for that violation.
- Inadequate Safety Supervision leading to repeated minor or medium risk type safety violation- Fine/Penalty of Rs.2000/- (Rs. two thousand only) and I card punching of responsible contractor Supervisor.
- Inadequate Safety Supervision leading to repeated major risk type safety violation- Fine/Penalty of Rs.2000/- (Rs. two thousand only) and I card punching of Contractor Supervisors with suspension or even termination of responsible contractor supervisor.

56. GENERAL GUIDELINES FOR ENVIRONMENTAL PROTECTION

The Contractor shall pay due regard to the environment by acting to preserve air, water, human life, animal and plant life from adverse effects resulting from its work or operation and to minimize any nuisance which may arise from such work or operations.

1. Uncontrolled releases of OPGC regulated materials, hazardous wastes, special wastes, and PCB or PCB contaminated materials from OPGC locations into the environment are prohibited.
2. All spills of OPGC regulated material, hazardous waste, special waste and PCB or PCB contaminated material must be cleaned up and waste residues generated disposed of properly.

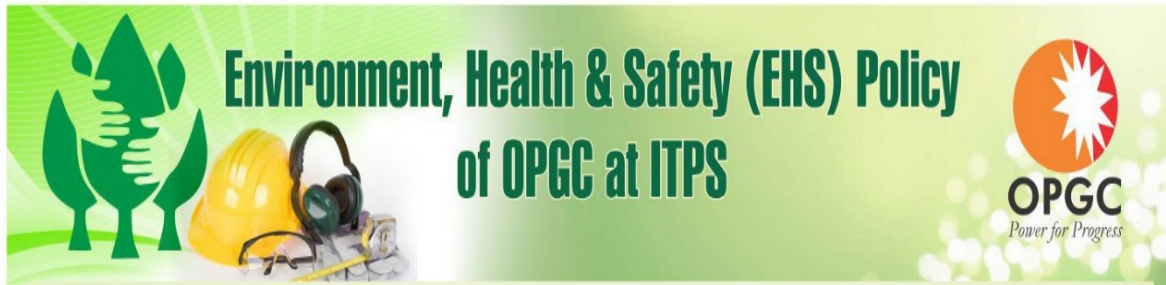
Planning must begin immediately and clean up must be initiated within 72 hours of discovery of the spill.

3. Use of PCB (Poly Chlorinated Biphenyl) containing products/ materials is prohibited.
4. Used oil & lubricants generated during work shall be collected in containers provided with lid and shall be placed at designated transit storage shed. This shall be subsequently sent to warehouse for storage in the designated shed in front of Store Shed No. 3 and final disposal to authorized recyclers / re-processors. Waste oil/lubricant spilled on the floor shall be contained and collected by the use of spill protection kit.
5. Used lead acid batteries shall be sent to Warehouse for storage at designated shed and final disposal to authorized recyclers / re-processors. Spilled lead acid shall be contained and collected by the use of spill protection kit. New lead acid batteries shall be procured against return of damaged used batteries to Supplier.
6. E- Wastes and used Ni-Cd batteries, fluorescent lamps, mercury vapour lamps are also treated as hazardous materials. These are to be collected and stored in identified places on impervious floor and under shed to avoid contamination. These shall be disposed in authorized manner.
7. Oil contaminated scraps, cotton wastes and other oil contaminated wastes shall be collected in specified collecting bins (designated as oil contaminated waste collecting bin) that are to be kept near work area and shall be sent to Warehouse for storage in specified collecting bin and final disposal to authorized recyclers/reprocessors, if possible. Otherwise the wastes shall be disposed off by warehouse in lined impervious covered pits.
8. Onsite work areas shall not be stored with improper and/or excessive amounts of scraps and debris.
9. Lead waste & other Non-ferrous metal wastes like, zinc, brass, copper, nickel and electronic wastes etc shall not be thrown around. It shall be collected in collecting bins and sent regularly to warehouse for storage in designated bins/shed and final disposal to authorized recyclers/re-processors.
10. Spent Resins shall be collected in barrels, provided with lids and shall be disposed as per authorized disposal means.
11. Acid/alkali / any other hazardous chemical contaminated scraps/wastes shall be collected in designated collecting bins to be placed near the work area and shall be returned to Warehouse for storage in designated collecting bin and final disposal to authorized recyclers/re-processors or else, these scraps can be disposed of by Ware House in lined impervious covered pits. Similarly, acid/alkali/ any other hazardous chemical contaminated barrels/jars shall be returned to Warehouse for disposing it back either to the supplier (as per the condition of Purchase Order) or to the authorized recyclers.
12. Materials that yield Hazardous Substances shall be identified prior to their initial purchase.

13. Ample spill response materials shall be available to deal with any potential hazardous and special waste releases.
14. All containers used and stored on the site must have proper labels.
15. Debris and solid wastes generated during any activity shall be collected & disposed regularly at the designated place and the combustible materials shall be controlled fired under direct supervision of OPGC Fire or Safety Officer. It shall not be dumped /thrown here and there.
16. Tree trimming and pruning wastes shall be kept sufficiently away from plant. Steps shall be taken to dispose these to outside agencies to avoid unwanted fire.
17. Carry bags made of virgin or recycled plastic, which are less than 20 microns thick, are not allowed to be used in ITPS.
18. Energy efficient products (eco marked products) will be preferred for use inside ITPS.
19. Goods packing material shall be bio degradable and environmental friendly material.
20. All chemicals shall be procured with its material safety data sheet (MSDS). The MSDS shall remain with the chemical for its entire period of stock inside OPGC.
21. Hazardous chemicals or substances in bulk transport will come with MSDS, TREM Card, hazard labeling of the lorry and containers. The transporters staffs/ staff shall be properly trained on emergency handling of the chemical.
22. Emergency preparedness shall be in place to handle chemical emergency or any other hazardous material emergency so as to prevent risk to environment.
23. Vehicular emission and noise shall be minimized in work zones by restricting use of defective vehicles, machineries and Tools & Plants.
24. Vehicles shall be certified with valid pollution under control certificate.
25. Source air emissions shall be controlled so as to meet regulatory norms. In case of incidental higher emission level, immediate control measure shall be taken on priority. Continuous emission monitoring for Stack SPM, NOx, SO2 shall be made available all time except the period of planned maintenance. Alternative offline monitoring shall be in practice during the period of on line equipment maintenance.
26. Fugitive emission shall be controlled in work places (CHP, AHP, ESP, Ash Pond & Dry ash storage silo areas). These places shall be tested for dust concentration periodically to ensure taking step to reduce dust emission level to acceptable state. People working in these areas shall use dust mask to prevent inhaling dust.
27. Sufficient water spraying shall be ensured in haul roads and working areas to reduce fugitive emission during earth work by mechanical means.
28. While painting any structural materials on ground, the structural materials shall be kept on any impervious barrier so as to avoid land contamination by paints.

29. Use of Ozone Depleting Substance (ODS) like CCL4, CFC-11, CFC-12, Halon and other ODS based substances shall be phased out in phased manner. Venting of ODS gas to atmosphere is forbidden. During phasing out process of these substances, these ODS shall not be released to atmosphere. These gases shall be handled as per local regulation guideline. CFC containing equipment like refrigerators and hydrogen driers shall be replaced with non CFC refrigerant containing equipment.
30. SF6 consumption shall be managed in such way that there will be no waste or/ and release to atmosphere. The user shall maintain a consumption record covering the equipment name in which the gas is used, quantity and date of use.
31. Asbestos ropes and packing shall not be used in any work. No new asbestos sheets shall be used in any work. Before cutting/handling old asbestos sheets, the sheets shall be made wet and handled by using nose mask and hand gloves. Waste asbestos pieces shall be disposed in lined impervious covered pits.
32. During construction and maintenance works, melting of Bitumen should be done by using fuel oil / fire wood. In no case burning of rubber tyres will be allowed.
33. Smoking is prohibited inside plant.
34. Optimum utilization of water, energy and raw materials shall be ensured by minimizing the loss in any activity.
35. Spitting on walls is prohibited.
36. Preference shall be given for using eco-friendly materials/packing and technology, wherever it is techno-economically viable.
37. Special care shall be given for good housekeeping.
38. Non-biodegradable solid wastes like plastic pouches/packing materials shall be disposed in lined impervious covered pits.
39. Empty paint drums, brushes shall not be thrown around. It shall be the responsibility of the contractor to dispose it outside ITPS as per the provision of Hazardous Wastes (Management & handling) rule.
40. Waste water generated inside plant and sewage effluent shall be reused
41. Ground water and surface water adjacent to ash disposal area and coal pile area shall be tested periodically so as to ensure no adverse impact on environment.
42. Spillage and disposal of any liquid or solid waste into storm water drains is prohibited.
43. Spillage of Chemical or OPGC regulated material shall be reported to Manager (Environment) within 01 hour of the incident occurs.
44. For safe Handling and Transportation of Hydrogen, Chlorine, Petroleum Products and other Chemicals please MSIHC rule.

45. Any noisy operation more than 85dBA shall be carried with the use of appropriate noise abatement barrier. Wherever barrier cannot be provided, the person nearby must have ear protection.
46. Environmental monitoring equipment that has been originally designed and installed must be satisfactorily maintained and continually operated (with the exception of standard downtime for planned or unplanned maintenance).
47. Any abnormal environmental incident observed/ noticed shall be communicated to EHS



Environment, Health & Safety (EHS) Policy of OPGC at ITPS



Odisha Power Generation Corporation Limited., at Ib Thermal Power Station (ITPS), Banharpali, Jharsuguda, commits to have continual improvement in the Environment, Health and Safety standard in all its activities related to Power generation at all times;

To achieve this, the objectives envisaged for commitment are to-

1. Provide the appropriate resources to ensure that all our people have the means to work safely and its surrounding environment is protected.
2. Minimize impact on the environment through control and prevention of Pollution.
3. Conserve all natural resources used as input.
4. Minimize fugitive emission & improve work zone condition.
5. Manage solid & hazardous waste in a safe and eco-friendly manner.
6. Believe "Put Safety First at OPGC" & "All Occupational Incidents are preventable".
7. Minimize risk due to hazards associated with its activities and prevent injury and illhealth to all persons working at ITPS.
8. Adopt Zero Tolerance on OPGC Safety Cardinal Rules and be responsible and accountable for Safety of all persons working at ITPS.
9. Empower to stop & report any work when there is a reasonable belief that the work poses imminent risk of injury.
10. Be responsible for own Safe Behaviors & those of co workers.
11. Reward outstanding Environment, Health & Safety performances & discourage at risk behaviours.
12. Comply with applicable Environment, Health & Safety regulations and other requirements.
13. Have on-site emergency plan & preparedness for handling various emergency situations related to Environment, Health & Safety.
14. Build Environment, Health & Safety awareness among all persons working for or on behalf of ITPS through training & awareness campaigns.
15. Communicate this Policy to all persons working at ITPS, contractors, suppliers, visitors and other interested parties.

Alok Mukherjee

Occupier & Director (Operation), OPGC

Date: 16.11.2015

Last Reviewed on 17.11.2018

APPENDICES- 2
OPGC High Risk Activities

	Activity
1	Activities on or near equipment with the potential to cause Arc Flash
2	Activities in a road way with potential to be struck by vehicles (Does not include driving or travelling on a public road way.)
3	Activities with drowning potential
4	Activity involving work at height above 1.8 meters (6 feet) and any pole climbing
5	Handling of hazardous substance which can cause acute injury, exposure to ionization sources or potential to cause explosion
6	Activities with potential for live voltage exposure ≥ 50 Volt
7	Activities on or around pressurized safety valves or other energized energy relief devices where there is the possibility of exposure to the stored energy if released
8	Hoisting and Rigging
9	Hot Work outside of its designated locations
10	Activities involving Confined Space entry or potential for entrapment/engulfment such as work inside a trench, tunnel, etc.
11	Tree trimming and related activities with the potential to cause injury by tree trimming equipment and / or hit by falling tree or limb
12	Activities involving operation of or working in the vicinity of operating plant equipment
13	Activities in potential explosive areas due to accumulation of combustible dust or vapor
14	Activities on or near rotating, rolling or moving equipment or its parts having the potential to cause cut, entrapment, crushing or caught by injuries
15	Activities with the potential to cause a hit by falling objects

APPENDICES- 3

UNDERTAKING

FOR OPGC HSE RULES AND REGULATIONS FOR CONTRACTORS

I hereby undertake that:

- (1) I have received a copy of, and read, these regulations;
- (2) I agree to execute the work under all provisions contained herein;
- (3) I understand & will make my entire project team understands the applicable rules & regulations;

Signature: _____

Name : _____

Date: _____

Contract Company: _____

APPENDICES- 4

EHS Violation Record for Contractor	Date:
Ib Thermal Power Station, Banaharpali	

Name of Violator: _____	
Location of Violation: _____	
Type of Violation: _____	
Contractor's Name _____	Signature-----
Observer's Signature Name _____	Signature _____



Name of the work:

“AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit”

SCOPE OF WORK & TECHNICAL SPECIFICATION

BOILER & AIR-PREHEATER

The basic concept of this contract is to carry out the maintenance mostly on job basis. Quantum of job mentioned against all items in the price bid is indicative only & may vary as per site requirement & not to be construed as maximum quantity. The quantities shown in the price bid are approximate yearly quantities and may vary as per site requirement. The quantity will be approximately same for subsequent two years.

ITEM – 1(A): SERVICING OF SOOT BLOWERS: -

- a) Ensure PTW.
- b) Manually check the mechanical freeness of WB or LRSB.
- c) Dismantle the rotary & transverse gearbox.
- d) Dismantle the rack & pinion in WB and traveling carriage & chains in LRSB.
- e) Remove the lance in LRSB or swivel tube in WB.
- f) Dismantle the D-head valve, ensure valve seat & disc lapping and assemble the valve with new gasket and gland packing.
- g) Clean all the parts of gearbox and traverse mechanism.
- h) Assemble the traverse mechanism and the gearbox with new bearing or oil seal if required. Put new gasket and gland packing.
- i) Replace gear oils.
- j) Gear oil, gland packing rings, gaskets and spares shall be provided by ITPS free of cost.

Necessary assistance for trial run of wall blowers, LRSBs also forms a part of this scope.

- I) WALL BLOWER
- II) LRSB

ITEM – 1 (B): SERVICING OF ROTARY & TRAVERSE GEAR BOX: -

- a) Ensure PTW.
- b) Dismantle the gearbox.
- c) Clean all the parts of the gearbox.
- d) Replace oil seal, bearing or spares if required.
- e) Assemble the gearbox and check that the movement of the soot blower for freeness.
- I) WALL BLOWER
- II) LRSB

ITEM – 1(C): CLEANING & CHECKING OF TRAVERSE MECHANISM: -

- a) The scope of work includes cleaning, inspection and lubrication of traverse mechanism like rack & pinion, chains & sprockets.
- b) Ensure complete freeness of traverse mechanism by manually operating it.
- c) Check for looseness of motor coupling, cam, chain & sprocket.
- d) Adjust the chain length if required.

NB: - Rate shall be quoted per wall blower and LRSB cleaning and checking

I) WALL BLOWER

II) LRSB

ITEM – 1(D): D-HEAD VALVE SERVICING: -

- a) Dismantle the D-head valve from the soot blowers.
- b) Lapping of the valve disc, seat and blue match if required.
- c) Replace gland packing after lapping
- d) Refix of the valve with new flange gasket.

NB: Lapping compound and gland packing will be provided by OPGC free of cost.

ITEM – 1(E): FLANGE GASKET/ GLAND REPLACEMENT:-

- a) Loosen the flange bolts.
- b) Remove the damaged gasket from the leaky flange.
- c) Repair of flange face if required to ensure smoothness at the gasket seating area.
- d) Replace glands for arresting steam leakage.

ITEM – 1(F): REPLACEMENT OF MOTOR: -

- a) Ensure PTW.
- b) Ensure that the cable has been disconnected.
- c) Remove the defective motor.
- d) Shift the coupling half from defective motor to the new/repaired motor.
- e) Fix the new /repaired motor.

ITEM – 1(G): REPLACEMENT OF D-HEAD VALVE: -

- a) Ensure PTW.
- b) Remove the damaged D-head valve.
- c) Check the condition of the flange face, repair if required.
- d) Replace old damaged gaskets.
- e) Fix the new/repaired D-head valve.

ITEM – 2: REPAIR OF SAMPLE COOLER: -

- a) Ensure PTW.
- b) Remove the cooler tube bundle from the cooler.
- c) In case of welded type cooler, remove the cooler from the system by hacksaw cutting.
- d) Flush the spiral type condensing loop pipe.
- e) Clean the threaded pressure reducer.
- f) Check for any leakage by putting air or water inside the coil.
- g) Repair the damaged coil if required or replace.
- h) Clear the tube chocking.
- i) Fix the cooler tube bundle.
- j) Assemble the cooler.

k) Check for any defect after charging of the cooler and rectify it.

ITEM -3. BOILER TUBE REPAIR/REPLACEMENT: -

- a) Ensure PTW.
- b) Engage IBR class welder (certified IBR welder with TIG welding experience and having valid license for welding of carbon steel and alloy steel from Chief Inspector of Factories and Boiler Orissa).
- c) Mobilize necessary manpower and materials for attending the tube repair/replacement work.
- d) Arrange scaffolding, sky climber materials, gratings, cutting set, grinding machine, argon set and welding machine etc.
- e) Shift the required materials to the required location of the boiler for attending the job.
- f) Do thickness survey of failed tubes or the adjacent tubes as per the instruction of the E-I-C.
- g) Make bends if ready-made bends are not available.
- h) Prepare bends to the required angle from straight tubes for replacement.
- i) Erect scaffolding and assemble sky climber depending upon the location of the job in the boiler.
- j) Separate payment will be made for sky climber assembly as per item no.11 and for erection of scaffolding as per item no.8 (miscellaneous).
- k) Mobilize manpower for assistance in carrying out hydro test after completion of the jobs for inspection by Asst. Director of Factories and Boilers.
- l) No extra payment is to be done for hydro test.
- m) Special welding electrode will be supplied free of cost.
- n) No extra payment to be done for fin cutting of the damaged tubes.
- o) Payment for fin welding is to be made on the basis of RM as per item no.02 of miscellaneous job.
- p) Carry out radiography and stress relieving as per the instruction of E-I-C.
- q) Separate payment is to be made for stress relieving and radiography.
- r) Repair the weld joint again if the joint fails without any cost to OPGC.

NB:I)Tube Repair/Replacement up to 05nos of tubes (up to 76.1mm OD)

II) Tube Repair/Replacement above 05nos of tubes (up to 76.1mm OD)

ITEM - 4 BOILER HEADER/INTERGRAL PIPE REPAIR/REPLACEMENT: -

- a) Ensure PTW.
- b) Engage IBR class welder (certified IBR welder with TIG welding experience and having valid license for welding of carbon steel and alloy steel from Chief Inspector of Factories and Boiler Orissa).
- c) Mobilize necessary manpower and materials for attending the tube repair/replacement work.
- d) Arrange scaffolding, sky climber materials, gratings, cutting set, grinding machine, argon set and welding machine etc.
- e) Shift the required materials to the required location of the boiler for attending the job.
- f) Do thickness survey of failed header/pipe as per the instruction of the E-I-C.
- g) Erect scaffolding and assemble sky climber depending upon the location of the job in the boiler.
- h) Mobilize manpower for assistance in carrying out hydro test after completion of the jobs for inspection by Inspector of Factories and Boiler.

- i) No extra payment is to be done for hydro test.
- j) Special welding electrode will be supplied free of cost.
- k) No extra payment to be done for fin removal of the damaged tubes.
- l) Payment for fin welding is to be made on the basis of RM as per item no.02 of miscellaneous job.
- m) Carry out radiography, ultrasonic testing and stress relieving as per the instruction of E-I-C.
- n) Separate payment is to be made for stress relieving, ultrasonic testing and radiography.
- o) Repair the weld joint again if the joint fails without any cost to OPGC.

NB: I) Pipe/Header Repair/Replacement above 76.1mm OD up to 150mm OD.

II) Pipe/Header Repair/Replacement above 150mm OD up to 250mm OD.

III) Pipe/Header Repair/Replacement above 250mm OD.

ITEM – 5. BOILER HYDROTEST: -

- a) Carry out hydro test after completion of the annual overhauling of boiler in presence of Inspector of Factories & Boiler, Jharsugusa Zone as per the statutory requirement.
- b) Assist the operation personnel for manual operation of the valve for carrying out hydro test.
- c) Do safety valve gagging.
- d) If any defect like valve passing or gland leakage was detected the same is to be attended for successful completion of hydro test.
- e) Blank some drain lines as per the instruction of E-I-C.
- f) Open the IBD tank manhole before hydro test and close it with new gasket after the completion of hydro test.
- g) Make ready the high pressure-reciprocating pump for carrying out hydro test as per the instruction of the E-I-C.
- h) Provide manpower for checking of the inside of the boiler in both 1st & 2nd pass after the completion of hydro test for any defect.

ITEM – 6. SKY CLIMBER ASSEMBLY / DISMANTLING: -

- a) Ensure PTW.
- b) Open the elliptical manhole.
- c) Shift gratings and sky climber components like platforms, handrails, fasteners, motors and wire ropes from their storing place to the place of assembly.
- d) Lay the bottom gratings above water wall hopper.
- e) Assemble sky climbers in 1st pass inside the furnace as per the instruction of E-I-C.
- f) Follow safety procedures while assembling and operating the sky climbers.
- g) Use sky climbers for different maintenance work like tube repair, 1st pass cleaning, conducting tube thickness, survey burner servicing etc.
- h) Deploy skilled operators & an electrician for operating the sky climbers.
- i) Dismantle the sky climber after completion of the work.
- j) Shift the dismantled sky climber materials and gratings to storing place.
- k) The contractor has to quote for the entire work on lump sum basis.
- l) The payment will be made for the nos. of sky climber assembled inside the boiler.

ITEM – 07. FIXING OF SS/MS SHIELDS OVER TUBES: -

- a) Ensure PTW.
- b) Fix SS/MS shields over tubes with proper locking as & when required as per the instruction of E-I-C.
- c) Remove old damaged shields and fix new shields.
- d) Erect scaffolding for shield fixing work as per requirement.
- e) The shield will be provided by ITPS free of cost in length of 500 to 1000mm.
- f) Special electrodes for welding will be supplied free of cost.

ITEM – 08: REPAIR OF COAL NOZZLE / NOZZLE TIPS / PF BENDS / ELBOW / ORIFICE ETC. BY WELDING & HARD

FACING: -

- a) Inspect all the nozzles/nozzle tips/pf bends/elbow/orifice for any damage.
- b) Mark all the damaged and worn out areas.
- c) Cut the area where thickness has reduced considerably and weld new plate.
- d) Hard face the worn out area/new area after putting the buffer layer.
- e) Lock properly so that distortion of the nozzle tip is avoided
- f) Assemble the coal nozzle with nozzle tips.
- g) Replace the damaged fasteners.
- h) Repair/replace the damaged reach rods.
- i) Repair/replace the coal nozzle brackets.
- j) Tilt the coal nozzle tips after assemblies.
- k) Check that there is no fouling of coal nozzle with nozzle tips while tilting.
- l) ITPS will supply hard facing electrode free of cost.

NB:(I) Hard facing (Sq. mtr. of hard facing done).

(II) SS Plate welding (RM basis)

(III) CS Welding (RM basis)

ITEM –09: OIL GUNS SERVICING: -

- a) Ensure PTW.
- b) Remove oil gun from the assembly.
- c) Dismantle the cap nut & spray plates for inspection.
- d) Dismantle the flexible hoses.
- e) Replace damaged hoses.
- f) Lap the spray plate and fix cap nut.
- g) Put new sleeves and gasket.

ITEM – 10: REPAIR/REPLACEMENT OF PEEP HOLE/MANHOLE DOOR: -

- a) Check the operation of manhole/peep hole door for freeness.
- b) Check that the door is closing tightly so that there is no air/gas leaking through it.
- c) Lubricate the hinges of the manhole door.
- d) Replace the manhole door if it is in damaged condition.
- e) Replace the spare of the door if required.
- f) Put new ceramic rope.

ITEM – 11: REPAIR/REPLACEMENT OF RESTRAINTS/SUPPORTS OF PIPE LINES: -

- a) Remove the defective hangers and restraint supports.
- b) Repair/replace the defective hangers and restraint supports.
- c) Install in position and set the cold/hot values.

DUCTS, DAMPERS & GATES

ITEM – 01: FLUE GAS DUCT REPAIR: -

- a) Opening of duct manhole doors in flue gas duct from Economizer to ESP, secondary air duct to wind box, primary air duct to mills, flue gas duct to chimney & hot air duct to PA Fans as per requirement for inspection.
- b) Removal of insulations from outside of the duct for gas cutting of the eroded plates of the duct wall. The sheet & damaged wools are to be shifted to a safe location for good housekeeping.
- c) Removal of eroded duct plates by gas cutting from inside/outside, bracing pipes & diverters as per instruction of engineer-in-charge.
- d) The diverters are to be made to the required degree by bending machine arranged by the contractor.
- e) Repair/replacement of grid pipes in secondary duct.
- f) Providing angle of 75x75x6 size on the bracing pipe.
- g) Providing MS baffle plates of 6 to 8mm thickness over the expansion bellow inside the duct to prevent ash ingress.
- h) Seal welding of the entire duct wall plates as per required fillet size for making the ducts gas tight.
- i) After completion of work the contractor shall remove the scrap from the duct inside/outside and final box up of the manhole doors with new ceramic rope.
- j) Cutting & welding rate will not be claimed extra for replacement of angle/bracing pipe.
- k) Over lapping of plates will not be allowed in any case during repair.

NB:- General electrodes and cutting gas will be supplied by the contractor. Electrodes of reputed make like D&H, Advani Oerlikan, Esab, Modi are to be used for welding work. Test certificate if required are to be submitted by the contractor. All the welders shall be tested by OPGC before deployment in duct welding works.

Scaffoldings required for the outside/inside duct repair work & ceramite lining will be in the scope of the contractor. No extra payment will be claimed by the contractor.

- I) Cutting work in duct in running mtr.
- II) Welding work in duct in running mtr.

ITEM-02: REPAIR OF DAMPERS:

The scope of the work as follows:

- a) The contractor has to completely disassemble the bearing holder, follower Plate, bearing, gland and gland packing of the affected flaps. If required the stub shaft, slave shaft, drive shaft and drive lever are also to be removed after making suitable arrangements.
- b) Repair the worn out shafts and levers by welding deposits and subsequent grinding and machining. The electrodes for this purpose shall be supplied free of cost.
- c) Any damage to any other components are also to be suitable repaired as per instruction of the Engineer-in-charge. If required any damper flap, shaft etc. are to be replaced. Any welding, cutting, scaffolding shall be in the scope of the contractor. Checking of damper freeness in open and close position with manual/motor/pneumatic device.

Note:- The type of the dampers are given below and the contractor has to quote accordingly.

- I) APH SECONDARY AIR OUTLET DAMPER/FD DISCHARGE DAMPER/APH FLUE GAS OUTLET DAMPER
- II) SCANNER AIR DAMPER

ITEM – 03: POWER CYLINDER SERVICING:

- a) Contractor has to disconnect the power cylinder from the damper
- b) Open the power cylinder and inspect the seals, shaft etc.
- c) Replace the damaged seals with new ones.
- d) Repair/Replace the shaft after trueness checking.
- e) Assemble the power cylinder and Check the operation of power cylinder.
- f) Connect the power cylinder to the damper and check for smooth operation.

Note:- The type of the power cylinders are given below and the contractor has to quote accordingly.

- I) SERVICING OF POWER CYL. (BAD/SADC/MBD)
- II) SERVICING OF POWER CYL. (PAD/CAD/HAD)
- III) SERVICING OF POWER CYL. (BURNER TILT/IGV/PA GEN.SHUT OFF GATE/FEEDER O/L GATE)

ITEM – 04: GREASING OF GATES (ID INLET/ID OUTLET/ESP INLET/ESP OUTLET GATE): -

- a) The contractor is to thoroughly clean the gates, chain and gearbox area.
- b) Old grease is to be taken out from the gearbox and new grease to be filled in.
- c) All the bearing points are to be greased till the old grease comes out.
- d) Adjustment of chain tension if required.
- e) Apply the grease on the driving chain (Grease shall be supplied free of cost by OPGC).

ITEM – 05:REPAIR OF GATES: (ID INLET/ID OUTLET/ESP INLET/ESP

OUTLET/PA GEN. SHUT OFF GATE): -

- a) The contractor has to dismantle the gear box and repair/replace the damaged Components and again re- fix in position.
- b) Any deformation found on the gates, gate seals, guide and guide way are to be rectified by the contractor. Any welding and cutting work involved is a part of the job.
- c) Damaged chain, seals, bearing etc. shall be repaired/ replaced by the contractor.

If greasing is necessary, then payment shall be made extra as per item no.06.

ITEM – 06: SERVICING OF GATE SEAL AIR BLOWER: -

- a) Repair/Replace the Seal air blower impeller and shaft.
- b) Any damage to the casing or structure is to be repaired.
- c) Flap gate is to be made smooth for operation.
- d) Seal air chamber is to be cleaned for any accumulated ash.
- e) Assemble the components and ensure smooth operation of the blower.

ITEM 1(A): FABRICATION & ERECTION OF PIPING SYSTEM: -

Erection of piping system shall include withdrawal of materials from stores, cleaning by wire brushing / water flushing, cutting preheating, bending, setting, alignment, erection, welding, providing support, fitting to the required equipment / flange etc. & pressure testing etc. If the piping length involved is less than 5 mtrs for a particular size of pipe, payment shall be made on the basis of length of welding and cutting as per **item no.2**. No separate payment for the erection of pipe, valves, orifice, flow nozzle, other supports & fittings shall be made. Special electrodes will be supplied free of cost.

NOTE: -

- a) For the pipe above 200 NB size but below 500 NB, the rates applicable shall be 18 % above the base rate of 200 NB pipe, for every 50 NB increase pipe size as per **formula-A**.

- b) For pipe above 500 NB size, the rate applicable shall be 12 % above the base rate of 500 NB pipe, for every 50 NB increase in pipe size as per **formula –H**.
- c) For pipes/tubes below 200 NB size, the rate applicable shall be directly proportionate to the rate of 200 NB pipe (e.g. For 40 NB pipe it will be, **(200 NB ratex40/200)** & so on.
- d) The rate shall be applicable for pipe thickness up to & including 10mm.
- e) For thickness above 10 mm, for every 1 mm increase in thickness the unit base rate shall be increased by 3 % as per **formula - C**
- f) For argon root run where required, percentage factor on the unit base rate shall be increased by 20 % as per **formula -D**
- g) These rates are applicable to the rate of piping system equal to or more than 5 meters.
- h) No separate payment shall be made scaffolding etc. or any such arrangement, necessary to be made for efficient erection of the job.
- i) The rate includes cutting leveling, fitment, preheating, welding & erection of valves, flanges, Tees, elbows. piping fittings etc. if any in the piping system.

Refer measurement of piping work below.

ITEM 1(B):- DISMANTLING OF PIPING SYSTEM: -

The job involves dismantling of piping system by gas cutting / hack saw cutting, disconnecting of threaded & bolted joints & transportation of scraps to a suitable place as instructed by concerned engineer. Rates applicable shall be 50% of the rates against item 1(A).

ITEM 2:CUTTING & WELDING: -

The rates shall be applicable for cutting and welding of laid up of pipe lines whose length is less than 5mtr. or making some modifications on existing pipelines or equipment / structural wherever cutting, beveling and welding is involved. These rates shall also be applicable for branch joint also wherever branching is taken (i.e. no special rate shall be applicable for branch fabrication. Necessary locking of pipes for replacement will be made.

The radiography /stress relieving shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If a joint fails in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for the second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. Cutting & welding of Carbon steel/Alloy steel/SS plates for fixing inside boilers as per instruction of Engineer in charge are also included in the scope of work. No separate payment to be made for scaffolding. Rate for cutting & welding will be limited to 10 mm alloy / carbon/S.S and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4 % for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding. The contractor will quote in running mtr. for welding and cutting.

ITEM-2A: CUTTING

- I) CARBON STEEL
- II) ALLOY STEEL
- III) STAINLESS STEEL

ITEM-2B: WELDING (IBR)

- I) CARBON STEEL
- II) ALLOY STEEL
- III) STAINLESS STEEL

ITEM-2C: WELDING (NON IBR)

- I) CARBON STEEL
- II) ALLOY STEEL
- III) STAINLESS STEEL

ITEM – 3:RECTIFICATION OF FLANGE LEAKAGE:-

Leaky flanged joints shall be rectified by removal of bolts & nuts, cleaning the mating surface providing new gasket & tightening the bolts. The line when commissioned or tested should be leak proof.

NOTE:-

- a) For the flange joints above 200 NB size the rate applicable shall be 20% above the base rate of 200 NB flange joint, for every 50 NB increase in the flange size as per **formula-G**.
- b) For flange joints 200 NB size, the rates applicable shall be in direct proportion to the rates of 200 NB flange joint as per the example given in previous clause.
- c) Rate shall be applicable for all types of flanges of all materials of construction & pressure ratings.
- d) The flanges may be on pipelines / equipment / heat exchangers etc.
- e) Gaskets required are to be cut from metallic / non- metallic / oil gasket sheet including punching of holes. Gaskets & nut – bolts shall be provided by ITPS.
- f) The scope of work includes all types of joints (except welding joints) viz, flange/screw joints union etc. Manhole joints shall also be treated as flange joints.
- g) Odd flange joints like square / rectangular etc. are to be treated as circular flange joints by comparing the perimeter to nearest standard circular flange joint.
- h) The flange should be leak proof after commissioning / charging the line failing which the contractor is to attend the same free of cost.

ITEM – 4: FABRICATION & ERECTION OF STRUCTURAL:-

The job involves fabrication & erection of structural, like platform ladders, handrails, supports, miscellaneous structural items etc. Fabrication & erection are to be carried out at different heights & various locations within factory premises. Required materials, drawings & job details will be provided by ITPS. Billing shall be as per Tonnage.

ITEM – 4(A): FABRICATION:-

The job includes receipt of structural from ITPS stores, transportation to site / place of use, & fabrication as per drawing / sketch / instruction of the concerned engineer. Type of welding electrode to be used & thickness of weld shall be directed by the concerned engineer & to be arranged by the contractor. The entire structure shall be free from sharp edges, slags, & burrs. Two coats of red oxide paint are to be applied by the contractor, after the fabrication work, for which no extra charge shall be made. Vehicles required for material transport from store will be provided by OPGC.

ITEM – 4(B): ERECTION:-

The job covers transportation of fabricated structure to site & erection / assembly etc. Assembly, bolting, welding, alignment etc. come in the scope. Grouting will be done by the contractor. However grout material will be supplied by ITPS. ITPS shall provide as free issue materials, structural steels including angle, channels, plates, pipes, fasteners like nut & bolt etc. The contractor has to arrange other consumables like gas, electrodes, paint, clamps tools & tackles etc.

No separate payment for scaffolding will be made.

ITEM –5: APPLICATION OF PAINTING :-

Protective coating may be required to be applied to pipes, equipment, structural at various locations & elevations inside the plant. The scope of work includes cleaning the surface to remove dirt, oil, grease, rust, scale & other contamination etc. by blasting, chipping, scrapping, wire brushing etc., applying one coat of primer paint & two coats of finishing enamel paint .The interval of surface preparation & painting shall be minimum & in no case longer than 4 hours. The application procedure shall be in accordance with the prescribed recommendations of the paint manufacturers & IS: 1477 Part-II. ITPS shall supply paint as free supply material. However the agencies may quote the rates for this item as (i) including the cost of paint & thinner, (ii) excluding the cost of paint & thinner. All other materials like brush, wire brush etc., tools & tackles are to be arranged by the contractor at his own cost.

- I) APPLICATION OF PAINTING (WITH COST OF PAINTS)
- II) APPLICATION OF PAINTING (WITHOUT COST OF PAINTS)

ITEM –6: ERECTION OF SCAFFOLDING :-

The scope of works includes fabrication & erection of scaffolding inside & out side of Boiler & vessels etc. to facilitate inspection & other job to be carried out by ITPS. The scaffolding should be rigid. They can be made out of MS tubes / pipes / bamboos / planks etc. Clamps & new ropes are to be used for preparing the scaffolding. Wherever required, the contractor has to provide platform by using good wooden planks, which can withstand a minimum of 4 people of about 300 kg. Load. All materials required for executing the above job should be arranged by the contractor at his cost. While erecting the scaffolding, the contractor should exercise utmost caution, so that instruments, pipelines etc. are not damaged. Scaffolding outside the pipes / equipment shall be two meters length & two meters in width. If it is required to cover a large area , another scaffolding has to be erected by the contractor. The payment shall be per meter height of erection from the base of the scaffolding up to the top most platform only covering a minimum base area of 4 sq. mtrs.

Scaffolding inside the boiler shall be covered in the inside area. The payment shall be per meter height from the base of the scaffolding to the top most platform.

The start point for measurement at height shall be from the base of the erected scaffolding & not from the bottom of the boilers of ground as the case may be.

8(A) – ERECTION OF SCAFFOLDING OUTSIDE BOILER

8(B) – ERECTION OF SCAFFOLDING INSIDE BOILER

ITEM – 7: REPLACEMENT OF VALVES (MOT. OPERATED, CONTROL, MANUAL, NRV & STEAM TRAP) CLASS

1500 & ABOVE:-

The size of the above valves are from 3/8” to 14” and pipe thickness varies from 3mm to 50mm approx. The work involved in taking out the valves from the position by grinding/gas cutting as per instruction of E-I-C after proper locking of pipe/supports from where it will be replaced & returning the same to the stores or any other place as directed by engineer in charge. Erection of repaired valves or new valves into the position. Additional charges for joint welding based on pipe thickness shall be applicable as per **Item-2**. The radiography/ultrasonic/post heating/pre heating/stress relieving shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If joint fails in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for second time the

cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. Rate for cutting & welding will be limited to 10mm alloy/carbon/ss and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding.

NOTE:-

- a) For valves above 200NB size, the rates applicable shall be 25% above the base rate of 200NB pipe, for every 50NB increase in pipe size as per **formula – F**.
- b) For valves in pipelines below 200NB size, the rates applicable shall be direct proportionate to the rate of the 200NB pipe valve (for e.g. for 100nb pipe, it shall be 200NB rate X 100/200 and so on.) as per **formula – B**.
- c) Unit rate shall be applicable for all types of valves and all materials of construction & pressure ratings.

ITEM – 08: REPLACEMENT OF VALVES (MOT. OPERATED, CONTROL, MANUAL, NRV & STEAM TRAP) CLASS

800 & BELOW:-

The work involve in taking out the valve from the position and returning the same to the stores or any other place as directed by maint. engineer. Bolts and nuts shall be cleaned by applying graphite grease on the threads, which will be supplied by OPGC. Erection of repaired/new valves into position and make it leak proof at the flange joints. If necessary, the gaskets may be replaced by new gaskets. In case welded type valves are to be replaced, additional charges for joint welding shall be applicable as per item-2 of miscellaneous jobs. The radiography/ultrasonic/post heating/pre heating/stress relieving if required, shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If joint fails in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. Rate for cutting & welding will be limited to 10mm alloy/carbon/ss and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding.

NOTE:-

- a) For valves above 200NB size, the rates applicable shall be 25% above the base rate of 200NB pipe, for every 50NB increase in pipe size as per **formula – F**.
- b) For valves in pipelines below 200NB size, the rates applicable shall be direct proportionate to the rate of the 200NB pipe valve (for e.g. for 100nb pipe, it shall be 200NB rate X 100/200 and so on.) as per **formula – B**.
- c) Unit rate shall be applicable for all types of valves and all materials of construction & pressure ratings.
- d) While erecting the valves, wherever necessary new gaskets shall be provided at no extra cost. Gasket/gasket sheet shall be provided by OPGC free of cost. Fixing of gasket, bolts, nuts and making the joint leak proof are included in the scope of job.

No separate payment will be made for erection of valves.

ITEM – 9: SERVICING OF VALVES (GATES, GLOBE, CHECK, STEAM TRAP & CONTROL VALVE):-

- a) Ensure PTW.
- b) Remove the gland follower bolts.

- c) Remove the gland follower.
- d) Remove the bonnet from the valve body.
- e) Remove the spindle.
- f) Check the valve seat, if necessary lap it.
- g) Clean all the parts and replace all damaged parts.
- h) Fix the valve spindle, bonnet with new gasket and tighten it.
- i) Add gland packing as per requirement.

11(A): - Valves up to 6"

11(B): - Valves above 6"

ITEM – 10: REPLACEMENT OF THE GLAND PACKING OF VALVES: -

- a) Ensure PTW.
- b) Take proper safety precautions as per the nature of the valve as per directions of E-I-C.
- c) Loosen the gland nut.
- d) Carefully remove all the old/existing gland packing.
- e) Place new gland packing.
- f) Tighten the gland nut.
- g) Charge the line and complete hot tightening if required

12(A): - Valves up to 4"

12(B): - Valves 6" & above

ITEM-11: OVERHAULING & LOAD TESTING OF HOT/CHAIN PULLEY

BLOCK/ ELECTRIC HOIST:-

11-(A): OVERHAULING OF CHAIN PULLEY BLOCK/HOT: -

The lifting machines located at different locations in boiler area, FOPH, ash handling system, W.T Plant, raw water PH, BCW PH, CW PH, Workshop, wherever chain pulley blocks are mounted in monorail trolleys, they are to be dismantled & brought to the servicing/testing bay. The space for the same shall be located somewhere near the respective places.

All arrangements for dismantling & bringing it to the servicing bay are to the contractors account. Complete servicing has to be done & make the chain pulley blocks free to operate. During servicing any defective part noticed need replacement are to be supplied by OPGC. After thorough check up, the chain pulley blocks are to be assembled keeping proper clearance. Greasing of all bearing areas are to be included in the job.

After satisfactory servicing of the chain pulley blocks, they are to be refixed in their locations. The arrangements required for the job are to be made by the contractor.

11-(B): OVERHAULING OF ELECTRICAL HOIST:-

The gearboxes, brakes, all bearings, traveling wheels, wire ropes & other components are to be checked & serviced. Change of lubricants have to be done wherever required & as per advice of engineer in charge. After servicing & overhauling, proper working of the machines are to be ensured. Spares required shall be supplied by OPGC free of cost.

Minor repair arising out of wearing parts have to be done by the contractor & the same is considered as part of the scope of work.

ITEM – 12: LOAD TESTING OF ELECTRICAL HOIST/HOT/CHAIN PULLEY BLOCKS:-

12-(A): LOAD TESTING OF HOT /CHAIN PULLEY BLOCK 1T,2T,3T,5T,10T,15T:-

The chain pulley blocks are to be serviced & load tested at 1.5 times its individual capacity as enumerated or as per the direction of engineer in charge.

The test load shall be supplied by OPGC free of cost. However necessary arrangements, transportation of test loads are to the contractors accounts.

The servicing & load testing shall be repeated, if the equipment does not give satisfactory result & to the satisfaction of the testing engineers & safety officers of OPGC.

NOTE:- After servicing & load testing of lifting machine, the date of testing & the load for which it is tested has to be stamped on the equipment by paint

12-(B): ELECTRIC HOIST:-

The Electric Hoist with chain blocks shall have to be tested individually at 1.5 times of its capacity in presence of safety engineer & two dept. engineers.

The test load shall be given by OPGC & the contractor has to make their own arrangement for transporting the test loads to different spots as per requirement.

The test load shall be kept in lifted condition for at least 1½ hours & the lift clearance to the ground shall be measured at the interval of 10 mins. Further, along with the test load the crane shall be operated in long & cross travels .On satisfactory results the job is said to be completed,

Any defects noticed while testing the hoist is to be rechecked & same procedure shall be followed for which no extra cost shall be payable.

NOTE:- After servicing & load testing of lifting machine ,the date of testing & the load for which it is tested has to be stamped on the equipment by paint.

ITEM – 13: ARRESTING OF COAL LEAKAGE: -

13-(A): PATCH WELDING OF COAL PIPE: -

- a) Make suitable safe working platform near the work area.
- b) Cut alloy steel pipe/plate and make the required profile.
- c) Gas cut the coal pipe to the desired area as per the direction of E-I-C.
- d) Place the new piece on coal pipe and weld throughout the perimeter.
- e) Paint the new pipe as per the direction of E-I-C and check for any leakage on charging.
- f) Remove scrap and deposit as per the direction of E-I-C.

13-(B): ARRESTING OF COAL LEAKAGE (ON LINE): -

- a) Identify the leakage area and provide suitable safe working platform.
- b) Clean the area to expose the leakage.
- c) Apply sodium silicate/foam seal sealant with rope/cotton waste to arrest the leakage.
- d) Clean the area of coal dust.

ITEM – 14: REPLACEMENT OF BURNER TILT SHEAR PIN: -

- a) Replace the shear pin as directed by E-I-C.

ITEM – 15: CLEANING OF FUEL OIL DUPLEX STRAINER:-

- a) The choked strainer to be taken out by removing the cover.
- b) The strainer to be cleaned properly with diesel /air.
- c) Refitting the same
- d) There should not be any leakage after the fitting.
- l) LFO/HFO Transfer pump suction strainer
- ll) HFO Unloading pump suction strainer.

ITEM – 16: SERVICING OF HFO/LDO PRESSURISING AND UNLOADING PUMPS:-

- a) Confirm availability of PTW.
- b) Decouple the pump from motor and take alignment readings.
- c) Remove key, circlip and spacer bush.
- d) Remove mechanical seal ring and 'O' ring from the bearing cover.
- e) Take clearance readings in mechanical seal ring and inspect it for any damage.
- f) Remove the rotor assembly from casing and inspect it for any damage.
- g) Clean all parts.
- h) Insert rotor assembly into casing with proper gasket.
- i) Fit new mechanical seal if required.
- j) Put new seal ring and 'O' ring in the bearing cover.
- k) Fix bearing cover with cap screw.
- l) Fix the bearing into bearing cover properly and fix circlip and spacer bush.
- m) Fix key in the drive spindle.
- n) Align pump with respect to motor.
- o) After getting approval for alignment couple the motor with the pump.
- p) Take the trial run of the motor & pump. Rectify defects if any.

ITEM – 17: SERVICING OF DRAIN OIL PUMP:-

- a) Confirm availability of PTW.
- b) Decouple the pump from the motor.
- c) Remove the motor and keep it aside safely as directed by E-I-C (in case of vertical pumps)
- d) Remove support bolts and take the pump as directed by E-I-C.
- e) Remove pump from bearing housing.
- f) Inspect rotor assembly and couplings for any damage.
- g) Inspect the casing for any damage.
- h) Clean all the parts. Replace the coupling; pump casing & bearing if there is any damage.
- i) Insert rotor assembly in the bearing casing after providing new gland packing and proper lubrication to the bearing.
- j) Fix the bearing cover with the cap screw.
- k) Place pump casing in its original position and place the pump in its position with its supports fixed.
- l) Couple the pump with the motor.
- m) Take trial run of pump and motor and rectify defects if any.

ITEM – 18: SERVICING OF BOILER FILL PUMP:-

- a) Ensure PTW.
- b) Decouple the motor from the pump.
- c) Remove support bolts and take the pump as directed by E-I-C.
- d) Remove the gland packing.
- e) Remove bearing.
- f) Remove the cartridge and inspect impellers for any damage.
- g) Check the shaft run out.
- h) Assemble the cartridge and place the cartridge with new bearings.
- i) Put new gland packing.
- j) Align the pump with the motor and couple it.
- k) Take trial run and rectify defect if any.

ITEM– 19: REPLACEMENT OF BEARING AND MECHANICAL SEAL OF PRESSURIGING

PUMPS AND UNLOADING PUMPS (HFO/LDO):-

- a) Confirm availability of PTW.
- b) Decouple pump from motor and take alignment readings.
- c) Remove key from the drive spindle.
- d) Remove the circlip and spacer bush.
- e) Loosen the socket head cap screw at the bearing cover and remove it.
- f) Remove the bearing cover with the help of jackscrew.
- g) Inspect bearing and 'O' ring from the bearing cover.
- h) Clean all the parts.
- i) Fix new mechanical seal if required.
- j) Fix the seal ring and 'O' ring in the bearing cover.
- k) Fix the bearing cover with the cap screw.
- l) Fix circlip and spacer bush.
- m) Fix key in the drive spindle and align pump with the motor.
- n) Couple the pump with the motor.
- o) Take trial run and rectify defects if any.

ITEM – 20: RADIOGRAPHY/STRESS RELIEVING /ULTRASONIC

The scope of work includes testing of the quality of welding, joints by above NDT methods and stress relieving of the joints as & when required. The contractor has to arrange the agency for doing above works within 12hours of intimation. The test reports shall be submitted to the E-I-C. For each one rate shall be quoted on daily basis.

(I) RADIOGRAPHY

(II) STRESS RELIEVING

(III) ULTRASONIC

ITEM – 21: PRESSURE VESSEL TESTING (5 M3 CAPACITY)

The contractor has to shift the air compressor from garage/ workshop to the work site & pressure testing. The contractor has to clean the internals of the vessel & make

all the joints leak proof, servicing of the safety valves if required. Pressure testing shall be done to the full satisfaction of E-I-C.

ITEM – 22: REPAIR/REPLACEMENT OF UNION JOINTS IN IMPULSE LINES

The scope of work includes repair of the leaking joints by lapping of the male piece with female piece or replacement of union joints if it is beyond repair.

ITEM – 23: IMPULSE LINE FLUSHING:-

Cutting of the impulse line as per the instruction of the concerned engineer and Re welding it after completion of the flushing.

ITEM – 24: REPLACEMENT OF NEEDLE VALVES IN IMPULSE LINES

The scope of work includes removal of the damaged needle valve and fitting of new needle valve by welding.

ITEM – 25: REFRACTORY & INSULATION:-

Insulation of boiler drum, tanks, ducts, steam/water/oil pipelines, valves & pipes bends:-

Scope of work includes removal of damaged sheet/insulation, covering the pipe of outside diameter from 25mm to 508mm with preformed pipe section or light resin bonded mattresses with one side wire netting. The ends will be stitched by 24/22G wire. The insulation will be covered by 22/24G aluminum sheet having paint inside. The sheet will overlap 40mm longitudinally & circumferentially & the joint will be sealed with roofing felt strips. Binding the pipe section with two round G.I wire at distance of 300mm. Self tapping screws will be provided at a distance of 150 mm longitudinally & circumferentially. Aluminum bands of 20mmx24G at 500mm distance will be provided on aluminum cladding sheet.

(I) Fixing of wool

Measurement will be done on the basis of sq. mtr. The wool thickness will be 40mm/50mm. If one extra layer is needed, then the surface area of LRB mattress will be taken for measurement purpose.

(II) Fixing of sheet

Measurement will be on the basis of surface area of the sheet used for covering the insulation. Rate to be quoted on sq.mtr. basis for fixing of sheet.

ITEM 26: Castable refractory/ pourable insulation:-

Scope includes removal of the damaged castable / pourable, applying the refractory in paste form on furnace bottom, rear arch, top duct, below boiler drum, buckstay area, peepholes & manholes. Cast able should be cured for 24hrs by watering. If any crack on the surface observed. It will be rectified at your cost. Rate will be quoted on MT basis.

NOTES: -

Aluminum sheet, GI sheet, screws, aluminum band, insulation materials, retainer insulation pin, cast able /pour able, binding/ stitching wire will be supplied by OPGC free of cost. The contractor has to arrange drilling machine, bending machine cutter etc. to carry out the work. NO separate payment for scaffolding. Disposing the scraps as directed by the engineer in charge is the responsibility of the contractor.

ITEM 27: Shifting of Scrap materials to central store

The agency will collect scrap materials and shift to central store as per instruction of E-I-C. The scraps generated due to the job carried by the agency are not included in this scope. Truck and lifting device shall be provided by OPGC. Payment will be done on the basis of material weight.

METHOD OF MEASUREMENT (FOR PIPING): -

Measurement for erection of pipe lines shall be taken on the center line of the piping system from end to end which will include all fittings like bends, reducers, flanges, tees, expansion joints etc. Wherever branching is taken from main pipe, the measurement shall start from the root of the branch & no payment will be made for the branching. The above branching is applicable for pipe length of 5 mtrs & above.

APPLICATION OF FORMULA:-

FORMULA - A $RT=R \{1+ C (D-200)/50\}$.

RT=Rate for the pipe above 200 NB size but below 500 NB.

R =Base rate for 200 NB size pipe.

C =0.18, Co-efficient for pipe above 200 NB but below 500 NB.

D =NB of the

pipe.

FORMULA - B $RT=C1 R D1$

RT =Rate for the pipe below 200 NB.

C1=0.005, Co-efficient for pipes below 200 NB.

R =Base rate for 200 NB size pipe.

D1=NB of the pipe.

FORMULA - C $Rt=R \{1+C2 (t1-10)\}$

Rt=Rate for the pipes above 10mm thickness

R =Base rate for 200 NB size pipe

C2=0.03,Coeff. for pipes of thickness more than 10mm

t1= Thickness of the pipes

FORMULA-D $RA=C3T$ Where RA =Rate for the pipe/ plate having Argon root run

C3=0.2,Coeff. for Argon root run

R= Base rate for 200NB pipe/one meter length of welding

Whichever is applicable.

FORMULA-E $RH=R \{1+CH (D-200)/50\}$ Where

RH=Rate for the pipe above 200NB size

R= Base rate 200NB pipe, D=NB of the pipe

CH=0.15,Coeff. for pipes above 200NB

FORMULA-F $RV=R \{1+CV (D-200)/50\}$ Where

RV= Rate for the valve above 200NB size

R= Base rate for 200NB valve

CV=0.25,Coeff.for valve above 200NB

D=NB of the valve

FORMULA-G $Rs= R \{1+CS (D-200)/50\}$

Rs=Rate for the flange above 200NB size

R=Base rate for the 200NB flange

Cs = 0.20,Coeff. for flange Above 200NB

D=NB of the flange

FORMULA-H For piping erection Above 500NB size

$Rb=R \{1+Cb (D-500)/50\}$ where

Rb=Rate for the pipe of dia. above 500NB

R=Base rate for the 500NB pipe

D=NB of the pipe

FORMULA-IR=Base rate for 500NB butterfly valves & its gear box

servicing
 $R1=R \{1+C (D-500)/50\}$
D=Size of the valve
C=0.1,Coeff for the valve above 500NB size

SCOPE OF WORK FANS &APH

FD FAN

ITEM-1: CLEANING OF SILENCER & FAN INTERNALS.

- a) Opening of access doors of fan & silencer.
- b) Cleaning of impeller, impeller blades, static blades spiral casing, silencer suction screen, diffuser chamber & keeping the impeller ready for NDT.
- c) DP checks on impeller & blades and closing the access door after completion of work.
- d) Repairing the suction screen (if required)
- e) Painting of suction screen (if required)
The painting shall be paid extra as per miscellaneous work.

ITEM-2: FD FAN LUBE OIL SYSTEM.

ITEM-2.1: SERVICING OF LUBE OIL UNIT & CHANGING OF LUBE OIL.

- a) Draining of lube oil from filters, coolers & oil tank.
- b) Cleaning of the filters.
- c) Acid cleaning & neutralizing of oil tank & piping (if required).
- d) Filling of fresh oil in the oil tank.
- e) Arresting the oil leakages, if found when the lube oil system is put into service.
- f) Removing all unserviceable materials & cleaning the area.
- g) Servicing of 3- way valves, regulator etc.

ITEM-2.2: SERVICING OF OIL COOLER (WITH HYDRO TEST).

- a) Removal of the cooler from foundation after isolating it from BCW lines and oil Lines. Dismantling of cooler and removal of tube bundles, cleaning of tube Bundles with wire brush, hydro test of the cooler with necessary arrangement as Per requirement of hydro test, plugging of the tubes if tube leakage is observed & reassembly of the oil cooler and bring back to normalcy.

ITEM-2.3: SERVICING OF OIL COOLER (WITHOUT HYDRO TEST).

- a) Removal of the cooler from foundation after isolating it from BCW and oil lines, Dismantling of cooler and Cleaning of tube bundles & reassembly of oil cooler and bring back to normalcy.

ITEM-2.4: CLEANING OF OIL FILTERS (DISCHARGE SIDE).

- a) Remove the filter from the housing.
- b) Clean it with diesel and then with air.
- c) Box up the unit.

ITEM-2.5: CLEANING OF OIL FILTERS (SUCTION SIDE).

- a) Removal of filter from oil tank, cleaning of filter by diesel/compressed air & re- assembly.

ITEM-3: SERVICING OF LUBE OIL PUMPS.

- a) Taking out the pump from the foundation after decoupling from the motor and from oil lines.
- b) Dismantling, servicing of the pump with new seals, bearings.
- c) Reinstallation of the pump after reassembly with oil lines connection & alignment of the pump.
- d) Coupling of motor with pump with greasing of the Bibby coupling.

- e) Trial run of the pump to check any leakages from connecting flanges or from oil seal and rectification of the same.

ITEM- 4:SERVICING OF THE SHAFT SEAL & PROTECTION COVER ASSY.DIFFUSER

STATIC BLADES: -

- a) Removal of shaft seals on DE side of the fan.
- b) Dismantling of the end plate assembly, opening of manhole & opening of shaft cover inside.
- c) Preparing new gasket & assembling of the end plate & clamping of the same.
- d) Re-fixing of the shaft end cover & seal assemblies.
- e) Lifting the bullet cover & inspection for oil leakage. Replacement of the oil hose if leakage is from oil hose.
- f) Clean the diffuser, static blades, hub screen plates & undertake minor repair if any.

ITEM-5: REMOVAL & REPLACEMENT OF THE RUBBER EXPANSION JOINT ON

SUCTION SIDE.

- a) Checking & dismantling of the rubber expansion joint.
- b) Removal of worn-out rubber expansion joint.
- c) Cutting the new rubber sheet to correct dimension & refixing with proper clamping.
- d) Repair the fixing clamp & replace the fasteners.

ITEM-6: REMOVAL & REPLACEMENT OF THE RUBBER EXPANSION JOINT ON

DISCHARGE SIDE.

- a) Checking & dismantling of the rubber expansion joint.
- b) Removing the worn-out rubber expansion joint.
- c) Cutting the new rubber sheet to correct dimension & refixing.
- d) Repair the fixing clamp & replace the fasteners.

ITEM-7: DISMANTLING/REASSEMBLY WORKS FOR SERVICING OF FAN

BEARING/BLADE BEARING/ SERVOMOTOR.

- a) Open the diffuser end rubber bellow expansion joints.
- b) Open expansion joint at impeller housing.
- c) Decouple intermediate shaft after opening the silencer end man hole.
- d) Disconnect all oil supply piping/hose to the bearing & servomotor.
- e) Disconnect blade pitch control power cylinder. Check the blade clearances at open & close with oil supply on before opening oil hoses.
- f) Remove the conical duct pieces after the diffuser between the diffuser & transition piece support/secure it properly.
- g) Remove foundation bolts of the diffuser.
- h) Contractor will carefully pull the diffusers towards the outlet duct so that impeller can be withdrawn.
- i) Remove the blades after removing their fasteners & store them properly. Open bullet cover & remove the servomotor & blade bearing housing (impeller hub or impeller assembly).
- j) Remove the main bearing housing from its foundation after decoupling it from intermediate shaft & place all the components suitably at a safe place where further maintenance is planned as per the direction of the E-I-C.
- k) Attending servicing work in main bearing housing, servomotor & blade bearing housing as per the requirement.
- l) Reassemble with required checks (checking of blades tip and root clearances in open & close condition, stroke length adjustment etc), alignment & box up and bring back the system to normalcy.

ITEM-7.1:OVERHAULING OF MAIN BEARING ASSY.

- a) Overhauling of bearings in the main bearing assy. & replacement of INA ring, simmer ring (Contractor will engage experienced personnel for doing the above job as per the guidelines) & steps for removal/replacement of INA ring/simmer ring & bearing as per the requirement & advice at the time of such job. He will engage only those persons who have done such job in the past. All the risk & responsibility for a bad job will be at the contractors' cost.
- b) Contractor will reassemble the bearing; fan etc after the job has been attended to the satisfaction of engineer in charge.

ITEM-7.2: SERVO MOTOR SERVICING.

- a) Contractor will have to do the following works as per requirement.
- b) Keep the servomotor well supported with its axis in vertical position (oil supply head upward).
- c) Dismantle the oil head assy. & remove the INA ring.
- d) Remove the bush ejected out from the piston assy.
- e) Checking of piston rings & replace them if required.
- f) Check control slide & control bush for concentricity.
- g) Check servomotor spindle.
- h) Remove the piston assy with care.
- i) Check/replace needle bearing of control slide.
- j) Replace 'O' ring & oil seals of servomotor individually.
- k) Replace oil remover.
- l) Any other item as may be required to be done by the engineer in charge for proper operation & actuation of servomotor.
- m) Reassembly of the servomotor with necessary checks.

ITEM-7.3: BLADE BEARING ASSY. SERVICING.

- a) Support the rotor assy. in a convenient height in horizontal position.
- b) Separate servomotor from rotor assy. of blade bearing.
- c) Remove adjusting ring & adjusting disc.
- d) Remove the cover of impeller hub; remove the lever assy. & the nylon rings.
- e) Remove distance ring, connecting ring & balls from the thrust bearing.
- f) Replace the ball bearing, jewel bearing, oil seals, simmer rings, "O" rings as per requirement.
- g) Any other related activity, as directed by the concerned engineer for servicing is to be carried out.
- h) After reassembly of blade bearing leak test is to be done for all the blades up to a pressure rise of 10 kg/cm² by Mobil glycol.

ITEM-8: COUPLING BOLT REPLACEMENT.

- a) Check the coupling bolts (both fan side & motor side), connecting bolts for the intermediate shaft (both fan side & motor side), all checks to be done from inside the bearing housing to out side motor.
- b) Replace the coupling bolts after rearranging the flat springs & realignment of fan with motor from inside coupling to out side coupling.

ITEM-9: REPLACEMENT OF RIGIFLEX COUPLINGS.

- a) Decouple the motor side /fan side coupling as per requirement after removing the coupling guard.
- b) Remove the top cover of the bullet chamber for decouple the fan side coupling.
- c) Remove the foundation bolts of the motor. Position the motor in a Suitable position to remove the coupling
- d) Remove the coupling from the motor shaft/fan shaft.
- e) Fix the new coupling (by heating in oil)
- f) Reposition the motor for alignment
- g) Coupling of motor with shaft and alignment of fan with motor properly from inside Coupling to out side coupling.
- h) Fix the coupling guard.

ITEM-10: SERVICING OF RECIRCULATION/RELIEF VALVE.

- a) Dismantling, servicing, reassembly & setting of the valves.

ITEM-11.1: REPLACEMENT OF BIBBY COUPLING.

- a) Decoupling of the motor from pump, removal of both half couplings from motor as well as from pump shaft after removal of bibby coupling spring.
- b) Replace it by new bibby coupling, reassembly, alignment & coupling of the pump and motor with greasing.

ITEM-11.2: REPLACEMENT OF BIBBY COUPLING SPRING.

- a) Decoupling of motor from pump
- b) Replacement of damage spring with new one and coupling of motor with pump with proper greasing.

ITEM-12.1: REPLACEMENT OF BEARING & OIL SEAL OF LUB OIL PUMP.

- a) Decoupling of the pump from motor and from oil lines.
- b) Take out the pump from its foundation to out side.
- c) Replacement of damaged bearing & oil seal after dismantling of pump.
- d) Reassembly of the pump and repositioning of pump on foundation with oil lines connection & alignment of motor to pump and coupling with proper greasing of bibby coupling.
- e) Trial run of the pump to check any leakages from oil line flanges or from oil seal and rectification of the leakages if observed.

ITEM-12.2: REPLACEMENT OF LUB OIL PUMP.

- a) Removal of the pump from foundation after decoupling from motor and oil lines.
- b) Replace the same with new/reassemble pump on foundation with all oil lines connection & alignment of pump to motor.
- c) Coupling and greasing of bibby coupling.
- d) Trial run of the pump & attending to oil leakages if any from oil seal or from oil line flanges.
- e) Dismantling & reassembly of removed pump with new oil seal and bearings, as spare pump.

ITEM-13: SERVICING OF LINK ROD MECHANISM.

- a) Opening the manhole doors.
- b) Servicing / replacing the bearing (if any).
- c) Checking straightness of the actuation shaft, link rod, cylindrical pins & bearing foundation bolts, adjust /replace the hinge head screw.
- d) Checking of servo – motor travel & resetting.
- e) Attending to oil leakage if any & box up.

ITEM-14: CHECKING & REPLACEMENT OF OIL HOSES.

- a) Opening of manhole doors.
- b) Replacement of high/low pressure hoses / return line oil hose as per direction of E -I-C.
- c) Run the pump and ensure no oil leakage from hoses.

ITEM-15: STROKE LENGTH ADJUSTMENT OF SERVOMOTOR

- a) Opening of manhole doors.
- b) Decouple the link mechanism from the power cylinder.
- c) Operate the servomotor manually and adjust the stroke length as per direction of E-I-C.
- d) Couple with the power cylinder.
- e) Boxing up of the manhole doors.

ITEM-16: ALIGNMENT OF FAN WITH MOTOR

- a) Prepare necessary arrangement for checking alignment of fan with motor.
- b) Add or remove shims as per requirement of accurate alignment.
- c) Box up the coupling.

ID FAN

ITEM-1: CLEANING OF FAN INTERNALS

- a) Opening of manhole doors (bottom & back sides) of fan & spiral casing.
- b) Cleaning (water washing) of impeller, spiral casing, suction duct etc. & keeping the impeller ready for NDT.

- c) DP checks on welding points of impeller, conical covers/blades etc., welding of defect welding points after grinding
- d) Closing of manhole doors after completion of work.

ITEM-2: SERVICING OF THE LABYRINTH SEAL ASSY (DE & NDE)

- a) Removal of insulation at the labyrinth seal areas on DE & NDE side of the fan.
- b) Dismantling of the labyrinth seal assy. on both sides.
- c) Removal of old gaskets; putting new one & re-assembling of the labyrinth seal with required clearance to shaft & clamping with new ceramic cloth at both ends.
- d) Refixing of insulations.

ITEM-2.1: REPLACEMENT OF CLOTH OF LABYRINTH SEAL ASSY (DE & NDE)

- a) Remove both sides (DE & NDE) damaged cloth after removal of the Clamps.
- b) Put new clothes and clamp it properly.
- c) Ensure no leakages

ITEM-3: SERVICING OF BEARINGS (DE & NDE)

- a) Dismantling of coupling assy. of the fan to hydro coupling.
- b) Dismantling of flexible water hose, oil inlet hose; return oil pipelines & removal of thermo-couples.
- c) Loosening of the plunger screw of the housing cap.
- d) Dismantling of the bearing-housing cap of both expansion & non-expansion bearings.
- e) Dismantling of liner cap of bearings & removal of thrust plates.
- f) Jacking up of the rotor to have clearances for the bearing removal.
- g) Removal of the water pipes of the liner base.
- h) Removal of liner base of both bearings.
- i) Checking of liner assy. thrust collar thrust plates for burns & scratches & removing them.
- j) Replacing of thrust plates if failed.
- k) Drain the oil from bearing housing.
- l) Checking & replacement of oil rings.
- m) Cleaning of the liner base & mounting on the housing base to seat correctly (Replacement of liner if damaged)
- n) Lowering rotor correctly into place.
- o) Assembling of thrust plates & liner cap.
- p) Checking of axial & oil clearance for the bearings.
- q) Fixing of housing cap for both DE & NDE bearings.
- r) Fill oil as per requirement in the bearing housing.
- s) Connecting back lube oil pipelines, flexible water hoses, oil hoses etc. to the bearings.
- t) Checking the alignment of the fan to hydro coupling and hydro coupling to motor & Correction of alignment if needed.(radial as well as axial alignment).
- u) Greasing of both gear couplings after coupling. Fixing the coupling guards.
- v) Trial run of the fan & checking of the performance.
- w) Attend any defects after trial run.

ITEM-4: BEARING INSPECTION (DE & NDE)

- a) Dismantling of flexible water hoses, grommet pads etc.
- b) Opening of top cover of bearings.
- c) Removal of liners for inspection, fine scraping if required.
- d) Checking of oil clearances, oil rings & replacement if needed.
- e) Boxing up of the bearings with required torque, connection of the water hoses with Grommet pads etc.
- f) Checking tightness of foundation bolts & plunger screws.

ITEM-5: REPLACEMENT OF IMPELLER LINERS (WEAR PLATES)

- a) Opening of manhole doors.
- b) Removal of old liners (if damaged).

- c) Replacement of old liners with new ones with proper bolting. (Liners & bolts will be Supplied by OPGC). Welding of impeller tips with new wear plate tips.
- d) Closing of manhole door after balancing or weight correction of fan on situ-
Condition if required as per instruction of E-I-C.

NB: Rate shall be quoted per liner and entire fan

5.1 PER FAN: -

ITEM-6: REPAIR OF FAN LINERS (WEAR PLATES)

- a) Opening of manhole door.
- b) Repair of the liners by weld deposit.
- c) Ensure equal deposit of weld material in all the wear plates.
- d) Closing of manhole door after balancing or weight correction of fan on situ
Condition if required as per instruction of E-I-C.

NB: Electrodes shall be supplied by OPGC.

ITEM-8: REPAIR OF CASING LINERS

- a) Opening the manhole doors.
- b) Repair of casing liners after cutting of damaged liners and replacement with new liner by cutting and welding to required size.
- c) Closing of man hole doors and box up.

NB: The contractor shall quote in running mtr. of welding. Electrodes shall be supplied by OPGC.

ITEM- 09: INSTALLATION OF PHE

- a) Isolate the shell & tube cooler from water and oil side.
- b) Drain the oil from cooler.
- c) Remove the cooler from its foundation and bring it to ground floor.
- d) Position the Plate Heat Exchanger (PHE) in place of shell & tube cooler
- e) Fabricate necessary flanges and piping (by cutting & welding) for connecting the PHE to oil side & waterside.
- f) Then box up the PHE with necessary connection.
- g) Charge waterside and check leakages if any & rectify the same.

ITEM-10: SERVICING OF HYDRAULIC COUPLING

- a) Dismantle both sides of the gear couplings.
- b) Dismantle actuator and scoop tube. Drain the oil from the tank.
- c) Remove the housing cover and the scoop tube.
- d) Unscrew the filling pipe and lube oil piping to bearings. Drain the remaining oil from the working chamber by removing the Fusible plugs
- e) Loosen the scoop tube housing and input side bearing cover from the housing Lower part.
- f) Lift the complete coupling runner out of the housing and set it down on a Wooden base for further dismantling.
- g) Dismantle the input side bearing after removing the input side connecting Coupling, the labyrinth cover, the slotted nut, the tab washer and the Oil Thrower.
- h) Remove out put side connecting coupling, set the runner up vertically with the Secondary shaft upward and support with wooden blocks.
- i) Disassemble and re-assemble the filling pump after removing its bearings and pinions and after checking it, if required, replace the bearings and other parts as directed by E-I-C.
- j) Remove the labyrinth cover, the slotted round nut, the circlip and the Oil Thrower and then remove the bearings with lube rings by pressing the scoop tube housing over the secondary shaft.
- k) Tilt the runner so that the free end of the primary shaft is showing upwards and remove the angular contact ball bearings.
- l) After cleaning and checking the primary and secondary wheel and the shafts and replacing the bearings, the runner is reassembled and re-installed in the oil tank and box up the hydro coupling with other accessories,

which were dismantled earlier. (Housing cover, scoop tube with actuator, oil pipings, fillings etc.). Fill up the oil up to the required level.

- m) Align the fan with hydro coupling and then hydro coupling to motor (radial as well as axial). Couple both sides of the gear couplings with proper greasing.

ITEM-10.1: INSPECTION OF HYDRO-COUPLING

- a) Decoupling the hydro coupling.
- b) Check the old oil & replace it if required.
- c) Remove the top cover, clean the tank.
- d) Checking of fusible plug, pump & oil line flanges & attend to the defects.
- e) Checking of input side bearings & exposed fasteners.
- f) Box up the top cover.
- g) Coupling with proper greasing & refixing of coupling guard.

ITEM-11: CHECKING OF WELDING & BOLT TIGHTNESS FROM SHAFT

TO IMPELLER.

- a) Removal of top half of casing, removal of cone covers, replacing the fastening bolt, checking the welding by DP or any welding NDT test method, repair if needed & bringing back to normalcy. (If casing is already opened, 50 % of the rate shall be paid).

ITEM-12: REPAIR & REPLACEMENT OF STATIC SEAL (DE & NDE).

Removal of damaged static seals of both sides, replace it with new one with proper fasteners, use cutting & welding as per requirement.

ITEM-13: ALIGNMENT OF HYDRAULIC COUPLING & MOTOR.

- a) Removal of coupling guard, Decoupling of gear coupling and cleaning of grease from coupling. Make necessary arrangement for checking alignment of hydraulic coupling to motor, Check the alignment and correct it by putting shims whenever required during alignment (radial as well as axial alignment). Couple the gear coupling with proper greasing and put the coupling guard.

ITEM-14: ALIGNMENT OF FAN WITH HYDRAULIC COUPLING.

- a) Removal of coupling guard, Decoupling of gear coupling and cleaning of grease from coupling. Make necessary arrangement for checking alignment of fan to hydraulic coupling, check the alignment and correct it by putting shims whenever required during alignment (radial as well as axial alignment). Couple the gear coupling with proper greasing and put the coupling guard.

ITEM-15: EQUIPMENT CONDITION MONITORING/BALANCING.

- a) Assisting in condition monitoring of fan.
- b) Correction of unbalance of fan by putting balancing Weight in situ condition as per instruction of E-I-C.

ITEM-16: REPLACEMENT OF GEAR COUPLING (MOTOR SIDE).

- a) Decoupling of gear coupling after removing coupling guard.
- b) Shifting of motor to required position for removing the gear coupling.
- c) Removal of gear coupling both halves from motor shaft & hydro coupling input shaft.
- d) Mount new coupling after oil bath heating.
- e) Alignment of the motor with fan and correct it as per requirement (radial as well as axial alignment).
- f) Coupling of gear coupling with proper greasing and fixing of coupling guard.

ITEM-17: REPLACEMENT OF GEAR COUPLING (FAN SIDE).

- a) Decoupling of gear couplings of motor side & fan side after removing coupling guards.

- b) Shifting of hydro coupling to required position for removing the gear Coupling.
- c) Removal of gear coupling both halves from hydro coupling out put shaft & fan shaft
- d) Mount new coupling after oil bath heating.
- e) Alignment of fan to hydro coupling and hydro coupling to motor to be done as per requirement.
- f) Coupling of both gear couplings with proper greasing.
- g) Fix the coupling guards.

ITEM-18: CHECKING OF GEAR COUPLING (MOTOR SIDE).

- a) Remove the coupling guard & Check the teeth by opening of gear coupling and clean the grease.
- b) Put new grease and box up.
- c) Fix the coupling guard.

ITEM-19: CHECKING OF GEAR COUPLING (FAN SIDE).

- a) Checking of teeth by opening the gear coupling after removing of coupling guard
- b) Again coupling, greasing & putting of coupling guard

ITEM-20: REPLACEMENT OF BCW HOSE.

- a) Isolate BCW lines (both inlet & outlet)
- b) Removal of damaged hose
- c) Replace by new one
- d) Normalization of BCW lines

ITEM-21: REPLACEMENT OF GROMMET PAD.

- a) Isolation of BCW lines (both inlet & outlet)
- b) Removal of BCW hose from the bearings.
- c) Replacement of damaged grommet pads.
- d) Fixing of BCW hoses to the bearings
- e) Normalization of BCW line

ITEM-22: TORQUE TIGHTENING OF BEARINGS (DE & NDE).

- a) Loose the lock nut of bearing.
- b) Give the required torque and tight the lock nut as per instruction of E-I-C.

PA FAN

ITEM-1: INSPECTION OF FAN IMPELLER.

- a) Opening of access doors of fan.
- b) Cleaning of Impeller, keeping the Impeller ready for NDT at welding points (conical cover of both ends, impeller blades, endpins connection portion etc.) after NDT. If required welding to be done at welding points.
- c) Closing of manhole door.

ITEM-2: SERVICING OF LUBE OIL UNITS & CHANGING OF LUBE OIL.

- a) Draining of lube oil from filters, coolers & tank.
- b) Opening of oil tank inspection doors for tank cleaning.
- c) Cleaning of oil tank with diesel or as per instruction of E-I-C.
- d) Cleaning of filters & Maintenance of valves & NRVs.
- e) Filling of fresh oil into the tank and closing of inspection doors.
- f) Arresting the oil leakage in the equipment if any.
- g) Removing all unserviceable material & cleaning the area.
- h) Arresting oil leakage in pipe flanges.

ITEM-3: SERVICING OF THE LUBE OIL PUMPS.

- a) Dismantling of the lube oil pump from Motor and oil pipe lines after removing Coupling guard.

- b) Dismantling & servicing of the pump with new seal & bearing.
- c) After assembly of pump, fix it in original position & check the alignment with proper Coupling and oil pipe lines connection.
- d) Taking of trial run & checking for oil leakages if any & rectify it again if required & putting coupling guard.

ITEM-3.1: SERVICING OF RECIRCULATION/RELIEF VALVE.

- a) Dismantling, servicing, reassembly & resetting of the valves.

ITEM-3.2: ALIGNMENT OF LUB OIL PUMP.

- a) Removing of coupling guard.
- b) Decoupling the pump from motor.
- c) Alignment of the pump with motor to the full satisfaction of E-I-C.
- d) Coupling the pump with motor and fixing the coupling guard.

ITEM-3.3: REPLACEMENT OF OIL SEAL/ BEARING OF LUB OIL PUMP.

- a) Removal of coupling guard
- b) Decoupling of pump from motor and from oil lines. Removing the pump from foundation for changing of oil seal & bearing.
- c) Removal of damaged oil seal and bearings.
- d) Assembling the pump with new oil seal and bearings.
- e) Coupling the motor with pump after alignment.
- f) Fixing the coupling guard and checking for any leakage after running the pump.

ITEM-3.4: REPLACEMENT OF NEW/REPAIRED LUB OIL PUMP.

- a) Removal of the pump from foundation after decoupling from motor and oil pipelines.
- b) Replacing the same with new /reassemble pump on foundation with all oil lines connection & alignment of pump to motor.
- c) Coupling and greasing of bibby coupling.
- d) Trial run of the pump & attending to oil leakages if any from oil seal or from oil line flanges.
- e) Dismantling & reassembly of removed pump with new oil seal and bearings, as spare pump.

ITEM-3.5: CLEANING /REPLACEMENT OF SUCTION STRAINER/DISCHARGE FILTER.

- a) Remove the suction/discharge filter from its housing.
- b) Clean or replace the filter.
- c) Box up the filter in filter housing.

ITEM-3.6: REPLACEMENT OF LOVEJOY COUPLING.

- a) Remove coupling guard
- b) Decouple the motor from pump; remove the love joy coupling both halves from pump as well as from motor.
- c) Replace the same by new one.
- d) Alignment of motor to pump and coupling then put coupling guard.

ITEM-3.7: REPLACEMENT OF LOVEJOY COUPLING SPIDER

- a) Remove the coupling guard.
- b) Decouple the motor from pump, remove damaged spider & put new one
- c) Alignment of motor to pump and coupling & then put coupling guard.

ITEM-4: SERVICING OF THE LABYRINTH SEAL ASSY (DE & NDE)

- a) Removal of insulation at the labyrinth seal areas on DE & NDE side of the fan.
- b) Dismantling of the labyrinth seal assy. on both sides.
- c) Remove old gaskets; put new one & assembly of the labyrinth seal with required clearance to shaft & clamp with new ceramic cloth at both ends.
- d) Refixing of insulations.

- e) Checking the sealing aluminum fans mounted to shaft on both end of fan.

ITEM-4.1: REPLACEMENT OF CLOTH OF LABYRINTH SEAL ASSY (DE &NDE)

- a) Remove both sides (DE & NDE) damaged cloth after removal of the Clamps.
- b) Put new clothes and clamp it properly.
- c) Ensure no leakage.

ITEM-5: SERVICING OF BEARING (DE & NDE).

- a) Dismantling of pin type coupling assy. of the fan.
- b) Dismantling of flexible water hose, oil inlet hose, return oil pipe lines & removal of thermo-couples.
- c) Loosening of the plunger screw of the housing cap.
- d) Dismantling of the bearing-housing cap of both expansion & non-expansion bearings.
- e) Dismantling of liner cap of bearings & removal of thrust plates.
- f) Jacking up of the rotor to have clearance for the bearing removal.
- g) Removal of the water pipes of the liner base.
- h) Removal of liner base of both bearings.
- i) Checking of liner assy. thrust collar thrust plates for burns & scratches & removing them.
- j) Replacement of thrust plates if failed.
- k) Cleaning of the liner base & mounting on the housing base to seat correctly. (Replacement of liner if damaged)
- l) Lowering rotor correctly into place.
- m) Assembling of thrust plates & liner cap.
- n) Checking of axial & oil clearance for the bearings.
- o) Fixing of housing cap for both DE & NDE bearings.
- p) Connecting back lube oil pipe lines, flexible water hoses, oil hoses etc. to the bearings.
- q) Checking the alignment of the motor - fan & correction if needed.
- r) Fixing back the pin type coupling assy.
- s) Trial run of the fan & check the performance.
- t) Attending to further defects, found after trial run.

ITEM-6: BEARING INSPECTION (DE & NDE)

- a) Dismantling of flexible water hoses, grommet pads etc.
- b) Opening of top cover of bearings.
- c) Removal of liners for inspection, fine scraping if required.
- d) Checking of oil clearances and oil rings, replacement if needed.
- e) Boxing up of the bearings with required torque, connection of the water hoses with grommet pads etc.
- f) Checking tightness of foundation bolts & plunger screws.

ITEM-7: REPLACEMENT OF IMPELLER LINERS (WEAR PLATES)

- a) Transportation of new liners from stores to site.
- b) Opening of manhole doors.
- c) Removal of old liners (if damaged).
- d) Replacement of old liners with new ones (10nos.) with proper bolting.
- e) Welding of impeller tips with new wear plate tips.
- f) Assisting for Vibration monitoring and balancing of the fan by running the fan from local in situ-condition
- g) Arranging balancing weight and fixing the same at suitable location on fan impeller while balancing of fan and torque tightening of bearings if required as per instruction of E-I-C.
- h) Closing of manhole door and discharge duct door after balancing or weight correction of fan on situ-Condition.

NB: Liners & bolts will be supplied by OPGC. Rate shall be quoted for replacing entire liners in one fan.

ITEM-8: HARD FACING OF FAN CASING/IMPELLER.

- a) Opening of manhole doors.
- b) Opening of the parting plane bolts.

- c) Lifting the top half & to reverse the same to facilitate repair.
 - d) After repair of casing as per scope in ITEM NO.09, hard facing shall be done as per instruction of E-I-C.
 - e) Boxing up after renewal of packing rope. (Hard facing / joining electrode etc. will be supplied by OPGC.
- NB: Rate shall be quoted per kg of electrode deposited.**

ITEM-9: CUTTING & WELDING OF CASING PLATE/IMPELLER

- a) Removal of eroded plates by gas cutting from impeller saw tooth/casing (top and bottom casings).
- b) Cutting, Bending & welding of new plate (chequered plate of 6mm/ 8mm thick.) as
- c) per profile of the casing / as per requirement.
- d) Cutting, Bending & welding of the angle as per the direction of EIC.

NB: Rate shall be quoted for cutting and welding in running meters.

ITEM-9.1: CUTTING

ITEM-9.2: WELDING

ITEM-10: SERVICING OF OIL COOLER (WITH HYDRO TEST)

- a) Draining of oil from cooler & Isolate the cooler from water and oil pipe lines.
- b) Remove the cooler from its foundation.
- c) Dismantling the oil cooler in out side.
- d) Cleaning the tubes bundle by nylon brush.
- e) Boxing up of the cooler with new 'o' rings.
- f) Hydro test of the cooler (with water) to the required pressure after making necessary arrangement for hydro test.
- g) Plugging the tubes at both ends if leakages found.
- h) Repeating the hydro test, if required.
- i) Boxing up the cooler and placing in position with all necessary connections & normalization of the cooler.

ITEM-11: SERVICING OF OIL COOLER (WITHOUT HYDRO TEST).

The scope of the work is as per item No.10 except hydro test.

ITEM-12: REPAIR & REPLACEMENT OF STATIC SEAL (DE & NDE).

- a) Open the manhole doors.
- b) Removal of damaged static seals of both sides, replace it with new one with proper fasteners, use cutting & welding as per requirement.
- c) Check the seal clearance and adjust it if required.
- d) Close the manhole door.

ITEM-13: ALIGNMENT OF FAN WITH MOTOR.

- a) Remove the coupling guard.
- b) Decouple the motor from fan.
- c) Check run out of the shaft.
- d) Alignment of fan with motor (radial as well as axial) to be done after making necessary arrangement for checking of alignment & correction to be done by putting shims as per instruction of the E-I-C.
- e) After alignment couple the motor with fan. Put the coupling guard.

ITEM-14: SERVICING OF INLET GUIDE VANES.

- a) Opening of the bearing end cover, cleaning & replacing of graphite bearings.
- b) Make the dampers free & check the operation by operating IGV power cylinders.
- c) Repair / replace the IGV flaps (if required).
- d) Adjustment of stroke, clearance & overlap as per requirement & instruction of the engineer in charge.

ITEM-15: COMPLETE REPLACEMENT OF INLET GUIDE VANES.

- a) Locking of inlet duct of fan suction sides (before & after of IGV)
- b) Decoupling of the knuckle joint.
- c) Complete removal of inlet guide vanes (both side suction) after cutting of welded joint at one side and removing of bolts on the other side.
- d) Reassemble of new IGV and replace the same by new one with new gaskets/rope.
- e) Operate the IGV by chain block and ensure freeness.
- f) Connect the IGV with power cylinder and check for free operation.

ITEM-16: CHECKING OF WELDING & BOLT TIGHTNESS FROM SHAFT TO IMPELLER

- a) Removal of top half of casing and removal of cone covers.
- b) Replacing the fastening bolts.
- c) Checking the welding by DP/magnetic particle test
- d) Repair the defective welding area.
- e) Box up.
If casing is already opened then 50 % of the quoted rate shall be paid.

ITEM-17: REMOVAL & REASSEMBLY OF THE TOP CASING.

- a) Remove the parting plane bolts.
- b) Remove the seals.
- c) Lifting of the casing & placing on suitable place in ground floor for repair etc.
- d) Reassembly of the casing after repairing and putting ceramic rope/cloth on the parting plane & ceramic cloth on the labyrinth seal.
- e) Tightening of the parting plane bolts.
- f) Ensure no leakage of air.
- g) If any hot tightening is required after running of the fan it shall be done as per instruction of E-I-C.

ITEM-18: ASSEMBLY OF ROTOR.

- a) Assembly of impeller to shaft with bolts.
- b) Bolting of cone covers on both sides of the impeller after DP test of welding points and if any defect is found the same shall be rectified by grinding and then welding.
- c) Fixing of wear plates (10nos.) on the impeller with proper bolting and welding of the impeller tips with wear plate tips.
- d) Bolt tightening as per instruction of E-I-C.

ITEM-19: REPLACEMENT OF ROTOR ASSY.

- a) Decoupling of motor from fan after removing coupling guard.
- b) Dismantling of both side bearings and its accessories connections (BCW hoses, oil hoses, grommet pads etc.)
- c) Remove the top casing by removing parting plate bolts & place it in a suitable Position.
- d) Remove the rotor assy. and keep it in a suitable location in ground floor.
- e) Remove the coupling half from the fan shaft by making puller.
- f) Put the old/new coupling half on the new rotor shaft (heating in oil bath).
- g) Fix of new / repaired impeller on position after requisite checks.
- h) Fix the top casing with proper bolting
- i) Box up the both side bearings with all connections and giving the torque on bearings.
- j) Alignment of motor to fan to be done (radial as well as axial)
- k) Couple the fan with motor and fix the coupling guard.
- l) Trial run fan to be done by running the fan from local and balancing or weight correction to be done if any unbalance is there in rotor as per instruction of E-I-C.

ITEM-20: EQUIPMENT CONDITION MONITORING/BALANCING

- a) Open the discharge duct door.
- b) Assisting for Vibration monitoring and balancing of the fan by running the fan from local.

- c) Arranging of balancing weight and fixing the same at suitable location on fan impeller as per instruction of E-I-C.
- d) Close the manhole door as well as duct door by putting rope after balancing of fan.

ITEM-21: REPLACEMENT OF BCW HOSE

- a) Isolate BCW lines (both inlet & outlet)
- b) Removal of damaged hose
- c) Replace by new one
- d) Normalization of BCW lines.
- e) Check for any leakage and attend the same.

ITEM-22: REPLACEMENT OF GROMMET PAD

- a) Isolation of BCW lines (both inlet & outlet)
- b) Removal of BCW hose
- c) Replacement of damaged grommet pads.
- d) Fixing the BCW hose to the bearing housing.
- e) Normalization of BCW line.
- f) Check for any leakage and attend the same.

ITEM-23: TORQUE TIGHTENING OF BEARING (DE & NDE).

- a) Loose the lock nut.
- b) Apply the required torque as per instruction of E-I-C.
- c) Tighten the locknut.

ITEM-24: ATTENDING MANHOLE DOOR LEAKAGE

- a) Open the manhole door.
- b) Repair by welding of eroded portion of the door.
- c) Closing of manhole door with new rope.

AIR-PREHEATER

ITEM-1: SERVICING OF LUBE OIL PUMPS.

- a) Decouple the pump from the motor & remove the oil inlet/outlet pipes.
- b) Dismantle the pump and replace the damaged seal/bearing with new mech. seal & bearing.
- c) Reposition the pump and connect the inlet/outlet oil lines with new gaskets.
- d) Alignment of the pump with motor.
- e) Take trial run, check for any oil leakage from flanges or from seal and rectify the same if any.

ITEM-2: SERVICING OF OIL COOLER (WITH HYDRO TEST).

- a) Isolate and remove the cooler from the connecting oil lines.
- b) Remove the cooler tubes bundle from the cooler body.
- c) Cleaning of tubes with wire brush followed by water washing.
- d) Cleaning of end covers.
- e) Reassembly of the cooler with new O' rings or gasket & hydro test with water after making necessary arrangement for hydro test to required pressure as directed by E-I-C.
- f) Plugging of tubes at both ends if leakages found.
- g) Hydro test to be done till zero leakage of cooler.
- h) Reposition the cooler after assembly to its original position with all necessary connection of oil lines by putting new gaskets.
- i) Attend any leakage found after running of the pump.

ITEM-3: ALIGNMENT OF LUBE OIL PUMP.

- a) Decouple the pump from motor.
- b) Arrange for alignment after replacement of the motor.
- c) Couple the pump with motor.

ITEM-3.1: REPLACEMENT OF OIL SEAL/BEARING.

- a) Decouple the pump from motor and remove oil lines connected to pump.
- b) Remove the pump for changing of oil seal/bearing and dismantle it.
- c) Replace the damaged oil seal and bearing with new one and assemble it.
- d) Couple the motor with pump after alignment.
- e) Connect oil lines to pump by putting new gaskets.
- f) Check for any leakages after running the pump and rectify the same if leakages observed.

ITEM-3.2: CLEANING /REPLACEMENT OF FILTER

- a) Remove the suction/discharge filter from housing.
- b) Clean with diesel and replace with new filter, if necessary.
- c) Box up the filter in housing.

ITEM-3.3: REPLACEMENT OF NEW/REPAIRED LUB OIL PUMP.

- a) Remove the pump from foundation/from motor after disconnecting of oil piping.
- b) Reassembly /erection of the new/repared pump including checking of the pump foundation, normalization of the piping with new gaskets & alignment.
- c) Trial run of the pump & attending to oil leakage if any.
- d) The old pump to be made ready (replace oil seal / bearing etc.) for spare

ITEM-3.4: REPLACEMENT OF LOVEJOY COUPLING

- a) Removal of damaged love joy-coupling halves from the lube oil pump as well as from motor after decoupling of pump from motor.
- b) Replace by new one (coupling of both motor and pump).
- c) Alignment and coupling to be done.

ITEM-3.5: REPLACEMENT OF LOVEJOY COUPLING SPIDER

- a) Removal of damaged love joy-coupling spider after decoupling pump from motor.
- b) Replace by new one.
- c) Alignment and coupling to be done.

ITEM-4: SERVICING OF RELIEF VALVE:-

- a) Dismantling, serving, reassembly & resetting of the valve.

ITEM- 5 CLEANING OF GUIDE BEARING AREAS

- a) Removal of deposited ash (due to leakages) from guide bearing area by scraping. to a safe location.
- b) Disposal of the same in bags to disposal yard or as directed by E-I-C.
- c) Attending leakages from casing /duct by welding or putting refractory.

ITEM- 6: SERVICING/REPLACEMENT OF OVER RUN CLUTCH ASSEMBLY

- a) Remove the oil from reducer gear, de-link motor from the reduction gears, remove the over run clutch housing, inspect the over run clutch & bearings, oil seals, replace any spares required, re-fixing to normalcy.

ITEM- 7: SERVICING OF FLUID COUPLING/ AIR MOTOR /LUBRICATOR

- a) Removal of fluid coupling /air motor /lubricators, dismantling & checking mechanical components, replace the damaged ones, put back to normalcy by filling oil into the fluid coupling /lubricator.

ITEM- 8: REPAIR OF SOOT BLOWER LINKAGE MECHANISM/REDUCTION GEAR/WORM GEAR

- a) Checking the linkage assy. Pins, reduction gear couplings, lubricating the reduction gear, worm gear, put back to normalcy.

ITEM- 9: ATTENDING THE JAMMING OF SWIVEL JOINT/D-HEAD VALVE

- a) Attending the steam leakage by replacing gasket.

- b) Attending repair of D – Head valve which includes replacement of diaphragm and arrest of leakage etc.
- c) Repair / replacement of swivel joint.

ITEM- 9.1 SERVICING OF D – HEAD VALVE

- a) Dismantling of the D-head valve.
- b) Replacement of spiral gaskets, diaphragm and repair of the stem.
- c) Assemble the valve and check for trouble free operation.

ITEM- 10: REPLACEMENT OF SWIVEL JOINT VALVE

- a) Remove the damaged swivel joint valve.
- b) Replace it by new one.
- c) Check for any leakage during soot blowing.

ITEM- 11: RENEWAL OF KAOWOOL: -

- a) Cleaning of the guide bearing area.
- b) Loosening the bolts and removal of old kaowool.
- c) Renewal of kaowool & tightening the cover plates.
- d) Check for any leakage and rectify.

ITEM- 12: ALIGNMENT OF MOTOR TO MAIN REDUCER

- a) Align the motor with main reducer as per instruction of E-I-C.

SCOPE OF WORK MILL & FEEDER

1. FABRICATION, REMOVAL & WELDING OF DAMAGED SCREW CONVEYOR RIBBONS, CHAIN LINKS, STIFFNER PLATES OF MILL DURING REPAIR /OVERHAUL

- a) Open mill shell, PA duct and screw conveyor manholes.
- b) Remove the old worn out/broken ribbon with chains.
- c) Fabrication of screw conveyor ribbon to required size, align new ribbon and weld with existing helix with a back of plate.
- d) Fabricate required size chains from EN8 rod and weld chain links with hot air tube.
- e) The above work includes opening & closing of required manhole doors and extra payment will not be done for manhole doors opening and closing.
- f) Raw material like ribbon plate, rod for chain fabrication and special electrodes shall be provided by OPGC.

NB-Rate shall be quoted on Mill basis.

2. REPLACEMENT OF ENTIRE SCREW ASSEMBLY (ONE SIDE OF MILL)

- a) Removal of the bearing and bearing housing of the screw conveyor.
- b) Removal of the hot air duct by gas cutting.
- c) All fastenings of the screw conveyor with mill shell i.e. drive bars are to be removed by gas cutting.
- d) Withdrawal of the existing damaged screw conveyor.
- e) Inserting the new /repaired screw conveyor.
- f) Align hot air tube and fix drive bars.
- g) Mount new/old bearing in screw conveyor.
- h) Maintain the clearances after final alignment as per instruction of E-I-C.
- i) Weld the drive bars and nut.
- j) Box up the manholes.

3. REPAIR OF SPARE SCREW CONVEYOR OUTSIDE MILL

- a) Removal of old/damaged ribbon/chain link /worn out liner plate/angle etc.
- b) Hard facing of the screw conveyor joint and refitting of new angles.
- c) New helix shall be refitted and chains to be fabricated and refitted.
- d) Angles shall be welded at suitable distance.
- e) Arc welding shall fill any wear and tear in the hot air tube. Grinding shall be done to achieve good finishing.

NB;- OPGC shall supply readymade ribbons. However, chains are to be fabricated from EN8 rod supplied by OPGC.

4. INSPECTION OF MILL INTERNALS AND PREVENTIVE MAINTENANC

- a) Open mill shell & PA duct manholes.
- b) Arrange for access & lighting arrangement (24 V AC) to inside of mill.
- c) Carry out preventive patch welding of ribbons, weld deposit in eroded chains, checking drive bars rods & shields, trunion liners as per the direction of E-I-C.
- d) Box up manholes.

Rate shall be quoted per mill.

5. OPENING OF MAN HOLE DOOR

- a) Open the manhole door as directed by the engineer in charge.
- b) Close the manhole doors after completion of job/inspection etc by putting proper rope/gasket as may be the case. Contractor will quote rate per manhole basis.

5.1 SHELL MAN HOLE DOOR:-

5.2 SIDE MAN HOLE DOORS IN HOT AIR BOX & DUCT

6. REPLACEMENT OF CERAMIC PACKING ROPE FOR PC OUTLET PIPE BEFORE CLASSIFIER FEED ASSY. & REFUSAL DUCT CLASSIFIER EXPANSION JOINT

- a) Loosen the fasteners of non-metallic bellows erected in feed pipe and PF duct.
- b) Loose the bolts and insert new ceramic rope (supplied by OPGC).
- c) Tight sufficient to arrest coal leakage.
- d) Finally put the non-metallic bellows and tighten all the bolts.
- e) Check for any leakage after running of the mill.

6.1 PC OUTLET PIPE BEFORE CLASSIFIER FEED ASSY.

6.2 REFUSAL DUCT CLASSIFIER EXPANSION JOINT.

6.3 P.C. OUTLET GATES FLANGE JOINTS

6.4 FEED PIPE FEEDER O/L EXPANSION JOINT

7. INSPECTION & TIGHTENING OF LINER/ANCHOR/SHELL/ TRUNION BOLTS ETC.:-

- a) Inspection & tightening of mill liner bolts, anchor bolts, hot air box bolts, trunion bolts, girth gear bolts & shell bolts during AOH.
- b) Required nuts & bolts will be provided by OPGC. Contractor will be paid as per no of bolts tightened/replaced by them.
- c) Rates to be quoted accordingly. All types of nuts & bolts are treated as same in this scope e.g 8.8 to 10.9 class M24,M36 etc.

Rates are to be quoted per bolt as well as entire mill.

Total number of bolts in one mill is approx.1200.

7.1 Rate to be quoted per bolt tightening in mill

7.2 Rate to be quoted for entire bolts in mill.

8. BALL CHARGING AFTER BALL SEGREGATION

- a) Shell shall be rotated to suitable position for easy removal of shell manhole.
- b) Opening of the shell manhole.
- c) Mounting of Ball Feeding funnel to manhole.

- d) Ceiling of Ball drum and charging of balls (**Total quantity maximum 80Ton**).
- e) Closing the shell manhole door & normalization.
- f) Empty drums to be shifted to its position as directed by EIC.

8.1 PER MILL

9. SHELL LINER REPLACEMENT

- a) Shell to be rotated to suitable position for easy removal of shell liners.
- b) Opening of the shell doors as required for the work.
- c) Loosening the liner bolts & removal of old liners.
- d) Liners to be replaced with new ones & to be bolted new bolts/nuts/washers as per instruction of E-I-C.
- e) Torque tightening as per instruction of the E-I-C.
- f) Sound hood structure is to be reassembled, man hole doors to be closed.
- g) Rechecking of tightness of the liner bolts after mill is rotated for 7 to 8 hours.

NB- Total number liners are 560 approximately in BBD4760 mill.

9.1 PER LINER

9.2 FOR ENTIRE LINERS

10. BALL CHARGING

- a) Shift the ball drums from stacking area to the ball filling area of the mill.
- b) Make suitable safe lifting arrangements for lifting the ball drums to the ball-feeding funnel. Arrange for manual/motorized winch incase overhead hoist is not operative.
- c) Lift the ball drums to the ball feeding funnel and fill the funnel by opening the drum.
- d) Operate the ball feeding sequence and charge the balls in to the mill. Operate the gates manually in case the sequence is not operative.
- e) Lower down the empty drums to 'O' M and shift them to stacking area as per the direction of E-I-C.

NB-Contractor shall quote rate on tonnage basis.

11. INSPECTION & SERVICING OF MAIN REDUCER TO DRIVING SHAFT_COUPLING

- a) Open the coupling guard.
- b) Open the coupling by opening coupling bolts & back plate bolts.
- c) Entire grease to be taken out.
- d) Coupling hub outer is to be taken out along with the oil seals & 'O' rings.
- e) Inspection of the gear teeth & checking of coupling gap.
- f) Reassembly of the whole thing after completion of the work. There should not be any grease leakage after trial run. In case of leakage, contractor has to do the job free of cost. spares will be provided by OPGC.

12. INSPECTION & SERVICING OF OTHER DRIVE COUPLINGS

12.1 AUX. REDUCER TO MAIN MOTOR

- a) Contractor has to open the coupling guard
- b) Open the coupling after opening the necessary coupling bolts.
- c) Entire grease is to be taken out
- d) Inspect the Coupling and replace any oil seals & 'O' rings if required.
- e) Assembly the coupling.

12.2 MAIN MOTOR TO MAIN REDUCER

- a) Contractor has to open the coupling guard
- b) Open the coupling after opening the necessary coupling bolts.
- c) Entire grease is to be taken out.
- d) Coupling outer hub is to be taken out along with the oil seals & 'O' rings.
- e) Flexible springs shall be cleaned properly.
- f) Inspect the coupling and box up.

- g) Inject new grease.

12.3 AUX. MOTOR TO AUX. REDUCER (FLUID COUPLING)

- a) Contractor has to open the coupling guard
- b) Open the coupling after checking the seals & oil level
- c) Check the alignment, replace the fusible plugs.

12.4 AUX. MOTOR TO AUX. REDUCER (PIN BUSH COUPLING)

- a) Open the coupling and inspect the pins and bushes.
- b) Replace the damaged pins and bushes.
- c) Box up the coupling.

13. SERVICING OF AUX. REDUCER

- a) Drain oil from reducer and remove top half after removing sound hood panels.
- b) Clean the bottom of gearbox and the spray nozzles.
- c) Inspect the condition of gears and bearings.
- d) Put the top half of the gearbox.
- e) Fill the old/new oil in the main reducer
- f) Run the lube oil pump and check the flow pattern to bearings.

14. SERVICING OF MAIN REDUCER

- a) Drain oil from reducer and remove top half.
- b) Clean the bottom of gearbox.
- c) Inspect the condition of gears, seals and bearings.
- d) Clean the oil spray nozzles.
- e) Put the top half of the gearbox.
- f) Fill the old/new oil in the main reducer.
- g) Run the lube oil pump and check the oil flow to the bearings.

15. SERVICING OF MAIN REDUCER LUB OIL PUMPS / REPLACEMENT OF COUPLING

- a) Dismantling of the LOP from the pump motor assembly.
- b) Dismantling & servicing of the pump with the new seals & bearings.
- c) Assembly of the pump to the lube oil system.
- d) Replacement of damaged coupling.
- e) Trial run & checking for oil leaks.

16. CLEANING/REPLACEMENT OF OIL FILTERS/STRAINERS (MAIN& MAIN REDUCER)

- a) Isolation of the filter by closing the valve.
- b) Open the vent of filter housing to depressurize.
- c) Open top cover of filter housing and remove filter.
- d) Clean the filter with air and diesel.
- e) Install new/old filter and tighten housing bolts as per instruction of E-I-C..
- f) Open equalizing valve and fill the filter with oil.
- g) Check the improvement in after filter pressure.

17. SERVICING OF GIRTH GEAR & DRIVE PINION

- a) Clean the teeth of girth gear & drive pinion from grease with diesel.
- b) Rotate the mill in inching mode and check backlash & blue contact.
- c) Record the readings at various locations as per direction of E-I-C.
- d) Clean the blue from the gear and pinion.
- e) Final box up.

18. SERVICING OF THE GIRTH GEAR GREASE PUMP

- a) Decouple the pump from the motor.
- b) Remove the pump from the barrel.
- c) Open the pump, clean the internal gears & inspect the seals/bearings for any damage.
- d) Inspect the shaft bearings & adjust the stroke if required.
- e) Couple the motor with pump and run the pump.
- f) Box up.

19. CLEANING OF MAIN LUBE OIL COOLER (PLATE HEAT EXCHANGER)

- a) Isolate PHE from water and oil side.
- b) Dismantle the cooler from piping and base frame.
- c) Draining the oil from the cooler.
- d) Removal of plates of PHE with proper care not to damage the gaskets and cleaning of the debris from the plates and refitting of the same with new/old Gaskets supplied by OPGC.
- e] Reconnecting the pipelines, replacing old or damaged gaskets.

19.1 CLEANING OF MAIN LUBE OIL COOLER (WITHOUT HYDRO TEST)

20. CLEANING OF MAIN REDUCER (PLATE HEAT EXCHANGER)

- a) Isolate PHE from water and oil side.
- b) Dismantle the cooler from piping and base frame.
- c) Draining the oil from the cooler.
- d) Removal of plates of PHE with proper care not to damage the gaskets and cleaning of the debris from the plates and refitting of the same with new/old gaskets supplied by OPGC.
- e) Reconnecting the pipelines, replacing old or damaged gaskets.

20.1 CLEANING OF MAIN REDUCER LUB OIL COOLER (WITHOUT HYDRO TEST)

21. FABRICATION, REMOVAL & WELDING OF DAMAGED CONVEYOR BODY LINERS

- a) Open screw and main PA duct manholes.
- b) Identify the eroded portion of screw conveyor/trunion liner.
- c) Fill up, if necessary by providing plates and hard face as per instruction of E-I-C.
- d) Box up manholes.

NB:-Hard facing electrodes and plates shall be supplied by OPGC.

22. BALL FEEDING GATE SERVICING

- a) Removal of actuator from gate shaft, dismantling of gate after taking out all flange bolts.
- b) Gate blade to be separated by removing all bolts from top & bottom cover.
- c) Cleaning of blades, all Vee grooves by diesel & compressed air .
- d) Damaged seals & gaskets to be replaced by new ones, shaft threaded area to be cleaned & greased.
- e) Assembling & operation checking by manually /through actuator.

23. ALIGNMENT OF AUX. REDUCER TO MAIN MOTOR

- a) Dismantle the coupling.
- b) Alignment to be checked by proper mounting of dial gauges through suitable fixtures.
- c) Any deviation found to be corrected by suitable addition / deletion of shims.

24. ALIGNMENT MAIN MOTOR TO MAIN REDUCER.

- a) Dismantle the coupling.

- b) Alignment to be checked by proper mounting of dial gauges through suitable fixtures.
- c) Any deviation found to be corrected by suitable addition / deletion of shims.

25. ALIGNMENT OF MAIN REDUCER TO PINION SHAFT

- a) Dismantle the coupling.
- b) Alignment to be checked by proper mounting of dial gauges through suitable fixtures.
- c) Any deviation found to be corrected by suitable addition / deletion of shims.

26. MILL SHELL LEVEL INSPECTION

- a) Cleaning top half of trunion on both sides of the shell.
 - b) Marking the centerline on trunion top on both sides.
 - c) Shell level to be checked by using dial gauge & running B&S and HP Pump.
- Contractor shall quote rate per mill.

27. SEAL AIR FAN:-

27.1 SEAL AIR FAN COUPLING REPLACEMENT /ALIGNMENT

- a) Coupling to be opened & motor to be shifted for easy removal of coupling.
- b) New coupling to be placed after heating in oil up to 60-70 deg C.
- c) If it is gear coupling, then it should be greased properly after checking the alignment of motor with fan.

27.2 DECOUPLING & ALIGNMENT SEAL AIR FAN

- a) Decouple the motor and fan.
 - b) Remove the coupling in motor only.
 - c) Fit the old/new coupling with old/new motor.
 - d) Align the motor with the fan.
- (This is the requirement when motor is to be dismantled for rewinding or motor Bearing replacement etc. & reassembly.)

27.3 REPLACEMENT OF SEAL AIR FAN BEARING.

- a) Decouple motor and fan. Lift and shift motor to facilitate shaft removal.
- b) Remove coupling hub. Remove suction filters, suction cone and silencer piping to provide access to impeller.
- c) Dismantle impeller from hub.
- d) Remove bearings on the shaft.
- e) Dismantle hub from shaft.
- f) Replace/rectify shaft/impeller.
- g) Box up shaft and install new bearings
- h) Install coupling hub. Connect suction piping.
- i) Lift and install motor and check alignment with respect to fan.
- j) Couple motor and assist in taking trial run and vibration measurement.

27.4 SERVICING OF SEAL AIR FAN AUTO DAMPER

- a) Remove the cover plate of the damper and inspect the damper internals for Wear/clearances in full shut position.
- b) Rectify the same and check damper freeness.
- c) Box up the damper.

27.5 SERVICING OF THE SEAL AIR FAN FILTER

- a) Remove seal air fan primary and secondary filters.
- b) Clean them by air till they are free of dirt.
- c) Replace any defective filter.
- d) Box up the filter housing.

27.6 REPLACEMENT OF SEAL AIR GASKETS

- a) Gasket backup plates to be removed & damaged gaskets to be replaced with new ones.
- b) Place the back up plate on the gasket.
- c) Tighten all the bolts and ensure no overloading of seal air fan.

27.7 SEAL AIR FAN SUCTION DAMPER SERVICING.

- a) Opening of the intermediate piece to the damper for access to the damper.
- b) Free the damper mechanically by repeatedly operating it manually.

c) Replace gland packing and gaskets and box up the intermediate piece.

28. SERVICING OF GIRTH GEAR SEAL AIR FAN FILTER.

- a) Filter element is to be cleaned by compressed air.
- b) Clean the seal air fan discharge piping of any dust.
- c) In case of damaged filter same is to be replaced by new ones
- d) Fix the filter and tighten the foundation bolts.

29. GG SEAL AIR FAN DECOUPLING & MOTOR REASSEMBLY

- a) Remove the fan impeller from motor.
- b) Install the impeller on the new/old motor.
- c) Box up the fan.

30. SUPPORT BEARING:-

30.1 REPLACEMENT OF OIL HOSES IN SUPPORT BEARING

- a. Open inspection door on support bearing housing.
- b. Remove the old worn out hoses.
- c. Replace them with new hoses.
- d. Run pumps to detect any leakage.
- e. Box up the inspection door.

30.2 MAIN LUB OIL UNIT TANK SERVICING.

- a) Drain and empty main tank by collecting oil in barrels.
- b) Open inspection doors and clean the tank internals thoroughly.
- c) Inspect the internals for any crack or rusting and take suitable preventive measure including welding/painting as per direction of E-I-C.
- d) Close inspection doors and fill oil in to tank till the desired oil level is achieved.
- e) Clean the work area and shift old oil barrels to store.

30.3 MAIN BEARING LUBE OIL PUMP SERVICING (HP, B & S, LP)

- a) Decouple the pump from motor after shifting the motor.
- b) Disconnect the pump from suction and discharge side.
- c) Replace the coupling if required.
- d) Dismantle the pump and check internals.
- e) Replace defective oil seals/ gears/pistons/bearings/screw etc.
- f) Box up the pump and trial run to be made up to the satisfaction E-I-C.

30.4 SUPPORT BEARING LINER REPLACEMENT

- a) Open support bearing access door and housing bolts.
- b) Remove the oil line flexible hoses, thermocouples and spray Connections.
- c) Remove the top half of bearing housing by chain pulley block.
- d) Lift the mill body with the help of lifting cradles and hydraulic jacks as directed by E-I-C.
- e) Remove the bearing lining, lift and place it in a clean area for inspection.
- f) Shift new bearing lining from store.
- g) Install the bearing.
- h) Inspect and clean trunion ball and socket joints.
- i) Lower hydraulic jacks and mill cradles to rest mill body on bearing.
- k) Box up the bearing.

SERVICING OF MAIN LUBE OIL UNIT RECIRCULATION /HP LINE SUCTION VALVE

- a) Contractor has to open the valve & service the same.
- b) Spring tension to be adjusted, if required.
- c) Box up the valve.

30.6 SUPPORT BEARING OIL NOZZLE CLEANING / REPAIR

- a) Open the access door.
- b) Clean the nozzles after removing from the place.

- c) Repair/replace the nozzles if required.
- d) Check the oil flow after running the pump.
- e) Box up the access doors.

Rate shall be quoted per mill basis.

31. MILL SHELL

31.1 TRUNNION SEAL REPLACEMENT

- a) Loosen and remove felt holding plate bolts.
- b) Remove holding plates.
- c) Remove old worn out felt.
- d) Install new felt seal throughout the trunion after heating with oil.
- e) Fix metallic plates above felt and tighten bolts. Replace the defective bolts if required.
- f) In case of damaged aluminum oil deflector, the same is to be replaced with new ones by removing the support bearing top cover.
- g) Check for leakage while mill is service and uniformly tighten all bolts.

31.2 GIRTH GEAR HOUSING SEAL REPLACEMENT

- a) Loosen all bolts of seal around the housing.
- b) Remove the existing seal and clean the surface.
- c) Prepare and fix new seal in position.
- d) Replace defective holding studs.
- e) Tighten seal holding bolts.
- f) Check for any leakage while mill is running and rectify it by tightening bolts uniformly.

31.3 SEAL BOX INSPECTION AND CLEANING

- a) Open seal air box manhole.
- b) Clean seal box for accumulated coal dust.
- c) Inspect the internals for any erosion and facilitate access for delta-P line chocking removal.
- d) Box up the manholes after clearance from E-I-C.

31.4 TRUNION LINER AND DP TUBE REPLACEMENT (ONE SIDE OF MILL)

- a) Open mill shell, screw conveyor and main PA duct manholes.
- b) Cut the main PA duct for removal of the liner.
- c) Remove screw conveyor.
- d) Cut and remove the worn out trunion liner & DP tubes along with guard and nozzle.
- e) Place the DP tubes on base plate and fix them in position by tack welding & coupling with pipe in the seal box. Install nozzles and guard. Charge the lines and check for any leakages.
- f) Place the trunion liner plate and fix them in position by welding.
- g) Restore the cut PA duct portion.
- h) Box up all manholes.

32. DRIVE BAR REPLACEMENT

- a) Opening of manholes.
- b) Support hot air tube by temporary supports.
- c) Broken drive bar pieces are to be cut & removed after removal of coal from conveyor body.
- d) New drive bars are to be put & properly aligned
- e) Drive bars nuts are to be welded after alignment.
- f) Weld nut protection guard on tie rods.
- g) Remove temporary supports and box up manholes.

33. UNDER SIZE (<20MM) BALL SEGREGATION FROM MILL SHELL

- a) Opening the shell / man hole doors .
- b) Unloading of the ball from the mill.
- c) Under size (i.e. Below 30 mm) to be segregated(Either by segregation grill or ball segregation machine) & put into separate drums .
- d) Ball drums are to be placed at suitable location as directed by the E-I-C.

NB:- 1) Billing shall be made on Tonnage basis for undersize balls segregated From mill.

34. RAW COAL FEEDERS

34.1 DRIVING PULLEY/ TAKE-UP PULLEY BEARINGS AND SEAL REPLACEMENT

- a) Open feeder end doors and side doors.
- b) Open bearing end cover and remove bearings using suitable pullers.
- c) New bearings supplied by department will be mounted after thorough cleaning of bearing shaft.
- d) Checking of belt tracking.
- e) Box up the feeder.

34.2 INLET SPAN ROLLERS, TENSION ROLL & WEIGH ROLL BEARINGS AND SEAL REPLACEMENT

- a) Damaged bearing to be replaced with proper care using suitable pullers.
- b) New bearings supplied by OPGC will be mounted after thorough cleaning of bearing shaft.

34.3 FEEDER DOOR OPENING & CLOSING

- a) Contractor has to open the doors properly without damaging bolts, rubber gaskets & other fixtures.
- b) Refit the same as directed by E-I-C.

34.4 ENDLESS BELT REPLACEMENT.

- a) Inlet & outlet gates must be closed
- b) Remove both the end doors & side doors with care.
- c) Insert blocking below tension roller arm for support.
- d) Disconnect the grease hoses & the load shell etc.
- e) Remove the weighing roller & calibration weights.
- f) Insert pulley removal tool if required below the tension roller
- g) Remove the tension roller.
- h) Remove weigh span roller from any side
- i) Remove inlet span rollers bearing retainer plates from one side & remove rollers one by one from the opposite side
- j) Remove drive pulley & bearing cover .
- k) Take out the main drive shaft along with primary & secondary gearbox.
- l) Remove inlet skirt.
- m) Replacement of damaged bearing
- n) Insertion of new belt & reassembly.
- o) Box up the feeder after completion of above jobs.
- p) Run the feeder and ensure belt tracking.

34.5 LOAD CELL REPLACEMENT

- a) Open the side doors after disconnecting the hardware
- b) To take out the load cells & replace the same with the new ones.
- c) Closing the side doors.

34.6 SERVICING OF CLEANOUT CONVEYOR

- a) Opening the feeder doors after ensuring the closing of feeder inlet & outlet gates
- b) Opening the gear box for inspection & servicing including replacement of bearing & oil seals
- c) Chain tension adjustment /replacement with new chain links.
- d) Oil replacement.
- e) Box up after completion of the above jobs.

34.7 SHEAR PIN REPLACEMENT

- a) To open the end cover of the clean out conveyor
- b) Remove the broken shear pin after unlocking from the bevel gear arrangement
- c) To put back new shear pin & coupling (if found damaged).

34.8 MAIN DRIVE UNIT SERVICING

- a) Remove feeder end doors.

- b) Remove feeder drive shaft from gearbox.
- c) Inspect internals and replace shafts, bearings and oil seals.
- d) Box up gearbox and couple with motor.

34.9 INLET SIDE SKIRT & END PLATES, COAL ON BELT PADDLE SWITCH, DISCHARGE PLUG

- a) Renewal /repair/servicing as per the direction of the engineer-in -charge including opening /closing of the manhole doors.

34.10 FEEDER BELT TRACKING.

- a) Opening of Feeder doors
- b) Tracking and leveling of the belt
- c) Box up.

34.11 SERVICING OF EDDY CURRENT CLUTCH ASSY.

- a) Opening the motor & clutch assy.
- b) Servicing along with replacement of defective spares & bearings etc.
- c) Box up the clutch assy.

34.12 SERVICING OF FEEDER CHAIN GATE

- a) Remove the gate flap after removing the cover.
- b) Check the clad roller bearings and replace if required.
- c) Check the condition of the pinion.
- d) Recondition the hole on the flap for pinion meshing. By welding and grinding.
- e) Box up the gate.
- f) Check for free operation.

34.13 COAL REMOVAL IN CASE OF FEEDER CHOKING

- a) Open feeder manholes and empty coal from top and bottom trough.
- b) Inspect and remove any foreign materials stuck up between body and belts.
- c) Run the feeder and carry out tracking if necessary.
- d) Close the doors.

35. FEEDER OUTLET GATE: -

35.1 SERVICING OF THE FEEDER OUTLET GATE

- a) Remove feeder outlet gate holding studs.
- b) Decouple gate from power cylinder and remove gate assy.
- c) Open the gates and inspect all the parts.
- d) Copper cleaning bars have to be taken out, polished & put back. Springs are to be checked & proper compression to be applied.
- e) Assembly all the parts of the gate.
- f) Provide gaskets in the mating parts.
- g) Install the gates in the place and couple the power cylinder.
- h) Check freeness of the gate.

36. CLASSIFIER OUTLET GATE

36.1 SERVICING/SPINDLE REPLACEMENT:-

- a) Open P.C gate inspection door, top and bottom covers.
- b) Clean the guide rods.
- c) Check guide rods, guide bushes, scraper plates, gate guides and gate body for any damage and rectify/replace the same.
- d) Operate the gate manually and check freeness.
- e) Box up gate.

36.2 REPLACEMENT OF P.C. GATES

- a) Remove seal air connection to gate.
- b) De link the gate from actuator.
- c) Loosen the bolts of the gates for removal.

- d) Erect new gates in position after putting new gaskets/ropes.
- e) Tighten all the gate bolts.
- f) Couple actuator to gate body and operate to check freeness.
- g) Connect seal air piping and box up.

37. CLASSIFIER:-

37.1 CLASSIFIER CLEANING

- a. Open the classifier manholes (Top and sides).
- b. Clean all the vanes from foreign materials.
- c. Clean all the foreign materials from the cone portion.
- d. Box up all manholes.

37.2 CLASSIFIER & MILL TO CLASSIFIER CHUTE DAMAGED LINER REPLACEMENT.

- a) Open the classifier manholes.
- b) Make temporary arrangements to access all parts of mill to classifier chute.
- c) Remove the damaged liners and put new liners supplied by OPGC.
- d) Remove temporary platforms and debris.

37.3 SERVICING OF CLASSIFIER VANES AND ADJUSTMENT

- a) Open classifier manholes.
- b) Inspect the condition of vanes and bushings.
- c) Clean the bushing area thoroughly.
- d) Inspect the handle and lock nut.
- e) Operate the vanes and ensure freeness.
- f) Adjust the vanes position as per direction of E-I-C.
- g) Box up manholes.

37.4 CLACK BOX SERVICING

- a) Check the reject flap and rectify if any damage is found in the rubber flap.
- b) Clack box chocking, if found, to be cleared.
- c) Box up the manhole.

38. CHOKING REMOVAL IN DELTA-P LINE

- a) Open delta-P line near support bearing.
- b) Flush the line with service air.
- c) Poke the line with metallic wire in case of any chocking.
- d) Flush again with service air till chocking is cleared.
- e) Box up the piping.

39. SCREW CONVEYOR BEARING SERVICING/REPLACEMENT

- a) Support screw conveyor shaft by temporary means.
- b) Remove Plummer block holding nuts and end plate.
- c) Remove screw conveyor bearing sleeve lock nut and remove bearing.
- d) Install new/old bearing in new/old Plummer block.
- e) Insert bearing on the shaft and tighten the lock nut.
- f) Align Plummer block so that shaft sits at the center of stuffing box.
- g) Box up the Plummer block.

40. REPLACEMENT OF MAIN REDUCER BEARING/GEAR (INPUT/ INTERMEDIATE / OUTPUT SHAFT)

- a) Decouple main reducer from drive and driven side.
- b) Drain oil from the reducer and remove top half after removing sound hood panel.
- c) Remove the shaft with defect gear, bearings and oil seals.

- d) Remove the coupling if required.
- e) Install new bearings/gear with new/old shaft as per instruction of E-I-C.
- f) Box up the reducer.
- g) Align with respect to drive and driven ends and couple.
- h) Fill reducer with oil and run lubrication system to check oil supply to all bearings.

41. REPLACEMENT OF AUX. REDUCER BEARING/ GEAR (INPUT / INTERMEDIATE / OUTPUT SHAFT)

- a) Decouple aux. Reducer from drive and driven side.
- b) Drain oil from reducer and remove top half.
- c) Remove the shaft with defective gear/ bearings/oil seals.
- d) Replace the gear/bearing/seal as per the instruction of E-I-C.
- e) Box up the aux. reducer.
- f) Couple the reducer after alignment.

42. REMOVAL AND REFIXING OF COUPLING AND ALIGNMENT

42.1 AUX. REDUCER TO MAIN MOTOR

- a) Remove the coupling guard.
- b) Remove the defective coupling and install new coupling after oil bath heating.
- c) Couple after alignment.
- d) Apply grease and Box up.

42.2 MAIN MOTOR TO MAIN REDUCER

- a) Remove the coupling guard.
- b) Open the top cover of the main reducer.
- c) Remove the Input shaft with the coupling.
- d) Remove the defective coupling and install new coupling by oil bath heating.
- e) Couple after alignment.
- f) Apply grease and box up.

42.3 MAIN REDUCER TO PINION SHAFT

- a) Remove the coupling guard.
- b) Open the top cover of the gearbox.
- c) Remove the output shaft.
- d) Replace the coupling and box up the reducer.
- e) Couple after alignment.

43. REPLACEMENT OF PINION SHAFT/ BEARINGS:-

- a) Decouple main reducer and pinion shaft.
- b) If required, remove the output shaft from the main reducer for removal of the coupling half from pinion shaft.
- c) Remove the coupling from the pinion shaft and top half of the bearing housing.
- d) Lift the shaft and remove the defective sleeves and bearings.
- e) Check the clearance of bearings, replace if required.
- f) Check labyrinth seals.
- g) Replace with new bearings with sleeves.
- h) Mount the coupling and box up.
- i) If required, the pinion shaft shall be shifted to '0' mtr. for replacement of the bearings.
- j) Align and couple the pinion shaft with main reducer.

44. AUX.REDUCER FREE WHEEL:-

44.1 FREEWHEEL OIL REPLACEMENT

- a) Check the oil and replace if required.

44.2 FREEWHEEL BEARING REPLACEMENT

- a) Removal of freewheels assy.
- b) Removal of coupling, sleeve , bearings etc.
- c) Replacement of damaged bearing.

d) Box up.

45. GREASE PANEL SERVICING.

- a. Remove the distributor with its associated piping and filter.
- b. Clean the distributor and filter.
- c. Check the distributor hoses for damage and if necessary replace them.
- d. Remove the nozzles in grease panel and clean thoroughly by diesel/air.
- e. Box up the unit.
- f. Run the grease pump and check the grease flow uniformly.

46. GREASE BARREL CHANGING.

- a) Cutting of grease drums & transferring the grease pump assy.
- b) Topping up of the left out grease into the new drum.
- c) Disposal of the grease drums at suitable location as directed by the E-I-C.

47. MILL / FEEDER GREASING.

47.1 MILL GREASING (RATE IS TO BE QUOTED PER MILL)

- a) Greasing of screw conveyer bearing, pinion shaft bearing & gearbox as per instruction of E-I-C.
- b) Greasing of all the couplings including seal air fan coupling.

47.2 FEEDER GREASING (RATE SHALL BE QUOTED PER FEEDER)

- a) Greasing of all bearings & pulleys of feeders as per Instruction of E-I-C.

48. GREASE/OIL/BALL DRUM SHIFTING

- a) Waste filled grease, oil and ball drums shall be shifted after making proper lifting Arrangement in barrels by cutting/welding.
- b) Transport the barrels to warehouse in vehicle provided by OPGC.

NB: Rate to be quoted per drum basis

49. REPLACEMENT OF MILL DAMPERS

- a) The old damper is to be removed by gas cutting from duct and new damper shall be welded after necessary alignment.
- h) The damper operation shall be checked with power cylinder after proper welding. Required electrode shall be provided by OPGC.

Rate shall be quoted on the basis of replacing one damper.

49.1 Primary Air Damper (Size: 870mmx2310mm)

49.2 Bypass Air damper (Size: 860mmx860mm)

49.3 Mix Box Damper (Size:860mmx860mm)

50. SERVICING OF DAMPERS:

The scope of the work as follows:

- d) The contractor has to completely disassemble the bearing holder, follower plate, bearing, gland and gland packing of the affected flaps. If required the stub shaft, slave shaft, drive shaft and drive lever are also to be removed after making suitable arrangements.
- e) Repair the worn out shafts and levers by welding deposits and subsequent grinding and machining. The electrodes for this purpose shall be supplied free of cost.
- f) Any damage to any other components are also to be suitable repaired as per instruction of the Engineer-in-charge. If required any damper flap, shaft etc. are to be replaced. Any welding, cutting, scaffolding shall be in the scope of the contractor. Checking of damper freeness in open and close position with manual/motor/pneumatic device.

Note:- The size of the dampers are given below and the contractor has to quote accordingly.

50.1 BAD/CAD/MIXBOX DAMPER/PURGE AIR DAMPERS (Size: 860mmx860mm)

50.2 HAD/PAD (Size: 1727mmx1829mm, 870mmx2310mm)

51. REPLACEMENT WITH BALL VALVES

The existing valves shall be removed by gas cutting from oil and water lines and new ball valves shall be welded in the same location. Any extra pipe required shall also be welded for proper fitment. The ball valve sizes are 1/2 inch , 1 inch & 2 inch. Rate shall be quoted per valve.

52. REPAIR OF DAMPERS:

The scope of the work as follows:

- a) The contractor has to completely disassemble the bearing holder, follower Plate, bearing, gland and gland packing of the affected flaps. If required the stub shaft, slave shaft, drive shaft and drive lever are also to be removed after making suitable arrangements.
- b) Repair the worn out shafts and levers by welding deposits and subsequent grinding and machining. The electrodes for this purpose shall be supplied free of cost.
- c) Any damage to any other components are also to be suitable repaired as per instruction of the Engineer-in-charge. If required any damper flap, shaft etc. are to be replaced. Any welding, cutting, scaffolding shall be in the scope of the contractor. Checking of damper freeness in open and close position with manual/motor/pneumatic device.

Note:- The size of the dampers are given below and the contractor has to quote accordingly.

52.1. BAD/CAD/MIXBOX DAMPER/PURGE AIR DAMPERS (Size: 860mmx860mm)

52.2. HAD/PAD (Size: 1727mmx1829mm, 870mmx2310mm)

TURBINE & AUXILIARIES

1. INSPECTION OF TURBINE/ GENERATOR BEARINGS: -

The contractor has to ensure PTW from the Engineer in charge and then open the pedestal covers after removal of the turbine bearing fire fighting pipes and accessories. The contractor has to remove of the C & I instruments like vibration pick ups, differential pick ups etc. before lifting the top cover of the pedestal .The he has to take the critical dimensions as per the instruction of the Engineer in charge. Transport the shaft lifting devices from a place in the plant to the work site and use them properly and safely and transport them to the site store from which it was issued after completion of the work. Remove the top and bottom half bearings after removal of the temperature sensors and the jacking oil hoses. DP test and ultrasonic test of the bearings are to be done. Record the critical dimensions of the bearings. Then check the side pads clearances and the yoke key clearances .If necessary suitable modifications are to be carried out to maintain proper clearances. Maintain proper clearances between the shaft and the oil guard ring before final box up. A coupled run out of the rotor system is to be taken keeping all the bottom half bearings in position. Check the jacking oil hoses and replace if necessary. Clean the bearing pedestals and install the C and I instruments and check that there is no leakage from the jacking oil hoses and lift of the rotor. Normalize the fire fighting lines. Box up the pedestals. Oil flushing is to be done by the contractor till satisfactory result in the duplex filter comes. Adjust the oil throttles to the turbine bearings, adjust the lift of the rotor and then put turbine on barring gear.

2. REPLACEMENT OF JACKING OIL HOSE: -

The contractor has to locate the defective jacking oil hose and then replace the hose as per the direction of the Engineer in charge either by lifting the pedestal cover or by opening the inspection hole of the pedestal.

3. HP / IP / LPBP STOP/ CONTROL VALVES, WATER INJECTION VALVES: -

[i] SERVICING OF SERVO MOTORS OF ANY VALVE: -

The contractor has to isolate the oil lines and remove the oil/water /steam pipelines. The contractor shall remove the gratings and structure that will obstruct the movement of EOT crane during removal of the servomotor. Decouple the servomotor from the valve. Then dismantle and service the servomotor as per the instruction of the Engineer in charge. Measure the critical dimensions and record .All the damaged parts are to be replaced by new one. Blue matching of the seats are to be done and assemble and connect the oil pipe lines and re-commission the servomotor.

(ii) REPLACEMENT OF "O RING " FOR ATTENDING OIL LEAKAGES FROM THE OUTER FLANGE OF CONTROL VALVES: -

The contractor has to isolate the control oil lines and then remove the oil pipes attached to the outer flange of the control valve. A gap is to be made between the outer flange and the servomotor so that the parting plane is visible. Then replace the O-ring and tighten the parting plane bolts. Connect the oil pipes and commission the valve.

(iii) SERVICING OF ANY VALVE: -

The contractor has to isolate the oil lines and remove the oil/water /steam pipelines. The contractor shall remove the gratings and structure that will obstruct the movement of EOT crane during removal of the servomotor and the valve. Decouple the servomotor from the valve. Then dismantle and service the servomotor and the valve as per the instruction of the Engineer in charge. Measure the critical dimensions and record .All the damaged parts are to be replaced by new one. Blue matching of the seats are to be done. Then DP test of the spindle and the valve seats are to be done and assemble, couple the valve with servomotor by maintaining the critical dimensions and connect the oil pipelines and commission the servomotor and the valve.

(iv) SERVICING OF PILOT VALVES OF LPBP, HPCV AND IPCV CONTROL VALVES

The contractor shall isolate and open all necessary pipelines. The pilot valves are to be removed and cleaned with petrol. Necessary lapping, polishing with oil stone as instructed by concerned Engineer shall be done. Box up with replacement of damaged parts and sealing as per requirement. Re-fixing of all pipelines. Any oil leakages observed in the equipment after servicing shall be redone free of cost by the contractor.

(v) **SERVICING OF THE DAMPING DEVICE: -**

The contractor has to isolate the oil lines and clean/service the damping device as per the direction of the EIC.

(vi) **ATTENDING OF THE GLAND LEAKAGES FROM STOP/CONTROL VALVES: -**

The contractor has to open the gland box after decoupling the valve from the servomotor. Then replace the glands to arrest the leakage. Couple the valve with the servomotor.

(vii) **COUPLING THE SERVOMOTOR WITH THE VALVE: -**

Couple the servomotor with the valve stem as per the requirement and then lock the coupling. Fix the instruments removed for the same purpose.

4. MAIN OIL TANK:-

(i) **CLEANING OF MAIN OIL TANK & REFILLING OF OIL: -**

Transfer of oil from MOT to Clean / dirty oil tank, proper cleaning of tank – inside and outside, cleaning of the MOT basket strainer along with gasket replacement if necessary, refilling of oil by running centrifuge & boxing up. The centrifuge bowl is to be cleaned thoroughly before and after oil filling. Inspection of the oil pump casings by DPT is to be done.

(ii) **REPLACEMENT OF GASKET OF THE BASKET STRAINER: -**

The contractor has to open the manhole of the MOT and remove the basket strainer and then replace the gasket of the basket strainer.

(iii) **MOT VAPOUR EXTRACTION FAN SERVICING: -**

Removal of back cover, removal of fan if required for electrical or mechanical work, assembly, replacement of gasket & boxing up.

(iv) **CLEANING OF THE MOT BASKET STRAINER: -**

The contractor has to open the manhole of the MOT and remove the basket strainer and then clean the strainer with diesel and high-pressure air. Box up the strainer and close the manhole.

5. AUX . OIL PUMP, EMERGENCY OIL PUMP, JACKING OIL PUMP: -

(i) **SERVICING OF ANY PUMP: -**

Lifting of motor, lifting of pump, servicing of the pump, replacement of defective components including bearing if required, reassembly.

(ii) **BEARING REPLACEMENT OF ANY PUMP: -**

Lifting of motor, lifting of pump, replacement of defective bearing, reassembly.

(iii) **REPLACEMENT OF GEAR COUPLING: -**

The gear coupling is to be replaced after lifting of the motor and proper alignment.

6. MAIN OIL COOLER:-

(i) **CLEANING OF MAIN OIL COOLER (WITH HYDRO TEST):-**

Removal of top cover & cleaning of the tubes by nylon brush / water jet. Hydro test of the tube bundle. Renewal of gasket & assembly. The water box is to be cleaned with wire brush and painted with black epoxy.

(ii) **CLEANING OF MAIN OIL COOLER TUBE BUNDLE (WITHOUT HYDRO TEST): -** All the jobs as above without hydro test are to be done..

(iii) **CLEANING OF THE MOT OIL COOLERS BY OPENING OF THE PEEP HOLES AT THE INLET AND OUTLET: -**

The peepholes are to be opened and the pebbles are to be removed .If required the flange gaskets are to be renewed to make a leak free joint.

7. THRUST BEARING FILTER:-

(i) CLEANING OF THRUST BEARING FILTER & BOX UP.

The contractor has to open the filter and clean the elements with diesel and markin cloth. Then blow with high-pressure air and box up after renewal of O-rings if necessary.

(ii) SERVICING OF 3 WAY VALVE (CHANGE OVER VALVE)

8. CENTRIFUGE: -

(i) BOWL CLEANING: -

Opening of the Bowl cover, cleaning of the bowl parts with diesel and box up.

(ii) SERVICING OF OIL PUMP: -

Decoupling of the pump, dismantling, servicing, reassembly, coupling, alignment of the pump & attending to the problem after trial run.

(iii) SERVICING OF BOOSTER PUMP: -

Decoupling of the pump, dismantling, servicing, reassembly, coupling, alignment of the pump & attending to the problem after trial run.

(iv) REPLACEMENT/SERVICING OF FRICTION PADS: -

Opening of the manholes of the centrifuge gearbox clutch pads and inspection of the same. Renew the friction pads/ full set as per the necessity and box up.

(v) REPLACEMENT/SERVICING OF BRAKE PAD: -

Inspection of the brake pad and renew if necessary.

(vi) SERVICING OF THE MAIN PUMP:-

Decoupling of the pump, dismantling, servicing, reassembly, coupling, alignment of the pump & attending to the problem after trial run.

(vii) SERVICING OF VIEWING GLASSES: -

The same is to be opened fully and cleaned. Then it is to be boxed up after renewing the gaskets.

(viii) REPLACEMENT OF GEAR BOX OIL:-

The oil is to be drained completely and it is to be cleaned. Then fresh oil is to be charged in the gearbox.

(ix) SERVICING OF THREE WAY CONTROL VALVE: -

Opening of the three-way control valve and servicing, renewal of worn out/ damaged parts and box up.

x) SERVICING/REPLACEMENT OF THE WORM GEAR: -

The contractor has to open the gearbox after draining oil from the gearbox and service/replace the damaged parts like bearings/shafts/gears etc. Box up the opened parts and fill the gear oil.

9. SERVICING OF BUTTERFLY VALVE: -

Servicing of butterfly valve in the vapour extraction line.

10. TOP UP OF TURBINE OIL: -

i) FILLING OF OIL: -

This includes shifting of new oil drums from the DFS (store) to the site to 10 metre floor and oil filling in MOT by running centrifuge .The contractor will be paid on per drum basis oil filled. Then shift the empty drums to the central store.

ii) SHIFTING OF WASTE OIL DRUM:-

Includes shifting of waste oil drums from different floors of turbine area and transfer the same to the central store.

- 11. SERVICING OF GLAND STEAM VAPOUR FAN: -**
Removal of back cover, removal of fan if required for electrical or mechanical work, assembly, replacement of gasket & boxing up.
- 12. SERVICING OF EMERGENCY SHUT OFF VALVE:-**
Bringing out the Emergency control valve from its position and complete servicing of the valve and replacement of its damaged/worn out parts.
- 13. SERVICING OF TEMPERATURE CONTROL VALVE: -**
Opening of the valve and inspection of the same. Replace the damaged/ worn out parts if necessary. Then box up and place the valve in its position after renewal of the end gaskets.
- 14. SERVICING OF FIRE PROTECTION VALVE (at 5 metre and 15 metre): -**
The contractor has to isolate the oil lines and open the fire protection valve as per the direction of the EIC. Then renew the defective parts, service it and box up. Reconnect the pipelines after renewal of the gaskets/ O-rings.
- 15. CRH NRV: -**
- i) **SERVICING OF CRH NRV:-**
The valve is to be opened fully and then lapping is to be done between the seat and flap. Replacement of the gasket if necessary. Box up, and couple with the servomotor.
 - ii) **SERVICING OF CRH NRV SERVOMOTOR:-**
The oil lines are to be isolated and the Servomotor is to be decoupled from the NRV by proper marking. Then service the servomotor and renew the defective parts and box up. Then couple this to the NRV and check the operation.
 - (iii) **GLAND PACKING REPLACEMENT: -**
The gland packing of the CRH NRV is to be renewed or tightened/ loosened to arrest steam leakage or adjust the opening and closing of the NRV.
 - (iv) **ATTENDING THE FLANGE LEAKAGE OF LEVEL SWITCH:-**
The contractor has to make scaffolding for carrying out the job and then open the flanges and renew the gaskets. Attend the leakages.
 - (v) **GLAND ADJUSTMENT: -**
The gland packing of the CRH NRV is to be tightened/ loosened to arrest steam leakage or adjust the opening and closing of the NRV.
- 16. SERVICING OF GOVERNING/LPBP RACK EQUIPMENTS: -**
- (i) **CLEANING OF THE PLATE TYPE FILTERS: -**
The contractor has to open the plate type filters from its position and then clean the filter by immersing it fully inside the petrol and then blowing high pressure air to the filter. If necessary fully dismantle the filter ,clean and then box up after renewal of the O ring.
 - (ii) **SERVICING OF TEST VALVE:-**
The contractor has to remove the test valve from its position after dismantling all the pipelines, which would hinder the removal of the test valve and then dismantle it. Renew the defective parts as per the direction of the EIC. Then box up and check the valve for its function.
 - (iii) **SERVICING OF ELECTROHYDRAULIC CONVERTER /HYDRAULIC GOVERNER:-**

The contractor has to dismantle the system as per the direction of the Engineer in Charge and find out the fault. Then replace the defective parts and reassembly is to be done. The contractor has to assist in setting the governing after repair.

(iv) **SERVICING OF ANY EQUIPMENTS:-**

The contractor will be paid same for any individual equipment serviced. The scope includes servicing of any equipment in the racks, dismantling, change of damaged parts and sealing. Any polishing required to be done as per advise of concerned engineer. Box up after all works. Attending any leakage free of cost after servicing.

17. SERVICING OF EXTRACTION NRV: -

i) **SERVICING OF EXTRACTION NRV VALVE: -**

The NRV is to be fully opened and serviced. The necessary oil lines are to be isolated and reconnected after completion of the work.

ii) **SERVICING OF EXTRACTION NRV SERVO MOTOR: -**

The NRV is to be fully opened and serviced. The necessary oil lines are to be isolated, removed and reconnected after completion of the work.

iii) **REPLACEMENT OF BONNET GASKET:-**

The contractor has to make suitable scaffolding to reach to the area, open the bonnet and replace the bonnet gasket as per the direction of the EIC.

iv) **ATTENDING THE GLAND LEAKAGE:-**

The contractor has to replace or tighten the glands to attend the gland leakage as per the direction of the EIC.

18. ATTENDING TO OIL LEAKAGE FROM TURBINE BEARING OIL GUARD:-

The leakage is to be arrested by adjusting the oil guard ring of the bearing pedestal either by tightening the bolts or by lifting the bearing pedestal top cover and adjusting the oil catcher.

19. REPLACEMENT OF LPT SAFETY DIAPHRAGM: -

Removal of the damaged safety diaphragm, Renewal of gasket (if required), replacement of new diaphragm, box up.

20. CONDENSER & HOT WELL, TUBE CLEANING & DEBRIS FILTER SYSTEM:-

(i) **HOT WELL CLEANING:-**

Preparation of plat form, opening of man hole doors, cleaning of hot well by wire brush, removal of debris, water flashing, renewal of gasket & boxing up.

(ii) **VACUUM TIGHTNESS TEST:-**

Making platform , jacking of condenser , Filling of hot well upto one meter above tube nest ,Attending the leaky tubes by plugging and attending various gland leakages and welding leakages found during the vacuum tightness test , draining the hot well , removal of jacking and closing of steam side man hole.

(iii) ATTENDING TO CONDENSER TUBE LEAKAGE:-

Making platform, opening of manhole doors of water box, jacking of condenser, filling of hot well, detecting defective tubes (this can also be done vacuum & flame method), draining the hot well, removal of jacking, boxing up.

(iv) SERVICING OF DEBRIS FILTER: -

The manholes are to be opened and then strainers are to be cleaned with wire brush and high-pressure water jet cleaning is to be done.

(v) SERVICING OF BALL CIRCULATION PUMP:-

Decoupling of the pump, replacement of damaged parts, servicing, boxing up, alignment, coupling.

(vi) ATTENDING TO GLAND LEAKAGE:-

Replacement of damaged gland packing with new ones

(vii) RENEWAL OF THE PUMP COUPLING:-

Opening of damaged coupling/coupling pads, alignment and box up.

(viii) SERVICING OF PUMP: -

Decoupling of the pump, servicing, replacement of damaged parts, boxing up, alignment, coupling.

(ix) SERVICING OF DP LINE FLUSHING PUMP: -

Decoupling of the pump, servicing, boxing up, alignment, coupling.

(x) SERVICING OF BALL SEPARATOR SCREEN:-

The manholes are to be opened and the screens are to be cleaned fully. Then the ball discharge pipe header is to be pressure cleaned by the high pressure fire fighting water. Then the actuator is to be operated and the gap between the mesh and the pipes are to be checked for finding out the escaping of tube cleaning balls. If required necessary correction is to be done.

(xi) SERVICING OF THE SUCTION/DISCHARGE VALVE OF THE BALL VESSEL: -

The actuator is to be removed from the valve and the valve is to be serviced fully and renewal of the damaged / eroded parts if necessary.

21. SERVICING OF DEAERATOR: -

The contractor has to make scaffolding for opening the manholes of the de-aerator and the feed storage tank. Then open the manholes, clean the internals with wire brush, inspect the internal supports, renew /adjust the spray nozzles. Clean the tray of the de-aerator. Inspect and clear the sampling line before box up of the de-aerator. Then close the manhole doors of the de-aerator and feed storage tank after renewal of the gaskets.

22. SERVICING OF SAFETY VALVE IN TG AREA: -

The contractor has to open the safety valve and service it .Lapping between the seat and disc is to be done and confirm it to be 100% blue matching. Then replace the defective parts as per the direction of the EIC and box up. Assist during the safety valve setting.

23. HP HEATERS 5 & 6:-

(i) MAN HOLE GASKET REPLACEMENT:-

Removal of man hole dummy ,clean the gasket seating area ,renew the gasket by a new one and then box up as per the direction of the EIC.

(ii) GAUGE GLASS LEAKAGE: -
Dismantling & reassembly after renewal of new gasket / mica sheet.

24. LP HEATERS:-

(i) GAUGE GLASS LEAKAGE :-
Dismantling & reassembly after renewal of new gasket / mica sheet.

(ii) SAFETY VALVE REPLACEMENT/ SERVICING:-

Servicing of the safety valve and placing in position after renewal of the gaskets.

25. MAIN AIR EJECTOR: -

(i) COMPLETE SERVICING: -

Dismantling of steam & condensate lines, removal of the shell, renewal of gasket, cleaning of nozzles if reusable, boxing up with cleaned / new nozzles.

(ii) REPLACEMENT OF GASKET: -

The damaged rectangular gasket in the parting plane of the ejector is to be removed and the parting plane is to be cleaned. Then a set of new gaskets / one gasket is to be cut and the ejector is to be boxed up.

(iii) REPLACEMENT OF GASKETS OF NOZZLE: -

If steam leakage observed, then the individual gasket in the 1st/2nd / 3rd stage is to be renewed. The payment will be made per nozzle basis.

(iv) INSPECTION OF NOZZLES: -

The nozzles are to be inspected and renewed if necessary. Then box up after renewing the gaskets.

(v) INSTALLATION OF GAUGE GLASS: -

The gauge glass is to be fitted with new gaskets in the upper and lower flanges.

(vi) EJECTOR AIR MEASUREMENT: -

The contractor has to assist in the measurement of air from the ejectors. They have to make all arrangements for carrying out the same.

26. STARTING EJECTOR: -

(i) INSPECTION OF NOZZLE: -

Inspect the starting ejector and service it.

(ii) ATTENDING STEAM LEAKAGES IF ANY:-

Any leakage observed from the starting ejector is to be attended by renewal of the gaskets.

(iii) COMPLETE SERVICING OF STARTING EJECTOR:-

The contractor has to remove the starting ejector from its position to 15 metre floor and then dismantle it. Inspect the nozzle and replace the defective parts. Then assembly is to be done as per the direction of the EIC and put back in position.

27. HP BYPASS SYSTEM: -

(i) SERVICING OF BD VALVE without seat cutting: -

The contractor has to decouple the valve and actuator and then open the BD valve fully. Inspect and lapping of the valve is to be done and then it is to be boxed up after putting the suitable gland packing. Then adjust the stroke and couple the valve with servomotor.

(ii) SERVICING OF BD VALVE with seat cutting: -

The contractor has to decouple the valve and actuator and then open the BD valve fully. Inspection of the seat and stem is to be done. If the damage of the seat/stem is beyond repair, replace the seat/stem as per the direction of the Engineer in charge. Lapping of the valve is to be done and then it is to be boxed up after putting the suitable gland packing. Then adjust the stroke and couple the valve with servomotor.

(iii) SERVICING OF BPE VALVE Without seat cutting: -

The contractor has to decouple the valve and actuator and then open the BPE valve fully. Inspect and lapping of the valve is to be done and then it is to be boxed up after putting the suitable gland packing. Then adjust the stroke and couple the valve with servomotor.

(iv) SERVICING OF BPE VALVE With seat cutting: -

The contractor has to decouple the valve and actuator and then open the BPE valve fully. Inspect and If the damage of the seat/stem is beyond repair, replace the seat/stem as per the direction of the Engineer in Charge. Then lapping of the valve is to be done and then it is to be boxed up after putting the suitable gland packing. Then adjust the stroke and couple the valve with servomotor.

(v) SERVICING OF BP VALVE without seat cutting: -

The contractor has to decouple the valve and actuator and then open the BP valve fully. Inspect and lapping of the valve is to be done and then it is to be boxed up after putting the suitable gland packing. Then adjust the stroke and couple the valve with servomotor.

(vi) SERVICING OF BP VALVE with seat cutting: -

The contractor has to decouple the valve and actuator and then open the BP valve fully. Inspect and If the damage of the seat/stem is beyond repair, replace the seat/stem as per the direction of the Engineer in Charge. Then lapping of the valve is to be done and then it is to be boxed up after putting the suitable gland packing. Then adjust the stroke and couple the valve with servomotor.

(vii) SERVICING OF HYDRAULIC ACTUATOR FOR BD VALVE:-

The contractor has to decouple the actuator from the valve and take out the actuator from its position. Then dismantle the actuator fully, service, replace the damaged / worn out items and after completing the servicing, adjust the stroke and couple the actuator with the valve.

(viii) SERVICING OF HYDRAULIC ACTUATOR FOR BPE VALVE:-

The contractor has to decouple the actuator from the valve and take out the actuator from its position. Then dismantle the actuator fully, service, replace the damaged / worn out items and after completing the servicing, adjust the stroke and couple the actuator with the valve.

(ix) SERVICING OF HYDRAULIC ACTUATOR FOR BP VALVE:-

The contractor has to decouple the actuator from the valve and take out the actuator from its position. Then dismantle the actuator fully, service, replace the damaged / worn out items and after completing the servicing, adjust the stroke and couple the actuator with the valve.

(x) SERVICING OF SAFETY VALVE OF THE OIL PUMP:-

(xi) REPLACEMENT OF BLADDER (30 LTR.) OF THE ACCUMULATOR: -

The contractor has to remove the accumulator out side and then dismantle the accumulator and remove the damaged bladder. Replace with a new bladder. Reinstall the repaired accumulator and pressure setting is to be done.

(xii) REPLACEMENT OF BLADDER (10 LTR.) OF THE ACCUMULATOR: -

The contractor has to remove the accumulator out side and then dismantle the accumulator and remove the damaged bladder. Replace with a new bladder. Reinstall the repaired accumulator and pressure setting is to be done.

(xiii)HPBP PRESSURE SETTING:-

(xiv)ATTENDING ANY OIL LEAKAGES:-

(xv) DRAINING, CLEANING & OIL FILLING IN THE TANK: -

(xvi)STROKE ADJUSTMENT OF BP/BPE/BD VALVE:-Decoupling of the same and then stroke adjustment after coupling of the same.

(xvii)ATTENDING GLAND LEAKAGES: -

The contractor has to attend the gland leakage by tightening the glands.

(xviii) REPLACEMENT OF GLAND PACKING:-

The contractor has to replace the old gland packing by new one after decoupling the valve from the actuator. Then tighten the glands and couple the valve with the actuator .Set the stroke for tight seating.

28. GLAND STEAM CONDENSER / DRAIN COOLER:-

(i) ATTENDING TO THE TUBE LEAKAGES IF ANY.

29. GLAND STEAM CONTROL VALVE:-

(i) SERVICING OF VALVE:-

Removal of Servo motor, servicing of the valve, Lapping if required, changing damaged parts, replacement of Servomotor and coupling, box up.

(ii) SERVICING OF ACTUATOR:-

Includes oil draining, servicing, cleaning of suction and discharge filters, replacement of oil seals as per requirement and then oil charging and commissioning.

30. LEAK STEAM CONTROL VALVE:-

(i) SERVICING OF VALVE:-

Removal of Servo motor, servicing of the valve, Lapping if required, changing damaged parts, replacement of Servomotor and coupling, box up.

(ii) SERVICING OF ACTUATOR:-

Includes oil draining, servicing, cleaning of suction and discharge filters, replacement of oil seals as per requirement and then oil charging and commissioning.

31. BOILER FEED PUMP & BOOSTER PUMP: -

(i) RENEWAL/REPLACEMENT/ SERVICING OF BFP MECH. SEAL (DE): -

The damaged seal is to be removed after removal of the couplings. Inspect the damaged mechanical seal and replace the damaged parts of the seal. Then replacing the damaged seal with a new/reconditioned mechanical seal. Then alignment is to be done and the shafts are to be coupled and coupling guard is to be fixed.

(ii) RENEWAL/REPLACEMENT/ SERVICING OF BFP MECH. SEAL (NDE):-

The damaged seal is to be removed after removal of the thrust pads and the thrust collar. Inspect the damaged mechanical seal and replace the damaged parts of the seal. Then replacing the damaged seal with a new/reconditioned mechanical seal. Then alignment is to be done and the shafts are to be coupled and coupling guard is to be fixed .

(iii) RENEWAL/REPLACEMENT/ SERVICING OF BOOSTER PUMP MECH. SEAL (DE):-

The damaged seal is to be removed after removal of the couplings. Inspect the damaged mechanical seal and replace the damaged parts of the seal. Then replacing the damaged seal with a new/reconditioned mechanical seal. Then alignment is to be done and the shafts are to be coupled and coupling guard is to be fixed.

(iv) RENEWAL/REPLACEMENT/ SERVICING OF BP MECH. SEAL (NDE):-

The damaged seal is to be removed after removal of the thrust pads and the thrust collar. Inspect the damaged mechanical seal and replace the damaged parts of the seal. Then replacing the damaged seal with a new/reconditioned mechanical seal. Then boxing up the bearing, alignment is to be done and the shafts are to be coupled and coupling guard is to be fixed.

(v) RENEWAL/REPLACEMENT/ SERVICING OF BEARINGS (DE/NDE) OF BFP:-

This includes fixing of RTDs, removal & re-fixing of thrust collar & bearing etc.

(vi) RENEWAL/REPLACEMENT/ SERVICING OF BEARINGS (DE/NDE) OF BP:- This includes fixing of RTDs , removal & re fixing of thrust collar & bearing etc.

(vii) ALIGNMENT BFP TO VOITH COUPLING: -

Removal of the coupling guards and the couplings are to be aligned. Then coupling is to be done and coupling guard is to be fixed at its place.

(viii) ALIGNMENT VOITH COUPLING TO MOTOR: -

Removal of the coupling guards and the couplings are to be aligned. Then coupling is to be done and coupling guard is to be fixed at its place.

(ix) ALIGNMENT MOTOR TO BOOSTER PUMP:-

Removal of the coupling guards and the couplings are to be aligned. Then coupling is to be done and coupling guard is to be fixed at its place.

(x) REPLACEMENT OF BFP CATRIDGE: -

Removal & replacement of cartridge. This includes removal / replacement of collar, bearings, mech. Seals etc., replacement of suction side sealing ring. Then setting of the mechanical seals are to be done and alignment of the feed pump is to be done with the Hydro coupling. Then it is to be coupled and the coupling guard is to be fixed.

(xi) REPLACEMENT OF SUCTION SIDE SEALING RING (DE): -

Removal of the cartridge flange, renewal of O' ring & box up.

(xii) REPLACEMENT OF DISCHARGE COVER O' RING (NDE): -

Removal of the cartridge, renewal of O' ring & box up. This includes the replacement of suction side sealing ring. Then alignment of the feed pump with the hydro coupling is to be done.

(xiii) CLEANING OF WATER JACKET: -

Dismantling of BCW pipes, removal of booster pump bearings, removal of water jacket, acid cleaning of the water jacket, rinsing with water reassembly. (OPGC shall provide acid).

(xiv) ACID CLEANING OF BCW PIPING: -

Dismantling of all BCW piping of BFP & Booster pump, acid cleaning, rinsing with water & re fixing. (OPGC shall provide acid)

(xv) CLEANING/REPLACEMENT OF BFP MECH. SEAL COOLER: -

Dismantling, cleaning, renewal of gasket, painting & box up. (Paint shall be provided by OPGC).

(xvi) CLEANING OF SUCTION STRAINER: -

Dismantling of top cover, removal of strainer element, replacement of the cleaned or new one as the case may be, box up with new gasket.

(xvii)CLEANING OF DUPLEX FILTER: -

The contractor has to open and clean the duplex filter with diesel oil and high-pressure air and box up.

(xviii) DECOUPLING & COUPLING OF LOP MOTOR: -

Decoupling & coupling of motor at the time of electrical work or coupling replacement.

(xix) CLEANING OF WORKING OIL COOLER (WITH HYDRO TEST): -

Proper draining of oil cooler, removal of end cover, & cleaning of the tubes by nylon brush / water jet. Hydro test of the tube bundle. Renewal of gasket / rubber chord & assembly.

(xx) CLEANING OF WORKING OIL COOLER TUBE BUNDLE (WITHOUT HYDRO TEST): -

All the jobs as above without hydro test are to be done.

(xxi) CLEANING OF LUBE. OIL COOLER (WITH HYDRO TEST): -

Proper draining of oil cooler, removal of top cover & cleaning of the tubes by nylon brush / water jet. Hydro test of the tube bundle. Renewal of gasket / rubber chord & assembly.

(xxii)CLEANING OF LUB. OIL COOLER TUBE BUNDLE (WITHOUT HYDRO TEST):- All the jobs as above without hydro test are to be done.

(xxiii) REPAIR OF TUBE LEAKAGE OF LO / WO COOLER: -

Proper draining of oil dismantling the cooler, finding the defective tube by hydro test, plugging of defective tube, hydro test, & assembly.

(xxiv)SERVICING OF 3 – WAY VALVE:-

The contractor has to dismantle the three way valve and service it. If required renew the damaged parts and then assemble the valve in its position.

(xxv)ATTENDING B.C. LEAK OFF FLANGE LEAKAGE: -

The contractor has to remove the flange studs and then renew the gaskets and attend the leakage. If required renew the studs as per the requirement.

(xxvi)ATTENDING UNION LEAKAGE: -

leakage in the union is to be attended .The contractor will be paid on per union basis.

(xxvii)SERVICING/INSPECTION OF THE VOITH HYDRO COUPLING: -

The contractor has to drain of the tank oil and then service the hydro coupling fully. Renew the damaged / worn out parts as per the direction of the Engineer in Charge. Then assembly is to be done and again oil is to be charged after which trial run is to be done for 8 hours.

(xxviii)RECONDITIONING OF MECHANICAL SEAL: -

The old seal is to be dismantled and cleaned. Replace the damaged parts of the old seal with new one. Lapping of the mating surfaces is to be done and boxed up.

(xxix)REPLACEMENT OF COMPLETE OIL FROM BFP

The contractor has to drain oil from the hydro coupling tank, all bearings, all coolers and the oil pipelines. Then clean the hydro-coupling tank by markin cloth. Shift the waste oil barrels to the designated place or as directed by the EIC. Then put fresh oil after thoroughly cleaning of the system. Run the AOP and attend oil leakages if any. Then clean the duplex filter for next 48 hours if necessary without any extra charges.

(xxx) CENTRIFUGING OF BFP OIL: -

The contractor has to shift the portable centrifuge to suitable location, clean the centrifuge bowl before centrifuging, connect the oil inlet and outlet lines from and to the BFP oil tank, centrifuge the oil as per the direction of the EIC.

(xxxii)ATTENDING ANY LEAKAGE IN THE BFP SYSTEM:-

The contractor has to take up the job after draining of the energy (oil/water/steam) contained in the system .The leakage has to be attended by any means like gasket replacement/welding /union leakage. Payment will be made per leakage attended.

(xxxiii)SCOOP SERVICING/REPLACEMENT FROM OUTSIDE:-

The contractor has to open the scoop gear from outside, make it free and service it, re-assemble it.

(xxxiiii)COMPLETE SERVICING OF BOOSTER PUMP:-

It includes opening of top cover, servicing/replacement of mechanical seal, servicing/replacement of water jacket, replacement of defective parts, bearing inspection, parting plane gasket replacement and final box up.

(xxxi) REPLACEMENT/SERVICING OF OIL CATCHER OF FEED PUMP/BOOSTER PUMP

The contractor has to lift the bearing housing and then make suitable arrangement for reducing oil leakage. If the clearance between shaft and oil catcher is more than the designed clearance then the oil catcher is to be replaced by a new one. Then box up the bearing as per the guidelines of the OEM.

(xxxv)SERVICING OF BFP CATRIDGE:-

The BFP cartridge to be removed from the barrel and brought to the service bay. Dismantle the pump completely and note down the critical dimensions. Renew the damaged parts and the O rings along with the back up seals. Service the mechanical seals and correction in the cartridge if any is to be made as per the direction of the EIC. Then assemble the pump completely.

32. **CONDENSATE EXTRACTION PUMP:** -

(i) COMPLETE SERVICING OF CEP:-

Decoupling of the pump, lifting the motor & pump from the foundation, dismantling of BCW & oil piping, dismantling of the pump, shaft, impellers, checking & rectification, assembly of the pump, renewal of defective components, alignment, coupling etc.

(ii) REPLACEMENT OF PUMP BEARING: -

Decoupling of pump, lifting of motor, removal of coupling, removal of old packing, removal of old bearing, replacing new bearing, boxing up & normalization oil & water lines.

(iii) INSPECTION OF PUMP BEARING:-

Opening the top cover of the bearing housing, draining the complete oil and cleaning the housing. Inspection of the bearing, checking the healthiness of the oil cooler, filling fresh oil and box up.

(iv) REPLACEMENT OF GLAND PACKING:-

(v) REPLACEMENT OF GLAND SLEEVE:-

Decoupling of pump, lifting of motor, removal of coupling, removal of old packing, removal of old gland sleeve, replacing new sleeve, boxing up & normalization oil & water lines.

(vi) CLEANING OF SUCTION STRAINER: -

Dismantling of top cover, removal of strainer element, replacement of the cleaned or new one as the case may be, box up with new gasket.

(vii) LUBE OIL COOLER COIL LEAKAGE: -

Dismantling and detection of tube leakage. Then plug the leaked tubes and hydro test the cooler. Box up the cooler.

(viii) ALIGNMENT OF CEP WITH MOTOR: -

(ix) REMOVAL OF MOTOR: -

The contractor has to decouple the motor from the pump for the need of electrical/mechanical requirement. Then lift the motor from its position and put the motor on the stool after completion of the electrical/mechanical jobs. Do the alignment and couple it.

33. **HOT WELL MAKE UP PUMP:-**

(i) SERVICING OF HOT WELL MAKE UP PUMP:-

Decoupling the pump, complete overhauling, replacement of damaged parts and boxing up with new sealing. Alignment to be done.

(ii) REPLACEMENT OF HOT WELL MAKE UP PUMP BEARING:-

The pump coupling to be removed. The pump bearings to be replaced. Box up and alignment with motor.

(iii) REPLACEMENT OF GLAND PACKING:-

34. **DIRTY OIL PUMP:-**

(i) SERVICING OF DIRTY OIL PUMP:-

Decoupling of the pump, servicing, replacement of new coupling if required, boxing up, alignment & coupling.

(ii) COUPLING REPLACEMENT:-

Decoupling of motor & pump, shifting the motor, renewal of the coupling, placing in position, alignment & coupling.

(iii) REPLACEMENT OF MECH. SEAL:-

Pump decoupling, renewal of new seal, boxing up, alignment, coupling.

35. **EOT CRANE 125/30 TON CAPACITY:-**

(i) EOT CRANE RAIL TIGHTENING: -

The contractor has to take up the job with safety and after proper electrical isolations. The total rail alignment is to be checked and corrected. Wherever necessary the foundation bolts are to be replaced by new one.

(ii) COMPLETE GREASING OF THE EOT CRANE:-

The contractor has to do the total lubrication of the wheels, planetary gearbox, rope drum bearings, replace the gear box oil and other jobs as directed by the EIC.

(iii) BRAKE ADJUSTMENT OF EOT CRANE:-

The contractor has to assist in the brake adjustment for proper working of the hoists.

GENERATOR & AUXILIARIES

01. **SEAL OIL SYSTEM:-**

(i) SEAL OIL PUMP SERVICING:-

Decoupling of the pump, servicing, replacement of new coupling if required, boxing up, alignment & coupling.

(ii) COUPLING REPLACEMENT:-

Decoupling of motor & pump, shifting the motor, renewal of the coupling, placing the motor in position, alignment & coupling.

(iii) CLEANING OF SEAL OIL COOLER (WITH HYDRO TEST): -

Proper draining of oil cooler, removal of top cover, & cleaning of the tubes by nylon brush / water jet. Hydro test of the tube bundle. Renewal of gasket / rubber chord & assembly.

(iv) REPLACEMENT OF MECH. SEAL: -

Pump decoupling, renewal of new seal, boxing up, alignment, coupling.

(v) CLEANING OF SEAL OIL COOLER TUBE BUNDLE (WITHOUT HYDRO TEST): -

Proper draining of oil cooler, removal of top cover, & cleaning of the tubes by nylon brush / water jet. Renewal of gasket / rubber chord & assembly.

(vi) CLEANING OF SEAL OIL TANK:-

Opening the top cover, cleaning the internals, box up.

(vii) CLEANING OF IOT:-

Opening the top cover, cleaning the internals, box up.

(viii) SERVICING OF RING RELIEF LINE FLOW METER:-

(ix) SERVICING OF FLOAT VALVES: -

(x) CLEANING OF DUPLEX FILTERS:-

(xi) SEAL OIL VAPOUR FAN:-

Removal of back cover, removal of fan if required for electrical or mechanical work, assembly, replacement of gasket & boxing up.

(xii) SERVICING OF SEAL OIL VACUUM PUMP: -

(xiii) REPLACEMENT OF V BELT: -

(xiv) ATTENDING OIL LEAKAGES IF ANY :-

(xv) DECOUPLING AND ALIGNMENT OF MOTOR WITH PUMP:-

02. STATOR WATER SYSTEM: -

(i) STATOR WATER PUMP SERVICING: -

Decoupling of the pump, servicing, replacement of new coupling if required, boxing up, alignment & coupling.

(ii) COUPLING REPLACEMENT: -

Decoupling of motor & pump, shifting the motor, renewal of the coupling, placing the motor in position, alignment & coupling.

(iii) REPLACEMENT OF MECH. SEAL: -

Pump decoupling, renewal of new seal, boxing up, alignment, coupling.

(iv) CLEANING OF STATOR WATER COOLER (WITH HYDRO TEST):-

Proper draining of oil cooler, removal of top cover, & cleaning of the tubes by nylon brush / water jet. Hydro test of the tube bundle. Renewal of gasket / rubber chord & assembly.

(v) CLEANING OF STATOR WATER COOLER TUBE BUNDLE (WITHOUT HYDRO TEST)

Proper draining of oil cooler, removal of top cover, & cleaning of the tubes by nylon brush / water jet. Renewal of gasket / rubber chord & assembly.

- (vi) CLEANING OF DUPLEX FILTERS: -
- (vii) CLEANING OF MAGNETIC FILTERS: -
- viii) REPLACEMENT OF GAUGE GLASS OF EXPANSION TANK:-
- ix) DECOUPLING AND ALIGNMENT OF MOTOR WITH PUMP:-
- x) REPLACEMENT OF RUBBER PADS OF THE COUPLING:-

03. GAS SYSTEM :-

- i) TRANSPORTATION OF GAS CYLINDER (HYDROGEN, CARBON DI-OXIDE, NITROGEN):
Loading & unloading of full & empty gas cylinders from the truck/from the full cylinder stock yard to the empty cylinder stockyard.
- (a) EMPTY CYLINDERS :-
- (b) FULL CYLINDERS:-The contractor has to assist by shifting the full cylinders from the stock yard and then fill it and then shift the empty cylinder to its designated stock yard.
- (ii) SERVICING OF HYDROGEN/ CARBON DIOXIDE FILLING STATION VALVES: -
The contractor has to replace / service the damaged valve (1/2") as per the direction of the EIC. If necessary brazing is to be done to fit a new valve in the gas line.
- (iii) SERVICING OF HYDROGEN PRESSURE REGULATOR:-
The contractor has to remove the HPR and then repair and install in its position with the use of non-sparking tools. If necessary renew the damaged parts.
- (iv) REPLACEMENT/SERVICING OF HYDROGEN PRESSURE REDUCER: -
The contractor has to replace the HPR by a reconditioned / new HPR.
- (v) HYDROGEN LEAK DETECTION: -
The contractor has to search for the hydrogen leakages by the help of soap solution and attend the leakages if any.
- (vi) SERVICING OF SAFETY VALVE: -
The contractor has to bring out the valve and service it and put back into its position.
- vii) REPLACEMENT OF HYDROGEN/CO2 FILLING PIPE.

4. SERVICING OF HYDROGEN DRIER:-

- (i) REPLACEMENT OF COMPRESSOR:-
The contractor has to remove the old compressor, refitting the new one ,leak checking by nitrogen pressure, vacuuming ,charging freon gas to the system and running of the drier.
- ii) MAKE UP FREON GAS CHARGING: -
Replenishment of make up gas.
- iii) COMPLETE GAS CHARGING: -
Identifying the leakage by nitrogen pressure ,rectifying the same ,vacuuming and gas charging.
- iv) CONDENSER CLEANING:-

OTHER AUXILLIARY SYSTEMS

AIR COMPRESSOR - KPC- T-BTD-PM (TOTAL -----8 NOS.)

1. **COMPLETE SERVICING OF AIR COMPRESSOR: -**
Servicing/replacement of HP & LP valves, LP & HP pistons, valves, crankshafts, connecting rods, crossheads, all bearings, wiper rings, gland packing & solenoid valves. Cleaning of cylinder & valve ports & HP suction bottle. Checking/ servicing of oil pump, primary & secondary oil filter cleaning/ replacement. Replacement of lube oil. Cleaning/replacement of air suction filters, airline filter, moisture traps. Checking of control dimensions. Checking/adjustment of clearances in bearings, piston & cylinder. Interlock & protection checking. Renewal of spares wherever necessary.
2. **SERVICING/REPLACEMENT OF LP SIDE CYLINDER :-**
Assy., gland packing, Dismantling of piston, replacement of guide ring & piston ring, cleaning of cylinder and valve ports, reassembly of valves and piston assy. Fitting of valves and piston assy. Box up. Checking/adjustment of clearances in piston & cylinder. Renewal of spares wherever necessary.
3. **SERVICING/REPLACEMENT OF HP SIDE CYLINDER: -**
Servicing of HP valve assy., HP Piston assy., gland packing, Dismantling of piston, replacement of guide ring & piston ring, cleaning of cylinder and valve ports, reassembly of valves and piston assy. Fitting of valves and piston assy. Box up. Checking/adjustment of clearances in piston & cylinder. Renewal of spares wherever necessary.
4. **SERVICING OF LP VALVE ASSY.:-**
Dismantling of valves, Lapping of valve plates & cushion plates, seats and guards, cleaning valve ports, reassembly of valves and fitting. Renewal of spares wherever necessary.
5. **SERVICING OF HP VALVE ASSY.:-**
Dismantling of valves, Lapping of valve plates & cushion plates, seats and guards, cleaning valve ports , reassembly of valves and fitting. Renewal of spares wherever necessary.
6. **SERVICING OF ONE VALVE :-**
Rate is to be quoted for servicing of one valve of HP or LP cylinder .
7. **SERVICING/ REPLACEMENT OF LP PISTON ASSY.:-**
Opening of cylinder outer cover. Dismantling of piston, replacement of guide ring & piston ring, checking/ replacement of gland packing, & oil wiper rings. Fitting of piston assy. adjustment of clearances. Renewal of spares wherever necessary.
8. **SERVICING/ REPLACEMENT OF HP PISTON ASSY.:-**
Opening of cylinder outer cover. Dismantling of piston, replacement of guide ring & piston ring, checking/ replacement of gland packing & oil wiper rings. Fitting of piston assy. Cleaning of suction bottle, adjustment of clearances. Renewal of spares wherever necessary.
9. **REPLACEMENT OF CRANKSHAFT:-**
Dismantling of belt & flywheel, replacement of crankshaft, checking of crosshead & its shoes, Replacement of oil seals, thrust washer and bearings etc. if required, checking of oil circuit, leveling, checking of clearances, Renewal of spares wherever necessary.
10. **REPLACEMENT OF CROSSHEAD & ITS BEARING:-**
Dismantling of piston (damage side), replacement of crosshead and shoe, Assembly, checking of clearances, Renewal of spares wherever necessary.

11. **REPLACEMENT OF CONNECTING ROD & ITS BEARINGS:-**
Dismantling of damage connecting rod and bearings, replacement with new ones. Fitting, checking/rectification of clearances, Renewal of spares wherever necessary.
12. **ACID CLEANING OF WATER JACKET :-**
The valves are to be removed and the water jacket is to be cleaned with acid supplied and then clean with water and high pressure air.
13. **OIL MAKE-UP: -**
Small amount of oil make up is to be given to get the desired level.
14. **REPLACEMENT OF MAIN BEARINGS: -**
Dismantling of belt & flywheel, crankshaft, HP & LP pistons. Checking of crosshead & its shoes. Replacement of main bearings, proper tightening of crankcase main bearing bolts and nuts. Assembly of connecting rod and pistons. Replacement of oil seals, thrust washer and big end bearings etc. if required, checking of oil circuit, leveling, checking of clearances, Renewal of spares wherever necessary.
15. **REPLACEMENT OF STUFFING BOX: -**
Opening of outer cover, dismantling of piston rod and piston assembly (damage side) & stuffing boxes, Replacement of damaged parts of stuffing box. Reassembly of piston and outer cover and checking of control dimensions. Renewal of glands if necessary.
16. **SERVICING / REPLACEMENT OF WIPER RING ASSY.: -**
Renewal or adjustment of the wiper ring assembly as per the direction of the Engineer-in-charge.
17. **REPLACEMENT OF GLAND ASSEMBLY:-**
Opening of outer cover, dismantling of piston rod and piston assembly (damage side).& stuffing boxes, Replacement of damaged parts of stuffing box. Reassembly of piston and outer cover and checking of control dimensions. Renewal of spares wherever necessary.
18. **SERVICING OF LUBE OIL PUMP:-**
Opening of crankcase cover, dismantling of couplings. Removal and servicing of pump. Renewal of spares wherever necessary.
19. **REPLACEMENT OF LOP COUPLING;-**
Opening of crankcase cover, dismantling of couplings. Removal and servicing of coupling. Replacement of coupling if necessary. Box up.
20. **RENEWAL OF V BELTS: -**
Removal of the damaged set of belts, replacement of new belts, alignment and proper tensioning of the belts. Then giving tension to the V belt once within a week.
21. **BELT TENSIONING:-**
Giving tension to the belt and alignment of pulley of motor and the fly wheel.
22. **SERVICING OF SAFETY VALVE (UPTO 3"):-**
Dismantling of safety valve, lapping of valve, fitting, Resetting, Renewal of spares wherever necessary, Setting of safety valve.
23. **CLEANING OF AIR RECEIVER TANK: -**
Opening of manhole after required isolation, cleaning of the tank. Box up of the manhole. Air pressure testing of the tank.
24. **ATTENDING THE LEAKAGE IN INTERCOOLER: -**

Dismantling the intercooler after isolation of BCW lines. In case tube leakage hydro test of the intercooler to identify the defect tube(s). Plug the defect tube(s). Reassembly of the tube bundle with renewal of O' ring / gasket etc. Normalization of BCW valves.

25. REPLACEMENT OF INTERCOOLER TUBE BUNDLE ASSY.:-

The new intercooler is to be hydro tested. . Fitting of the intercooler with renewal of "O" ring/ gasket.

26. ATTENDING THE LEAKAGE IN AFTERCOOLER: -

Dismantling the intercooler after isolation of BCW lines. In case tube leakage hydro test of the intercooler to identify the defect tube(s). Plug the defect tube(s). Reassembly of the tube bundle with renewal of O' ring / gasket etc. Normalization of BCW valves.

27. REPLACEMENT OF AFTER TUBE BUNDLE ASSY.: -

The new intercooler is to be hydro tested. Fitting of the intercooler with renewal of "O" ring/ gasket.

28. REPLACEMENT OF OUTER COVER OF HP OR LP CYLINDER:-

Replacement of outer cover with new one, renewal of gasket, box up & adjustment of clearances.

29. RENEWAL OF LUB OIL: -

Opening of crankcase, Removal of old oil from crankcase and filters, cleaning of crankcase & filters. Refilling of new lub. oil in crankcase up to marked level and box up.

30. CLEANING OF MOISTURE SEPARATOR: -

Dismantling of moisture trap after required isolation. Cleaning of moisture trap and assembly.

31. REPLACEMENT OF MUFFLER: -

Dismantling of muffler and filters. Replacement with new muffler and reassembly.

32. PRESSURE TESTING OF AIR RECEIVER TANK :-

Transportation of portable air compressor. Arrangements for pressure testing .Attending the defects during pressure testing which includes safety valve servicing.

33. REPLACEMENT/RECONDITIONING OF CRANK CASE:-

Dismantling of the crank case and removal of the internal parts. Record of the critical dimensions, replacement of the damaged parts. Replacement/ reconditioning of the crank case and/or its bearing housings as per the direction of the EIC. Then assemble the other parts like bearings, crank shaft, connecting rod, fly wheel etc. Setting of the critical dimensions. Trial run of the compressor.

34. ATTENDING OIL LEAKAGE INSIDE CRANK CASE: -

For leakages inside crank case- Removal of crank case cover. Checking of the leakage by rotating the priming handle. Replacement of ferrule by flaring and swaging of the copper tube. If the copper tube is found defective, it is to be replaced with new one. Again the leakage is to be checked with priming handle

35. ATTENDING AIR/BCW/OIL LINE LEAKAGE COPPER TUBE:- Checking and replacement of ferrule/ copper tube with proper flaring.

36. ATTENDING LEAKAGE FROM THE LP/HP SUCTION/DISCHARGE VALVES:- Removal of valve cover plate by removing the valve studs. Replacement of the damaged O rings/ studs. Putting the cover back and tightening.

37. CLEANING OF OIL FILTER AND STRAINER:- Removal filter cover. Cleaning of filter with diesel and putting back. Cleaning of suction strainer.

AIR DRYING PLANT (03 nos.)

1. REMOVAL OF SILICA GEL IN ADP TOWER: -
Opening of manhole at top and bottom. Removal of used silica gel from tower. Refilling of new silica gel in ADP tower and box up.
2. REPLACEMENT OF BLOWER:-
Dismantling of blower from motor. Replacement with new blower. Replacement of asbestos rope. Cleaning of filter and box up.
3. SERVICING/REPLACEMENT OF 2-WAY VALVE:-
Dismantling of valve. Replacement of seals and adjustment. Reassembly. Renewal of spares wherever necessary.
4. SERVICING/REPLACEMENT OF 4-WAY VALVE:-
Dismantling of valve. Replacement of seals and adjustment. Reassembly. Renewal of spares wherever necessary.
5. SERVICING OF POWER CYLINDER: -
Dismantling of connections to & from the power cylinder. Replacement of seal kit / "O" rings. Reassembly and checking of operation.
6. CLEANING OF PRIMARY & SECONDARY FILTER IN ADP: -
Opening of filter to bring the filter element out. Cleaning of filter and assembly.
7. SERVICING OF SOLENOID VALVE:-
Opening and servicing of the solenoid valve as per the direction of the EIC.

AIR CONDITIONING PLANT / EQUIPMENTS: -

- (A) COMPRESSOR (KIRLOSKAR MODEL – AC-880) – 06 NOS.
- (B) COMPRESSOR (KIRLOSKAR MODEL – AC-470) – 02 NOS.
- (C) CONDENSER – 08 NOS.
- (D) WATER CHILLER (70 TR) – 06 NOS.
- (E) CHILLED WATER PUMP –(KIRLOSKAR – DSM 65/20) – 06 NOS.
- (F) AIR HANDLING UNITS (AHU) – 09 NOS.
- (G) PACKAGE WATER COOLED UNITS (7.5 TR) – 06 NOS.
- (H) SPLIT AC UNITS (7.5 TR) – 03 NOS.
- (I) FRESH AIR FAN UNITS – 04 NOS.
- (J) ROOM AIR CONDITIONER (2T / 1.5 T) – LOT.
- (K) ALL ASSOCIATED PIPES. VALVES, DAMPERS, FILTERS, COPPER TUBING ETC.

FOR CHILLING UNITS: -

01. COMPLETE OVERHAULING OF COMPRESSOR (AC – 880,): -

The job includes Pumping down R – 22 gas to condenser / empty cylinder. Opening heads, – unloading system, dismantling of piston / piston pins / rings, cylinders, connecting rods, crank shaft, bearings, oil pump, cleaning of oil strainer, paper filters, valve assembly, shaft seal and other parts. Thorough inspection of wear & tear, change of spares & oil as required. Assembly of all

components, Nitrogen pressure leak testing, vacuuming, gas charging, and putting compressor back to operation.

02. PARTIAL OVERHAULING OF COMPRESSOR (AC-880):

All jobs as mentioned in overhauling except removal of crankshaft & main bearings.

03. VALVE SERVICING (AC-880):

Pumping down of gas to condenser, opening heads, checking & servicing of all suction & discharge ring valves of compressor, cleaning of crankcase, replacement of paper filter, change of oil, leak checking, vacuuming, gas charging, putting compressor back to operation.

04. COMPLETE OVERHAULING OF COMPRESSOR (AC-470):

The job includes Pumping down R – 22 gas to condenser / empty cylinder. Opening heads, – unloading system, dismantling of piston / piston pins / rings, cylinders, connecting rods, crank shaft, bearings, oil pump, cleaning of oil strainer, paper filters, valve assembly, shaft seal and other parts. Thorough inspection of wear & tear, change of spares & oil as required. Assembly of all components, Nitrogen pressure leak testing, vacuuming, gas charging & putting compressor back to operation.

05. PARTIAL OVERHAULING OF COMPRESSOR (AC-470):

All jobs as mentioned in overhauling except removal of crankshaft & main bearings.

06. VALVES SERVICING (AC-470):

Pumping down of gas to condenser, opening heads, checking & servicing of all suction and discharge ring valves, cleaning of crankcase, replacement of paper filter, change of oil, leak checking, vacuuming, gas charging & putting compressor back to operation.

07. CONDENSER TUBE CLEANING: -

Dismantling of inlet and outlet connecting pipes, condenser heads, cleaning with nylon brush & water to remove fouling, scaling, repair or replacement of rubber head gasket if necessary, application of epoxy paint on tube end plates. Fitting back to original form.

08. REPLACEMENT OF TEFLON SEAT OF COMPRESSOR DISCHARGE SHUT OFF VALVE: -

Gas is to be drawn into empty cylinders. Teflon seat to be replaced, valve seat to be lapped, flange gaskets to be renewed if required. On completion of job, system to be leak tested by nitrogen, vacuumed & gas is to be refilled.

09. SERVICING OF LIQUID LINE ANGLE VALVE: -

Gas is to be drawn into empty cylinders. Angle valve to be serviced, flange gaskets to be renewed if required. On completion of job, system to be leak tested by nitrogen, vacuumed & gas is to be refilled.

10. REPLACEMENT OF TEFLON SEAT OF LIQUID LINE VALVES:

Gas to be pumped down to condenser, Teflon seats of liquid line valves to be changed, leak testing by nitrogen, vacuuming and gas charging.

11. FLANGE GASKET CHANGING OF DISCHARGE SHUT OFF VALVE and or LIQUID LINE ANGLE VALVE:

Gas is to be drawn into empty cylinders, gaskets to be changed, system to be leak tested by nitrogen, vacuumed & gas to be refilled.

12. SERVICING OF COMPRESSOR SUCTION SHUT OFF VALVE:
Gas is to be pumped into condenser or removed into empty cylinder. Teflon seat to be replaced, valve seat to be lapped, gaskets to be renewed if required, system to be leak tested by nitrogen, vacuumed & gas to be charged.
13. LEAD WOOL GLAND PACKING:
Adding lead wools to compressor suction or discharge or liquid line valve to arrest gas leakage.
14. SERVICING OF LOADING SOLENOID VALVE:
Pumping gas to condenser, servicing of solenoid valve, leak testing, vacuuming and gas charging.
15. REPLACEMENT OF SOLENOID COIL OF LOADING VALVE:
Pumping of gas to condenser, replacement of coil, leak checking, vacuuming and gas charging.
16. REPLACEMENT OF REFRIGERATION SOLENOID VALVE:
Pumping of gas to condenser, replacing valve, leak checking, vacuuming and gas charging.
17. REPLACEMENT OF REFRIGERATION SOLENOID COIL:
Coil to be replaced from outside, gas pumping not required.
18. MAKING OF COPPER TUBE FLARE:
Flaring $\frac{1}{4}$ "copper tube where gas is to be pumped down to condenser.
19. MAKE UP GAS CHARGING:
Freon gas charging from cylinder to replenish gas in the system.
20. FULL GAS CHARGING:
In case of total gas leakage from the system, the source of leakage to be found by nitrogen pressure, system to be vacuumed and gas charged.
21. CHANGE OF PRESSURE GAUGE OR PRESSURE SWITCH:
Isolating valve and changing of pressure gauge or switch.
22. REPLACEMENT OF CRANKCASE HEATER:
Pumping down gas to condenser, draining of oil, replacing heater, oil charging, leak testing, vacuuming and gas charging.
23. SERVICING OF THERMOSTATIC EXPANSION VALVES:
Pumping gas to condenser, servicing/replacement of expansion valves, gasket replacement, refitting, leak testing, vacuuming and normalizing.
24. GASKET REPLACEMENT OF THERMOSTATIC EXPANSION VALVE: Pumping gas to condenser, replacement of gaskets, leak testing, vacuuming and normalizing.
25. CLEANING/REPLACEMENT OF 'Y' STRAINER: Pumping gas to condenser, cleaning or replacing the strainer as per requirement, replacement of gaskets, leak testing, vacuuming and normalizing
26. SERVICING OF LOADING/UNLOADING PISTON VALVE OF COMPRESSOR: Pumping gas to condenser, servicing and replacing spares to rectify jamming, replacement of gasket, leak testing, vacuuming and normalizing.
27. BELT REPLACEMENT OF COMPRESSOR (C-105 / C-92): -
Removal of old belts, putting back new belts, alignment, proper tensioning, tightening foundation bolts, trial run.

28. BELT TENSIONING: -
Tensioning of loosened belts and belt alignment.
29. SHAFT SEAL OR ITS ' O ' RING REPLACEMENT: -
Pumping down of the compressor is to be done .The fly wheel is to be removed and the seal is to be serviced / replaced as required, leak testing is to be done by nitrogen, compressor to be vacuumed and putting back to operation after charging of R-22.
30. REPAIR / REPLACEMENT OF PISTON / CONNECTING ROD: -
Pumping down of the compressor is to be done. The cylinder heads are to be opened, valves to be opened and serviced, then repair/ replace the piston/connecting rod as per requirement.
31. PRESSURE TESTING OF THE CONDENSER: -
The gas is to be pumped down to empty and evacuated cylinder and both the isolating valves of condenser are to be closed. Then pressure testing is to be done to the required pressure by nitrogen, safety valve to be refitted after releasing nitrogen. Leak checking, vacuuming and gas charging.
32. REPLACEMENT OF SAFETY VALVE/ PURGING VALVE OF CONDENSER: -
The gas is to be pumped down to empty and evacuated cylinder. Then the safety valve or purging valve is to be replaced and leak testing is to be done, vacuuming and gas charging.
33. REPLACEMENT OF BRASS ANGLE VALVE ½" SIZE OF COMPRESSOR: - Gas to be pumped down to condenser. New valve to be replaced. Leak checking to be done by nitrogen, vacuuming and charging back gas to compressor.
34. GASKET REPLACEMENT OF LOADING VALVE OR OIL PUMP OF COMPRESSOR: Gas to be pumped down to condenser. New gasket to be replaced in oil pump body or that under loading/unloading valve. Leak checking to be done by nitrogen, vacuuming and charging back gas to compressor.
35. ACID CLEANING OF CHILLER:
Isolating valves to be closed, diluted acid to be recirculated to remove fouling, then flushing with clear water, acid to be taken to DM plant for safe disposal after work. Safety precaution during handling.
36. CLEANING OF CHILLED WATER MAKE UP TANK: Scraping of inside walls of rust, flushing with clear water and draining.
37. REPLACEMENT OF FLOAT VALVE:
Replacement of 1" size float valve of chilled water makes up tank.
38. DECOUPLING OF BELT: -
Decoupling of belt that may be required to facilitate removal of motor from its foundation, refitting and alignment of belts after installation of motor.
39. FILLING OF ALL THERMOSTAT WELLS:
Cleaning of Thermostat bulb wells once for all six no chillers and to be filled with oil.
40. OIL REPLACEMENT OF COMPRESSOR: Pumping down gas of compressor, draining of oil, cleaning of crankcase, cleaning/replacement of paper oil filter, charging of oil to crank case, leak checking, vacuuming, charging gas back to compressor
41. MAKE UP OIL CHARGING TO COMPRESSOR: Only make up oil charging to compressor crankcase. Pressure checking by nitrogen not required.

42. INTERLOCK TESTING OF SWITCHES OF CHILLING UNITS: Each chilling unit has five interlock switches. Checking functioning of switches and if required removal of the same for calibration at laboratory and refitting.

FOR PUMPS

43. CHILLED WATER PUMP OVERHAULING: -
Isolating pump from flow, removal of upper half casing, dismantling of bearing cover / bearing / shaft /impellers /wear rings/ glands etc. Thorough inspections of parts for wear & tear. Replacement of any worn out spares. Fitting back to original condition, alignment & running.
44. REPLACEMENT OF PUMP GLANDS / GLAND BUSH STUDS:
Isolating pump from flow, replacement of gland, stud etc.
45. GREASING OF PUMP BEARING:
Greasing of both DE & NDE bearings
46. REPLACEMENT OF DE SIDE BEARING:
Removal of bearing, replacement of bearing and alignment of pump & motor.
47. REPLACEMENT OF COUPLING PAD:
Removal of coupling guard, coupling cover and replacement of flexible rubber coupling pad.
48. REPLACEMENT OF NDE SIDE BEARING: NDE side bearing to be replaced. Alignment of motor & pump not required.
49. PUMP ALIGNMENT: -
Decoupling, alignment of motor & pump, coupling & trial run.
50. REPLACEMENT OF ISOLATING VALVE or PIPE OF PRESSURE GAUGE:
Closing isolating valves of pump from flow and replacement of valve/pipe.
51. ARRESTING WATER LEAKAGE:
Arresting small water leakages in condenser lines or chilled water lines inside A.C plant by welding or applying putty or any other method.

FOR AHU

52. WASHING: -
Washing of cooling coil with water jet, soap solution, cleaning of drain Pan / drain pipe etc., cleaning of pre filters.
53. ACID CLEANING:
Isolating cooling coil from water flow, circulation of diluted acid through pump and tank arrangement, flushing with water. Used acid to be disposed safely at DM plant.
54. BELT REPLACEMENT: -
Removal of old belts, putting back new belts, alignment, proper tensioning, tightening foundation bolts, trial run.
55. BELT TENSIONING:
Removal of belt guard, belt tensioning and belt alignment.
56. DECOUPLING OF BELTS:

Removal of belts that may be required to facilitate removal of motor from its foundation and again refitting and alignment of belts after installation of motor.

57. TACK WELDING OF IMPELLER BLADES:

Tack welding of dislocated impellers blades, if found during internal inspection.

58. REPAIR SERVICING OF DISCHARGE DAMPERS:

Removal of both dampers from AHU outlet, inspection, service and repair.

59. REPAIR SERVICING OF SUCTION DAMPER: Tightening of any loose damper /dampers.

60. REPLACEMENT OF AHU OUTLET CANVAS CLOTHS: - New canvass cloth to be fitted if required, between the duct flanges after removal of torn canvass.

61. STITCHING OF CANVAS CLOTHS: - Any torn out portion of canvass is to be stitched to arrest air leakage.

62. BEARING REPLACEMENT OF AHU SHAFT (NDE): -Removal of damaged bearing from NDE side and fitment of new bearing.

63. BEARING REPLACEMENT OF AHU SHAFT (DE): -Removal of belts, pulley, replacement of bearing, fitting of pulley & belt and alignment.

64. REPLACEMENT OF AHU SHAFT & BALANCING: -Removal of pulley, bearings, worn out shaft from AHU, refitting of new shaft, bearings, static balancing of impellers and trial run.

65. REPLACEMENT OF IMPELLERS & BALANCING: - Removal of pulley, bearings, shaft, damaged impellers from AHU, refitting of new shaft, impellers, bearings, static balancing of impellers and trial run.

66. REPOSITIONING OF SLIPPED PULLEY: If pulley has slipped resulting in misalignment of belts, then removal of belt guard, repositioning of pulley, belt alignment, fixing of belt guard and trial run..

67. SERVICING OF MODULATING VALVE:

Tightening for looseness of modulating motor, driving cam, greasing of rollers etc.

68. CLEARING OF AHU TRAY CHOKING:

In case of choking of AHU drain line resulting in over flow of water to floor, the same is to be cleared from inside.

69. REMOVAL OF FOUL SMELL FROM AHU:

Any foul smell coming from inside of AHU due to decomposed organic matters etc. to be removed by accessing inside.

70. CLEANING OF MICROVEE FILTERS (1 SET-72 NOS) OF CONTROL ROOM:

Removal of micro filters from duct header to outside, cleaning with compressed air and fitting back.

71. CLEANING OF MICROVEE FILTERS (1 SET-18 NOS) OF SWITCH YARD AHU: -

Removal of micro filters from duct header to outside, cleaning with compressed air and fitting back.

72. CLEANING OF PREFILTERS OF EACH AHU:

Removal of prefilters to outside and cleaning with air and fitting back.

73. CLEANING OF SUPPLY AIR GRILLES OF CONTROL ROOM:

Cleaning of ceiling mounted supply air grilles (1 SET- 44nos.) by moistened soap solution clothes.

74. REFIXING ANY FALLEN AIR GRILLE OR STRIP OF FALSE CEILING: -If any grille or false ceiling strip has fallen from it's position, the same is to be fitted back to it's position.
75. REPAIR OF HUMIDIFICATION KIT: Connection of hoses & making the pump and tank operational.
- FRESH AIR**
76. CLEANING OF MICROVEE FILTERS (09 no) & PRE-FILTERS OF EXCITATION ROOM:
Removal of diffuser section, cleaning of both micro & prefilters by compressed air and reassembly.
77. CLEANING OF MICROVEE FILTERS (06 no) OF FRESH AIR FAN OF CONTROL ROOM: Removal of filters, cleaning by compressed air and refitting.
78. CLEANING OF MICROVEE FILTERS (09no) & PREFILTERS OF FRESH AIR FAN OF SERVICE BUILDING: Removal of diffuser section, cleaning of both micro & prefilters by compressed air and reassembly.
- PACKAGE UNIT:**
79. CLEANING OF PRE-FILTERS:
Cleaning of prefilters 02 no of each package A.C by compressed air.
80. WASHING:
Washing of cooling coil with water jet, soap solution.
81. CONDENSER TUBE CLEANING:
Isolating condenser from flow, decoupling connecting pipes and heads, cleaning tubes with nylon brush, flushing with water and refitting all after job completion.
82. CHANGE OF FILTER & DRIER: -
Freon gas is to be removed to empty and evacuated cylinder, leak testing by nitrogen, vacuuming and gas refilling.
83. REPLACEMENT OF COMPRESSOR: -
Freon gas is to be removed to empty and evacuated cylinder, compressor replacement, flushing the cooling coil by solvent, nitrogen/dry air, leak testing by nitrogen, vacuuming and gas charging.
84. BEARING REPLACEMENT:
Replacement of DE or NDE bearing of blower shaft.
85. REPLACEMENT OF V BELT: One no belt to be replaced by removing front cover.
86. MAKE UP GAS CHARGING: Freon gas from cylinder to be given as make up to the required pressure.
87. FULL GAS CHARGING:
In case of total Freon gas leakage, system to be pressure tested, source of leakage to be found, vacuumed and gas charged.
88. CLEARING OF CHOKING OF DRAIN LINE:
Choking drain line of cooling coil drain pan to be cleared.
89. CHANGE OF THERMOSTAT: Replacement of thermostat and setting the cutout temperature.
90. SERVICING OF EXPANSION VALVE:
Gas is to be removed to empty and evacuated cylinder, servicing/cleaning of expansion valve, leak testing by nitrogen, vacuuming and gas charging.
91. INTERLOCK TESTING OF SWITCHES OF PACKAGE UNITS: Each package unit has three interlock switches. Checking functioning of switches.

92. REPLACEMENT OF PRESSURE SWITCHES OF COMPRESSOR OF PACKAGE AIR CONDITIONER: Removal of gas to empty and vacuumed cylinder, replacement of pressure switch, leak testing by nitrogen, vacuuming and charging back gas to the system.

SPLIT UNITS:

93. CLEANING OF PRE-FILTERS:

Cleaning 02 no pre-filters by water /compressed air.

94. WASHING OF COOLING COIL:

Washing of cooling coil with water and soap solution, internal cleaning of cooling coil drain.

95. CONDENSER COIL CLEANING:

Cleaning of condenser coil to remove dust and ash by compressed air & water.

96. REPLACEMENT OF COMPRESSOR:

Freon gas is to be removed to an empty and evacuated cylinder, compressor replacement, flushing the system with solvent, nitrogen, leak testing, vacuuming and gas charging.

97. MAKE UP GAS CHARGING: Replenishment of Freon gas as make up from gas cylinder.

98. FULL GAS CHARGING:

In case of total gas leakage, system to be leak tested, source of leakage to be found, vacuumed and gas charged.

99. SERVICING OF EXPANSION VALVE:

Gas is to be removed to an empty and evacuated cylinder, servicing of expansion valve, leak testing by nitrogen, vacuuming and gas charging.

100. CHANGE OF FILTER & DRIER:

Gas to be removed to empty and evacuated cylinder, changing filter, leak testing by nitrogen, vacuuming and gas charging.

101. INTERLOCK TESTING OF SWITCHES OF SPLIT UNIT: Each package unit has two interlock switches. Checking functioning of switches

102. REPLACEMENT OF PRESSURE SWITCHES OF COMPRESSOR OF SPLIT AIR CONDITIONER: Removal of gas to empty and vacuumed cylinder, replacement of pressure switch, leak testing by nitrogen, vacuuming and charging back gas to the system.

ROOM AIR CONDITIONER & WATER COOLER

103. REPAIR OF FREON GAS LEAKAGE:

Finding source of leakage, repair of leakage by brazing, nitrogen pressure testing, vacuuming, refilling of Freon gas. The Room A.C/Water cooler is to be brought to A.C plant for this work & after completion of work to be shifted back to it's location.

104. REPAIR REPLACEMENT OF CONDENSER FAN / BLOWER: Removal of damaged fan or blower and fitting a new one.

105. REPLACEMENT OF SELECTOR SWITCH or CAPACITOR or RELAY or THERMOSTAT: Replacement of any of the mentioned as per requirement including wiring.

106. REPLACEMENT OF COMPRESSOR: Removal of damaged compressor, thorough flushing of internals by solvent, nitrogen/dry compressed air, body painting if required, replacement of Compressor, fitment of new

strainer, nitrogen pressure testing, vacuuming, refilling of Freon gas, pressure testing, vacuuming, refilling of Freon gas. The Room A.C/Water cooler is to be brought to A.C plant for this work & after completion of work to be shifted back to it's location.

107.REPLACEMENT OF CAPILLARY TUBES / STRAINER: Replacement of new capillary tubes and strainer, nitrogen pressure testing, vacuuming, refilling of Freon gas. The Room A.C/Water cooler is to be brought to A.C plant for this work.

108.SERVICING OF ROOM AIR CONDITIONER:

Thorough cleaning of cooling coil, condenser, and body by compressed air, soap solution and water. Body to be painted if required. The A.C is to be brought to a suitable compressed air point for servicing.

109.SHIFTING OF ROOM AIR CONDITIONER: Only shifting Room AC from one location to another as per direction of engineer in charge. No other maintenance work involved.

110.REMOVAL OF BLOWER MOTOR: - Removal of motor of blower for repair and refitting the same after repair or fitting of new motor.

111. PAINTING OF RUSTED PORTION AND BODY STRENGTHENING: If the legs or body of window A.C or Water cooler is rusted, the same is to be suitably strengthened and painted.

112.SERVICING OF VACUUM PUMP: Vacuum pump used for vacuuming of A.C. system. Servicing involves opening of pump, servicing, assembly, oil replacement etc.

Xxxxx

SWITCHYARD PORTABLE COOLING TOWER

1. CLEANING THE SYSTEM (REMOVAL OF ALGAE): The contractor has to clean the sump, cooling tower, pump, strainer and the associated pipelines using suitable brush or acid.

DIESEL GENERATOR SET:-

1. FILLING OF DIESEL IN THE TANK: - The contractor has to transport diesel from the warehouse and fill in the DG set oil tank.

2. REPLACEMENT OF LUBRICATING OIL: - The oil is to be drained completely and then fresh oil is to be filled in the system.

3. CLEANING OF RADIATOR & CHARGING OF MAKE UP WATER: The water is to be drained and flushed and fresh water along with the CAC is to be charged to the system.

4. B CHECK MAINTENANCE OF DG SET: The B check maintenance of the DG set is to be carried out .The air filter, lub oil filter, diesel filter is to be cleaned. The lubricating oil is to be drained completely and fresh oil is to be charged. The radiator water is to be drained and flushed and fresh water with the cooling agent is to be charged. General cleaning of the DG set is to be carried out.



SCOPE OF WORK

PERIODICAL MAINTENANCE OF ASH HANDLING PLANT

1. ASH SLURRY PUMP

1.01) Overhauling of pump.

- i) Decouple of pump and motor & dismantle pump pulley.
- ii) Removal of Suction & discharge pipes with proper arrangement.
- iii) Loose of casing bolts and remove suction casing with liner.
- iv) Remove impeller with proper locking.
- v) Remove inner shell with motor side casing with liner.
- vi) Remove stuffing box.
- vii) Remove bearing housing top cover after oil draining.
- viii) Dismantle shaft, bearing, oil seal, "O" ring properly.
- ix) If required replace shaft/bearing/shaft sleeve/oil seal/o ring/compression spring etc to fit bearing housing correctly.
- x) After fitting of shaft, fit casings, liners, impeller, inner shell, and rubber gasket with new or minor repair work.
- xi) Checking of seal water line connections to casing, if required minor repair work may be done.
- xii) Connect properly the suction & discharge pipes properly.
- xiii) Replace gland properly.
- xiv) Fit pump pulley properly & align with motor pulley.
- xv) Fit Flat-belts (new/old) with guard & oil filling in bearing housing
- xvi) Trial run the pump & adjust gland leakage properly.
- xvii) There shouldn't any leakage from casing of pump.
- xviii) Spare parts to be brought from Central store.

1.02) ATTENDING CASING LEAKAGE OF PUMP

- i) Decouple of pump and motor & dismantle pump pulley.
- ii) Removal of Suction & discharge pipes with proper arrangement.
- iii) Loose casing bolts and remove suction casing with liner.
- iv) Remove impeller with proper locking.
- v) Remove inner shell with motor side casing with liner.
- vi) Remove stuffing box.
- vii) Checking/replacement of rubber gaskets/inner shell/casings/liners/impeller etc.
- viii) Fitting of casings, liners, impeller, inner shell, rubber gasket with new or minor repair work.
- ix) Checking of seal water line connections to casing, if required minor repair work to be done.
- x) Connect properly the suction & discharge pipes properly.
- xi) Replace gland properly.
- xii) Fit pump pulley properly & align with motor pulley.

- xiii) Fitting of V-belts (new/old) with guard & oil filling in bearing housing
- xiv) Trial run of pump & adjustment of gland properly.
- xv) There shouldn't any leakage from casing of pump.

1.03) REPLACEMENT OF FLAT BELT

- i) Remove belt guard.
- ii) Replace old Flat belts with new.
- iii) Align motor pulley with pump pulley.
- iv) Checking of proper tension of belts & fixing of belt guard.
- v) After 48 running hours, belt tension again to be checked.

1.04) REPLACEMENT OF SUCTION / DISCHARGE ADAPOTER

- i) Arrangement to made for removal of suction / discharge pipe.
- ii) Removal & fitting of adopter & rubber gaskets after repair/new ones.
- iii) Fitting of suction & discharge pipes.
- iv) If required replace coupling gaskets for pipes.

1.05) REPLACEMENT OF GLAND PACKINGS

- i) Removal of gland follower & then taken away old packing.
- ii) Place new packing rings properly with lantern ring.
- iii) Tighten the gland follower lightly.
- iv) After trial run of pump, final adjustment of gland to be done.

1.06) Replacement of lubricating oil

- i) Opening of drain plug.
- ii) Draining of lubricant.
- iii) Flushing lubrication chamber.
- iv) Cleaning of oil sight glass.
- v) Filling of new lubricating oil.

1.07) Servicing/ Replacement of pump pulley

- i) Remove belt guard and belts.
- ii) Opening of pulley bush locking bolts.
- iii) Removal of flywheel and shaft key.
- iv) Placement of new flywheel & its accessories.
- v) Align motor pulley with pump pulley.
- Vi) Checking of proper tension of belts & fixing of belt guard.

1.08) Servicing/ Replacement of motor pulley

- i) Remove belt guard and belts.
- ii) Opening of motor pulley plates & its accessories.
- iii) Removal of motor pulley bush with proper arrangement carefully.
- iv) Replace/ repair pulley parts.
- v) Fitting of pulley after proper checking & care.
- vi) Align motor pulley with pump pulley.
- Vi) Checking of proper tension of belts & fixing of belt guard.

2. DRAIN PUMPS

2.01. O/H OF DRAIN PUMP

- i) Decouple of pump & motor, shift motor with its base.
- ii) Remove pump coupling half if required by jacking.
- iii) Remove& check/replace bearings, oil seals after oil draining.
- IV) Lifting of pump assembly & checking of pump liner/casing/inner casing/impeller/shaft sleeve etc. if required
Change with new one or minor repair to be done.
- v) Fitting of pump parts correctly & fit gland packing properly.
- vi) Filling of oil up to mark & place motor with base in its position.
- vii) Align motor with pump & fit belts with new or old one.
- viii) Trial run of pump.

2.02) BEARING /OIL SEAL REPLACEMENT

- i) Decouple of pump & motor, shift motor with its base.
- ii) Remove pump coupling half if required by jacking.
- iii) Remove& check/replace bearings, oil seals after oil draining.
- iv) Place motor with its base at its position.
- v) Fill oil up to mark.
- vi) Align motor with pump & fit belts with new or old one.

2.03) CLEANING OF SUMP PIT

- i) Lift ash water by pump/manually.
- ii) After opening of sump cover, remove ash from pit.

2.04) REPLACEMENT OF GLAND PACKINGS

- i) Removal of gland follower & then taken away old packings.
- ii) Place new packing rings properly.
- iii) Tighten the gland follower lightly.
- iv) After trial run of pump, final adjustment of gland to be done.

2.05) REPLACEMENT OF V-BELT

- i) Remove belt guard if present.
- ii) Replace old v-belts with new.
- iii) Align motor pulley with pump pulley.
- iv) Checking of proper tension of belts & fixing of belt guard.
- v) After 48 running hours, belt tension again to be checked.

2.06) Replacement of lubricating oil

- i) Opening of drain plug.
- ii) Draining of lubricant.
- iii) Flushing lubrication chamber.
- iv) Cleaning of oil sight glass.
- v) Filling of new lubricating oil.

3) ASH DISPOSAL LINE AND RECYCLING WATER LINE

3.01) REPLACEMENT OF COUPLING SLEEVE / COUPLING RING / RING GASKET.

- i) Opening of coupling bolts, rubber gaskets & coupling.
- ii) Replace the damaged part with new one.
- iii) Proper fitting to be made with proper alignment to the pipes.

3.02) REPLACEMENT OF MS PIPE / CI PIPE.

- i) Opening of coupling bolts, rubber gaskets & coupling.
- ii) Remove the pipe from its position by making arrangement.
- iii) Placement of new pipe to the position.
- iv) Replace the damaged parts like coupling bolts, rubber gaskets & couplings with new one
- v) Proper fitting to be made with proper alignment to the pipes.
- vi) If needed nearby pipes to be dismantled & fitted with taking proper care.
- vii) Vehicle to be arranged to carry out the jobs.
- viii) If required tripod/ special arrangement to be made for above jobs.
- ix) Any cutting & welding of pipe is in party's scope.
- x) During the course of execution any civil structure/ blocks is required to be chipped is in party's scope.
- xi) Welding of MS pipe to be done with structural welding electrode of reputed brand which is to be supplied by party with no extra cost to OPGC.
- xii) MS / CI pipes are to be brought from central store.
- xii) Hydra & truck are to be provided by OPGC.

3.03) REPLACEMENT OF MS / CI BENDS.

- i) Opening of coupling bolts, rubber gaskets & coupling.
- ii) Remove the MS / CI bends from its position by making arrangement.
- iii) Placement of new bend to the position.
- iv) If required new MS bends are to be fabricated from MS pipe at site as per site requirement for which pipe is to be brought from central store / site which is in party's scope.
- v) Replace the damaged parts like coupling bolts, rubber gaskets & couplings with new one
- vi) Proper fitting to be made with proper alignment to the pipes.
- vii) If needed nearby pipes to be dismantled & fitted with taking proper care.
- viii) Vehicle to be arranged to carry out the jobs.
- ix) If required tripod/ special arrangement to be made for above jobs.
- x) During the course of execution any civil structure/ blocks is required to be chipped is in party's scope.
- xi) Welding of MS pipe to be done with structural welding electrode of reputed brand which is to be supplied by party with no extra cost to OPGC.

3.04) Inspection of ash disposal & recycling line

- i) Any coupling leakage on the line
- ii) Any coupling likely to develop leakage
- iii) Prior intimation for any theft of coupling bolts, clamps etc.
- iv) Erosion of soil from pipe support due to rain.
- v) Growth of wild grass & trees on the AD line.
- vi) Corrective action for any minor problems like tightening of loose coupling bolts, pipe holding clamps & couplings etc.

3.05) De-choking of ash slurry pipe line from AHP to ash pond per coupling

- i) Opening of pipe couplings & gaskets for one pipe from the pump discharge end
- ii) Flushing of that single pipe with water hose.
- iii) Checking of pipe jamming for the next pipe.
- iv) If the jamming continues then pipe dismantling /flushing/ fitting to be done one after another up to the disposal point.
- v) If needed any fabrication of clamp, pipes bend etc. to be made.

3.06) Laying of HDPE Pipeline

- i) Shifting of HDPE Pipelines manually to site
- ii) The pipelines are to be joined by flange joint by MS Bolt & Nut.
- iii) The pipes are to be laid on hard surface.

3.07) Dismantling of HDPE Pipeline

- i) Dismantle the pipeline by unthreading the bolts & nut in flange joints.
- ii) Shift the dismantled pipes to suitable location for storage/reuse.

4.) CLINKER GRINDER.

4.01) OVERHAULING OF CLINKER GRINDER

- i. Decouple the coupling of fluid coupling and motor.
- ii. Dismantle the drive chain, sprockets from the grinder.
- iii. Dismantle all the fittings to the grinder
- iv. Isolate the seal water line pipings.
- v. Dismantle the Rollers with housing from the Bottom ash hopper with proper care.
- vi. Checking of grinder rollers, shaft sleeves, housings & all spares.
- vii. Inspection/ Cleaning/ replacement of bearings & oil seals.
- viii. Replacement and repair of damaged spares & then fitting work.
- ix. Alignment of clinker grinder to the motor.
- x.

4.02) GLAND PACKING REPLACEMENT / BEARING SERVICING.

- i) Isolate seal water line to the grinder.
- ii) Dismantle the drive chain, sprockets, bearings & oil seals from the grinder with making special arrangement.
- iii) Inspection/ Cleaning/ replacement of bearings & oil seals.
- iv) Checking / flushing / repairing of seal water line pipings, nipples, unions & valves.
- v) Removal & placement of gland packing to the grinder with proper care.
- vi) Fitting of bearings with applying grease, oil seals, sprockets & drive chain.
- vii) Trial run & further rectification if required.

4.03) SERVICING OF FLUID COUPLING

- i) Dismantling of fluid coupling.
- ii) Checking/ replacement of damaged bearings.
- iii) Cleaning of parts & final box up.
- iv) Filling of lubricants up to the level marked.
- v) Alignment of coupling to motor & trial run checking.

4.04) ALIGNMENT OF CLINKER GRINDER, GEAR BOX, FLUID COUPLING & MOTOR.

- i) Removal of drive chain from the grinder.
- ii) Loosening of foundation bolts.
- iii) Alignment to be made by dial gauge.
- iv) Placement of drive chain to the grinder.
- v) Apply grease to the chain.
- vi) Trial run & further rectification if required.

4.05) ADJUSTMENT/ FITTING OF DRIVING CHAIN, SPROCKET AND CHAIN

- i) Removal of drive chain, sprocket & pinion from the grinder.
- ii) Checking & cleaning of parts.
- iii) Fitting of sprocket, pinion & chain to the grinder.
- iv) Apply grease to the chain.
- v) Trial run & further rectification if required.

4.06) GREASING OF CHAIN

- i) Removal of Chain guard
- ii) Cleaning of chain & scrapping of old grease
- iii) Apply new coat of greasing on the chain
- iv) Fitting of chain guard.

REPLACEMENT OF LUBRICATING OIL OF FLUID COUPLING

- i) Opening the coupling bolts
- ii) Remove the drain/Filling plugs
- iii) Replace the damaged oil & fill the clean oils.

05) BOTTOM ASH HOPPER FEED GATE.

5.01) OVERHAULING OF FEED GATE HOUSING

- i) Dismantling of side cover & manhole from the feed gate housing.
- ii) Removal of gate with proper care.
- iii) Checking / replacement of wear strip of gate & housing doorframe.
- iv) Metal build up on gate if eroded & finishing to be made.
- v) Checking / replacement of wedges, rollers, roller axle, axle bearing.
- vi) Adjustment of gate rollers to minimize leakage.
- vii) Final box up.

5.02) CLEANING OF AIR WATER CONVERTER TANK.

5.03) SERVICING OF POWER CYLINDER

- i) Dismantling of power cylinder.
- ii) Checking/ replacement of cylinder, seal kit, "O" rings etc.
- iii) Final fitting & placement of gland packing.

5.04) GLAND PACKING REPLACEMENT OF POWER CYLINDER

- i) Removal & fitting of gland packing.

5.05) REPLACEMENT OF SEAL KIT FOR POWER CYLINDER.

- i) Dismantling of power cylinder.
- ii) Checking/ replacement of cylinder, seal kit, "O" rings etc.
- iii) Final fitting & placement of gland packing.

5.06) OVERHAULING/REPLACEMENT OF SOLENOID VALVE.

- i) Dismantling of solenoid valve.
- ii) Checking/ cleaning of parts. If needed damaged parts to be replaced with new one.
- iii) Final fitting & placement of solenoid valve to its position.

5.07) REMOVAL OF FOREIGN MATERIALS FROM THE HOPPER.

- i) The job will be carried out by **ON LINE PTW** during the plant running condition.
- ii) Opening of manhole of feed gate with proper care.

- iii) Foreign material to be removed from inside the hopper or above the grinder roller.
 - iv) Fitting of manhole to the feed gate.
 - v) If needed packing rope to be placed in the manhole.
- 5.08) DECHOKING OF BOTTOM ASH PIPELINES FROM BOTTOM ASH HOPPER TO ASH SLURRY SUMP PER COUPLING.**

- i) Opening of pipe couplings & gaskets for one pipe from the BA Hopper side.
- ii) Flushing of that single pipe with water hose.
- iii) Checking of pipe jamming for the next pipe.
- iv) If the jamming continues then pipe dismantling /flushing/ fitting to be done one after another up to the slurry sump.
- v) If needed hydro ejector of the respective feed gate to be dismantled and Checking/cleaning / fitting of hydro ejector will be made.
- vi) If needed any fabrication of clamp, pipe bend etc. to be made.

6.0) HYDRO EJECTOR

6.01) OVERHAULING OF HYDRO EJECTOR

- i) Dismantling of the hydro ejector assembly.
- ii) Checking/ replacement of inlet piece, nozzle plate, nozzle, throat, throat increaser, O' ring.
- iii) Fitting of hydro ejector assembly to its position.

7.0) BOTTOM ASH HOPPER

7.01) REFRACTORY LINING INSIDE HOPPER.

- i) Making scaffolding arrangements inside the hopper.
- ii) Checking/ repairing of vent louver box and cleaning / replacement of pipings & nozzles if needed.
- iii) Chipping of old refractory.
- iv) Fixing of castable refractory.
- v) Curing to be made for the refractory.

7.02) REPLACEMENT OF HOPPER INSPECTION GLASS ASSY.

- i) Removal & renewal of damaged glass assy.

7.03) REPAIR OF VENT LOUVRE BOX, CLEANING OF NOZZLES &REPLACEMENT OF PIPING ETC.

7.04) CLEANING OF SEAL TROUGH CHAMBER.

- i) Flush the seal trough chamber through the bottom ash water pump.
- ii) If the chamber is not cleaned properly than by HP water hose chambers may be cleaned externally.
- iii) Remove the settled ash inside the chamber.

8.0) FLY ASH HOPPER.

8.01) ASH HOPPER OVERHAULING- ESP, APH & ECONOMISER HOPPER.

- i) Dismantling of flushing apparatus & wetting head.
- ii) Checking, cleaning, replacement of eroded nozzle.
- iii) Checking/ replacement of base plate, drain pipe, spool piece, expansion bellow.
- iv) Checking/ replacement of plate valve seals.
- v) Checking, cleaning & greasing of plate valve, 3 way flap valve.
- vi) Checking / replacement of Gun metal valves- 15 mm, 20 mm, 25 mm, 32 mm, 50 mm & 65 mm.
- vii) Checking/ replacement of LP/ HP water line pipings.

8.02) REPLACEMENT OF EXPANSION BELLOW OF HOPPER.

- i) Opening of expansion bellow flange bolts.

- ii) Replacement/ Fitting of new expansion bellow & packing rope.

8.03) REMOVAL OF FOREIGN MATERIALS & CLEARING THE HOPPER.

- i) Opening of expansion bellow flange bolts.
- iii) Removal of expansion bellow from the hopper carefully.
- iv) Placement / Fitting of new expansion bellow & packing rope.

8.04) REPLACEMENT OF POKE DOOR BOLT & GASKET

- i) Cutting of old poke door bolts.
- ii) Welding of new bolts.
- iii) Removal of damaged rubber gaskets.
- iv) Placement of new gasket.

9.0) ASH WATER PUMP:- (FALP, FAHP & BAWP)

9.01) OVERHAULING OF PUMP.

- i) Decoupling of pump from motor.
- ii) Opening of pump top cover.
- iii) Dismantling/ checking/ cleaning/ replacement of spares like- bearing, impeller, impeller wear ring, shaft, shaft sleeve etc.
- iv) Pump internal cleaning & painting of anticorrosive paint.
- v) Replacement of gland packing & casing gasket.
- vi) Replacement of coupling bush & bolt if required.
- vii) Final box up & alignment.
- viii) Trial run & further rectification if required.

9.02) BEARING REPLACEMENT

- i) Decoupling of pump from motor.
- ii) Opening of pump top cover.
- iii) Dismantling/ checking/ cleaning/ replacement of bearings.
- iv) Replacement of coupling bush & bolt if required.
- v) Final box up & alignment.
- vi) Trial run & further rectification if required.

9.03) GLAND PACKING REPLACEMENT

- i) Removal of old/ damaged gland packing.
- ii) Fitting of new gland packing.
- iii) Trial run & further rectification if required.

9.04) DECOUPLING, ALIGNMENT & COUPLING OF PUMP AND MOTOR

- i) Removal of coupling bolts & bush.
- ii) Loosening of foundation bolts.
- iii) Alignment to be made for pump and motor.
- iv) Coupling of pump & motor.

9.05) GREASING OF ASH WATER PUMPS

- i) Remove grease plug cap
- ii) Apply grease inside the cap

10.0) SEAL WATER PUMP.

10.01) OVERHAULING OF PUMP.

- i) Decoupling of pump from motor.
- ii) Opening of pump top cover.

- iii) Dismantling/ checking/ cleaning/ replacement of spares like- bearing, impeller, impeller wear ring, shaft, shaft sleeve & lock collets etc.
- iv) Pump internal cleaning & painting of anticorrosive paint.
- v) Replacement of gland packing & casing gasket.
- vi) Replacement of coupling bush & bolt if required.
- vii) Final box up & alignment.
- viii) Trial run & further rectification if required.

10.02) BEARING REPLACEMENT

- i) Decoupling of pump from motor.
- ii) Opening of pump top cover.
- iii) Dismantling/ checking/ cleaning/ replacement of bearings.
- iv) Replacement of coupling bush & bolt if required.
- v) Final box up & alignment.
- vi) Trial run & further rectification if required.

10.03) GLAND PACKING REPLACEMENT

- iv) Removal of old/ damaged gland packing.
- v) Fitting of new gland packing.
- vi) Assistance during the trial run for further adjustment of gland.

10.04) DECOUPLING, ALIGNMENT & COUPLING OF PUMP AND MOTOR

- i) Removal of coupling bolts & bush.
- ii) Loosening of foundation bolts.
- iii) Alignment to be made for pump and motor.
- iv) Coupling of pump & motor.

10.05) GREASING OF ASH WATER PUMPS

- i) Remove grease plug cap
- ii) Apply grease inside the cap

11.0) TRANSFER WATER PUMP (100% ash recycling system)

11.01) OVERHAULING OF PUMP

- i) Decoupling of pump & removal of motor from its base.
- ii) Draining of oil.
- iii) Removal of all connecting pipelines & gauges.
- iv) Removal of pump coupling through jacking.
- v) Complete dismantling/checking/ cleaning of pump parts.
- vi) If necessary special arrangements to be made for removal of parts.
- vii) Replacement of damaged parts if necessary.
- viii) Painting of parts with anti corrosive paint if necessary.
- ix) Reassembling of parts & fitting.
- x) Checking & correction of lubrication & cooling systems.
- xi) Lift checking of impeller.
- xii) Filling of new oil.
- xiii) Placement of motor to the pump, alignment & coupling.
- xiv) Trial run & further rectification if required & condition monitoring.

11.02) BEARING REPLACEMENT.

- i) Decoupling of pump & removal of motor from its base.
- ii) Draining of oil.

- iii) Removal of pump coupling through jacking.
- iv) Opening of lock & bearing nut (check nut).
- v) Opening of thrust bearing top cover.
- vi) Removal of thrust bearing.
- vii) Assembling of bearing & bearing top cover.
- viii) Checking of the lift/ float of the pump and locking.
- ix) Placements of pump coupling & motor to the pump.
- x) Alignment & coupling.
- xi) Trial run & further rectification if required.

11.03) DECOUPLING & COUPLING OF PUMP

- i) Decoupling of pump.
- ii) Removal of coupling bolts & coupling bush.
- iii) Alignment to be made for pump and motor.
- iv) If coupling bolts & bushes damaged, change with new one.
- v) Couple pump and motor properly.

11.04) REPLACEMENT OF GLAND PACKING.

- i) Removal of old/ damaged gland packing.
- ii) Fitting of new gland packing.
- iii) Trial run & further rectification if required.

11.05 CLEANING OF 100% ASH RECYCLING PUMP STRAINER

- a) Shifting of two nos. of petrol driven portable pump & accessories from Wt plant to site.
- b) Arrangement of vehicle is in party's scope.
- c) Petrol is to be arranged by the party.
- d) Due care should be taken for handling of petrol for above.
- e) Certified diver to be arranged for cleaning of pump strainer.
- f) Sump to be evacuated as per site requirement.
- g) Diver to enter the sump using SCBA & other safety gadgets for cleaning of pump strainer.
- h) After completion of the job system is to be normalized
- i) Petrol driven pumps & accessories to be returned to wt plant.

12. Preventive checks of Ash Handling Equipments

12.1 preventive checks of AHP pumps

- a) Check the oil level, oil quality, gland leakage from slurry pumps, water pumps, Clinker Grinders on weekly basis. If required tough up the oil if required.
- b) Grease the Water pump bearings once in every month. Report any abnormality to Engineer-in-charge.

12.2 Preventive check of Recycling Pumps.

- a) Check the oil level of the recycling pumps in every Wednesday of the week.
- b) Tough up oil if required.
- c) Check the Gland leakages if any from the pump gland. Tighten the gland in case of any leakage.

Periodical Maintenance of Dry Ash Handling System

Air Compressor(Screw)

- a. Preventive, Predictive , Corrective and Breakdown Maintenance of Screw Air Compressor.
- b. Overhauling of Screw Compressor
- c. Servicing of Air Drier
- d. Inspection & Bearing replacement of Screw.

- e. Cleaning of Filter, oil replacement in every 3 months
- f. Inspection/repairing of Intercooler
- g. Belt replacement Four time annually
- h. Servicing of Suction/Discharge Valve
- i. Replacement of cooling water pipe

Ash Conveying Vessels

- 1. Replacement of main dome valve
- 2. Replacement of Main dome Seal
- 3. Replacement of Vent dome valve
- 4. Replacement of Vent dome Seal
- 5. Overhauling of Ash Vessels
- 6. Replacement Plate Valve
- 7. Servicing / Replacement of Pneumatic Cylinder
- 8. Arresting of Ash leakage from Ash conveying line
- 9. Replacement of Ash conveying Pipe line
- 10. Replacement of Ash diversion chute

Dust Conditioner

- 1. Servicing of Rotary Feeder
- 2. Replacement of Chain
- 3. Replacement of Water Pipe with Nozzles with dust conditioner
- 4. Servicing/Repairing of Telescopic chute

Fluidizing Blower

- 1. Servicing of Fluidizing Blower
- 2. Servicing of Water booster pump

PERIODICAL MAINTENANCE OF WATER TREATMENT PLANT & BOP

PRE-TREATMENT PLANT

1. SLUDGE PIT PUMP

- ❖ **Sludge pit pumps –15KW, 2nos**
Make- SU pumps Ltd., Model-CPV1-100x80-315
Type- Vertical non-clog

1.1 Overhauling of Sludge pit pump

- a) Arrangement to be made for lifting of motor or pump parts.
- b) Making accessibility to impeller
- c) Remove motor & motor stool.
- d) Remove impeller & delivery pipe
- e) Remove casing, adaptor, column pipe, shaft coupling etc.
- f) Remove deflector & base plate.
- g) Loosen the clamping bolts & tighten the jack so that the shaft with bearing cover will come off from the bearing bracket.
- h) Next remove bearing cover, bearing housing, check nut & finally the ball bearing.
- i) Cleaning & painting of pump parts, if necessary.
- j) If required, minor machining/welding of pump parts to be carried out.
- k) For fitting, follow the reverse procedure.
- l) After fitting motor, it is to be aligned & coupled.
- m) Checking & rectification of lubrication & cooling system.
- n) Trial run, condition monitoring & rectification if required.

- o) Waste lubricants & scraps to be shifted to required designated area.

1.2 Impeller checking / Replacement of impeller (Sludge pump)

- a) Making accessibility to impeller.
- b) Removal of strainer & suction housing.
- c) Removal of impeller, checking & cleaning.
- d) If required, replace stud bolts/Teflon bearings with new ones.
- e) Fitting of impeller & strainer etc.
- f) Checking & adjustment of axial lift.
- g) Trial run of pump for proper working, if necessary rechecks.

1.3 Checking & Replacement of bearing of Sludge pump

- a) Arrangement to be made for lifting of motor or pump parts.
- b) Removing of motor & motor stool.
- c) Removing of pump coupling half.
- d) Removing of bearing cover & checking of bearing.
- e) If required replace coupling spider & foundation bolts of pump.
- f) Checking impeller lift & axial adjustment.
- g) Fitting of motor stool, motor & coupling after alignment.
- h) Greasing of bearing.
- i) Trial run of pump, condition monitoring & rectification if required.
- p) Waste lubricants & scraps to be shifted to require designated area.

1.4 Motor decoupling & coupling. (Sludge pump)

- a. Arrangement to be made for lifting of motor or pump parts.
- b. Decouple motor from pump coupling.
- c. Remove motor from its base & if reqd. remove motor half coupling.
- d. Place motor on its base with motor half coupling (after repair, if any).
- e. Check /change spider/bolts/nuts of coupling if required.
- f. Align motor with pump coupling & finally coupling is to be done properly.
- g. Trial run of pump, condition monitoring & rectification if required.

1.5 Repair of lubrication line of pump

- a. Make accessibility to inside the pit.
- b. Check the T's & L,s connected to spider, if required replace by new one.
- c. Check the cooling water line tubes/pipes for any damage & if required replace them by new ones.
- d. Check cooling line valve & if reqd. replace by new.

2. BCW make up pumps

❖ BCW make up pumps-22kw , 3nos

Make- Worthington pumps Ltd., Model-IAN 5070

Type- Vertical turbine pump.

2.1 Overhauling of BCW make up pump.

- a) Decoupling of pump & removing of motor from its base.
- a) Removing of pump & complete dismantling of pump parts.
- b) Checking of all pump parts/replacement of parts if necessary.
- c) If required minor repair works to be done.
- d) Cleaning & painting of parts, if required.
- e) Changing of bearing, coupling bushes/pins if required.
- f) Reassembling of parts & fitting.
- g) Lift checking of impeller.
- h) Motor fitting, alignment & coupling.
- i) Oil filling in bearing housing of pump.

- j) Gland tightening/checking after running.
- l) Trial run of pump, condition monitoring & rectification if required.
- m) During work, waste lubricants & scraps to be shifted/placed at designated area.

2.2. Bearing checking /replacement (BCW make up pump)

- a) Decoupling of pump & removing of motor from its base.
- b) If reqd. removes motor half coupling & refit.
- c) Removing of bearing casing & removing bearing by jacking arrangement.
- d) Changing of bearing, coupling bushes/pins if required.
- e) Checking/correction of lubrication system.
- f) Refitting of parts.
- g) Checking of axial lift of pump.
- h) Alignments of pump to motor & coupling.
- i) Gland tightening/checking after running.
- j) Trial run of pump, condition monitoring & rectification if required.
- k) During work, waste lubricants & scraps to be shifted/placed at designated area.

2.3. Decoupling & coupling of motor (BCW make up pump)

- a) Loosening of coupling bolts.
- b) Dismantling of motor from base.
- c) If reqd. removes motor half coupling & refit.
- d) Changing/replacement of coupling bushes/pins/spiders, if required.
- e) After repair of motor & again refitting.
- f) Alignment & coupling.
- g) Trial run of pump, condition monitoring & rectification if required.

2.4 Change of gland/gland tightening(BCW make up pump).

- a) Loosened the gland follower nuts to remove old gland pieces.
- b) Cut new gland pieces in reqd. sizes.
- c) Fit the new gland pieces properly with lantern ring (if present).
- d) Again tighten the gland follower lightly.
- e) During running adjust the gland leakage by proper tightening.

3. DM Plant Pump

❖ DM Plant Pump -18.25KW, 4nos

Make- Worthington pumps Ltd., Model-IAN 5073

Type- Vertical turbine pump

3.1 Overhauling (DMPP).

Same as BCW make up pump as mentioned above.

3.2. Bearing checking /replacement (DMPP)

Same as BCW make up pump as mentioned above.

3.3 Decoupling, alignment & coupling of motor (DMPP)

Same as BCW make up pump as mentioned above.

3.4. Change of gland/gland tightening (DMPP)

Same as BCW make up pump as mentioned above.

4. Back wash filter pumps

❖ Back wash filter pumps-46.6KW, 3nos

Make- Worthington pumps Ltd., Model-IAN 5080

Type- Vertical turbine pump.

4.1 Overhauling (Filter Back wash pump).

Same as BCW make up pump as mentioned above.

4.2 Bearing checking /replacement (Filter Back wash pump)

Same as BCW make up pump as mentioned above.

4.3 Decoupling, alignment & coupling of motor (filter Back wash pump)

Same as BCW make up pump as mentioned above.

4.4 Change of gland/gland tightening.(filter Back wash Pump)

Same as BCW make up pump as mentioned above.

5. Portable water pump

- ❖ Portable water pump-18.5KW, 3nos
Make- Worthington pumps Ltd., Model-IAN 5077
Type- Vertical turbine pump

5.1 Overhauling (Portable pump).

Same as BCW make up pump as mentioned above.

5.2 Bearing checking /replacement (Portable pump)

Same as BCW make up pump as mentioned above.

5.3 Decoupling, & coupling of motor (Portable pump)

Same as BCW make up pump as mentioned above.

5.4 Change of gland/gland tightening.(Portable pump)

Same as BCW make up pump as mentioned above.

6. CLARIFOCULATOR-

- ❖ CLARIFOCULATOR- 02nos
Clarifoculator bridge-02nos (2.2 KW), Bridge Agitator-4nos,
Flash Mixture Agitator-2nos (3.7KW)

6.1 Bridge wheel/bearing replacement.(4 shafts/BRIDGE)

- a. Remove the bearings/wheels along with shaft to be replaced by lifting the bridge on jack.
- b. Dismantle bearings/wheels from shaft.
- c. After cleaning, fit the new bearings/wheels properly to the shaft.
- d. Greasing the bearings & chain system.
- e. Shaft along with wheels to be fitted on bridge.
- f. During work, waste lubricants & scraps to be shifted/placed at designated area.

6.2 Bridge/Agitator Gear Box Servicing/replacement.

- a. Disconnect the gearbox from motor & driven shaft.
- b. Dismantle the gearbox.
- c. If required change the gears, bearings oil seals, if present.
- d. During fitting, check the backlash between gears.
- e. If required, replace the gearbox with new/repair one.
- f. Fill the gearbox with proper oil.
- g. Align the gearbox with motor & driven shaft & coupled them.
- h. During work, waste lubricants & scraps to be shifted/placed at designated area.

6.3 Bridge Agitator Servicing.

- a. Dismantle the agitator from gearbox.

- b. Check the supports of agitator, bearings & shaft & if required repair it.
- c. If required minor cutting/welding works to be done.
 - e. Fit the agitator properly at it's position.
 - f. Connect with gearbox.
 - i. Waste lubricants & scraps to be shifted/placed at designated area
 - g. Trial run to be done.

6.4 Overhauling of Flash Mixture Agitator.

- a. Decouple the motor from gearbox.
- b. Dismantle the gearbox & check gears, bearings, oil seals etc.
- c. Check the agitator, if required repair it.
- d. Check the tyre coupling etc. & if required replace it.
- e. Fit the gearbox & agitator properly.
- f. After alignment, couple the gearbox with motor.
 - h. During work, waste lubricants & scraps to be shifted/placed at designated area
 - i. Trial run of agitator to be done.

6.5 Decoupling & Coupling of Agitator/gearbox

- a. Decouple motor from agitator gearbox.
- b. Remove the coupling halves if required.
- c. Check the condition of tyre coupling & if required replace it by new one.
- d. After motor repair (if done), align motor with gearbox.
- e. Couple motor & agitator.
- f. Trial run to be done.

7. BACKWASH BLOWER/MIXED BED BLOWER

Qty- 4nos, Capacity-11KW/7.5KW

7.1 Overhauling of Mixed bed/Back wash Blower

- a. Disconnect blower from motor & discharge pipe if required.
- b. Dismantle both DE & NDE bearings, if required by jacking/puller etc.
- c. Check/replace NDE side gears.
- d. Fit the gears & bearings in proper sequence/backlash etc.
- e. If required, replace the blower impellers.
- f. During fitting of impellers, ensure proper clearance at different positions.
- g. After fitting of all parts, fill oil in the gear box.
- h. During work, waste lubricants & scraps to be shifted/placed at designated area
- i. With proper alignment, fix belts, motor & belt guard.

7.2 Belt replacement in Mixed bed/Back wash Blower

- a. Remove the belt guard.
- b. Loosen the motor foundation bolts, if required to loose belt.
- c. Remove old belt with new one.
- d. Align motor with blower.
- e. Tighten the foundation bolts with required belt tension.
- f. Fix the belt guards again.

7.3 Motor decoupling, alignment & coupling.

- a) Remove belt guard if required.
- b) Loosen motor foundation bolts, so that belts can be taken out from motor.
- c) After motor repair if any, put the motor in its position & align with blower.
- d) Fix the belts with required tension & fix the belt guard.

8. Alum/Lime Agitators

Type- Vertical & horizontal type, 06nos
LIME AGITATOR (02nos-Horz. Type)

8.1 Overhauling of lime agitator

- a) After L/C dismantle the bearing covers at both ends & check the bearing conditions, if required replace it by new one.
- b) Check alignment of motor to gearbox, tyre-coupling condition.
- c) If required do necessary correction/rectification etc.
- d) Change the oil in the gearbox.
- e) Check the condition of gears/pinions, if required do minor repair work.
- f) Grease the gears & pinions/bearings.
- g) Waste lubricants & scraps to be shifted/placed at designated area
- h) Do trial run of motor & then agitators.
- i) After proper trial run, return L/C.

8.2 Lime agitator Gearbox servicing.

- a) After L/C, isolate gearbox from motor by decoupling.
- b) Drain oil from the gearbox & took away GB from it's foundation.
- c) Dismantle gearbox cover & check different parts.
- d) Replace damaged & worn-out parts.
- e) Assembly the gearbox with required backlashes/clearances etc.
- f) Place the gearbox in it's position & align with motor.
- g) Fill oil in the gearbox up to required level.
- h) Waste lubricants & scraps to be shifted/placed at designated area.
- i) After all necessary repairs/ checking, trial run the gearbox & hence the agitator.

8.3 Decoupling & coupling of Lime agitator motor.

- i) After L/C, if required shift the motor from it's foundation.
- ii) After elect. Repair, position the motor in it's position.
- iii) Check the coupling parts/fasteners etc., if required replace it by new one.
- iv) After motor rotation check, align motor with gearbox.
- v) Trial run of motor with gearbox to be done.

ALUM AGITATOR (4-nos, vertical, 1.5KW)

8.4. Alum Agitator servicing.

- a) After L/C, decouple motor from agitator gearbox shaft.
- b) Dismantle agitator shaft/fan blades & check for straightness, looseness etc.
- c) Check the condition of agitator shaft bearing, if necessary replace it.
- d) After necessary repair on fan shaft/fan etc., fit properly in the housing.
- e) Drain oil from the gearbox & took away GB from it's foundation.
- f) Dismantle gearbox cover & check different parts.
- g) Replace damaged & worn-out parts.
- h) Assembly the gearbox with required backlashes/clearances etc.
- i) Place the gearbox in it's position & align with motor.
- j) Fill oil in the gearbox up to required level.
- j) Waste lubricants & scraps to be shifted/placed at designated area.
- k) If motor cable is removed, check the rotation of motor after cable connection.
- l) Now trial run the agitator & check for smooth operation

8.5 Decoupling & coupling of alum motor with gearbox.

- a) After L/C, if required shift the motor from it's foundation.
- b) After elect. Repair, position the motor in it's position.

- c) Check the coupling parts/fasteners etc., if required replace it by new one.
- d) After motor rotation check, align motor with gearbox.
- e) Trial run of motor with gearbox to be done.

9. D.M. PLANT

Neutralizing pit pump

❖ Neutralizing pit pump-30KW, 4nos

02 Make- SU pumps Ltd., Model-CPV1-150x100-315

03 Type- Vertical, non-clog type

9.1 Overhauling (Neutralizing pump)

Scope same as sludge pit pumps as mentioned above. But safety precautions for acidic/alkali environment must be taken.

9.2 Impeller checking / Replacement (Neutralizing pump)

Scope same as sludge pit pumps as mentioned above. But safety precautions for acidic/alkali environment must be taken.

9.3 Checking /Replacement of Bearing (Neutralizing pump)

Scope same as sludge pit pumps as mentioned above. But safety precautions for acidic/alkali environment must be taken.

9.4 Motor decoupling & coupling (Neutralizing pump).

Scope same as sludge pit pumps as mentioned above. But safety precautions for acidic/alkali environment must be taken.

10 D.M. Transfer Pumps

D.M. Transfer Pumps-22KW, 3nos

Make- Kirloskar Brothers Ltd., Model- KPD 80/40

Type- Horz. Centrifugal.

10.1 OVERHAULING OF DM TRANSFER PUMP

- a) System to be completely isolated.
- b) Decouple pump from the motor.
- c) Drain the lubricating oil & shifted to designated place carefully.
- d) Shift pump from its foundation to working bay.
- e) Opening/checking the shaft, impeller, wear rings, bearings, glands, & if required, replacement/rectification to be done.
- f) Trueness checking of shaft is to be done.
- g) Casing erosion (if required) to be rectified.
- h) Paintings of pump parts are to be done (if required.)
- i) Assembling the impeller with adjustment of the float / hydraulic ply and subsequent placement with system.
- j) Alignment with the motor with required tolerance & coupling after motor trial run.
- k) Refilling/checking of lubricating oil system.
- l) Coupling guards to be fitted again.
- m) Trial run of pump, condition monitoring & rectification if required.

10.2 Motor decoupling & coupling (DM Transfer pump).

- a. Remove coupling guard.
- b. Decouple motor from pump coupling.
- c. Remove motor from its base.
- d. Place motor on its base (after repair, if any).
- e. Check /change spider/bolts/nuts of coupling if required.

- f. Align motor with pump.
- g. Fit coupling guard in it's position.
- h. Trial run of motor for rotation check.
- i. Finally coupling is to be done properly.

10.3 Gland tightening/replacement of DM Transfer Pump

- a) Loosen the gland follower.
- b) Remove old gland packing & replace by new ones.
- c) Tighten the gland follower.
- d) After running of pump final adjustment on gland to be done

11. Degassed water Pumps

Degassed water Pumps-30KW, 5nos
 Make- Kirloskar Brothers Ltd., Model- KPD 80/40
 Type- Horz. Centrifugal

11.1 OVERHAULING OF DEGASSED WATER PUMP

Scope same as D.M. Transfer pump as mentioned above.

11.2 Motor decoupling, & coupling (Degassed Water pump).

Scope same as DM transfer pump as mentioned above.

11.3 Gland tightening/replacement (degassed Water Pump)

Scope same as DM transfer pump as mentioned above.

12. ACID PUMPS

- ❖ Acid Pumps- 3.7KW, 2.2 KW - 4nos
 Make- ANTICO, Model-CPP 60 &
 Make- Investa, model-2nos , Capacity-2.2KW
Type- Horz. Centrifugal

12.1 OVERHAULING OF ACID TRANSFER PUMP

- a) Proper protective equipment should be worn to prevent contact with the fluid in the pump or pipeline.
- b) If facility for draining is present, the pump/pipe line must be cleaned from trapped liquid & diverted to proper disposal area.
- c) Decouple pump from motor.
- d) Dismantle pump parts & checked condition of shaft, mechanical seal, bearings, shaft, impeller, couplings & spiders etc and if required replace with new ones..
- e) If required minor repair works to be done.
- f) Paint pump parts, foundation, fasteners etc.
- g) Fit all pump parts properly.
- h) Connect water line to mechanical seal.
- i) Align pump with motor.
- j) Couples pump with motor after rotation check of motor (if required).
- k) Trial run of pump to be done & check for any abnormality & leakage.
- l) If required rectify the defects.

12.2 Motor decoupling & coupling (Acid Transfer pump).

Scope same as DM transfer pump as mentioned above.

13. MIXED BED/ CAUSTIC AGITATORS

13.1 Agitator Servicing.

1. Lift the motor from it's base & place in a suitable location.
2. If required, loosened the tank cover bolts & lift the cover.
3. Remove the agitator, check for straightness of shaft & bearing condition.
4. Minor repair works to be done.
5. Then fit the agitator in it's position & tighten the cover bolts.

13.2 Repair/replacement of tank level gauges.

1. After proper isolation & taking necessary precautions, level gauge valves, guide rods, tubes, tube bushes etc. dismantled.
2. Checks for any damage of above parts, if required replace it by new ones.
3. If required replace the fasteners of the level gauge.
4. Properly fit the level gauge at it's location.
5. Check for any leakage from level gauge.

14. REGENERATION AREA

14.1 Replacement of MSRL Pipe/CPVC/PVC pipes.

1. Isolate the acid line & see that there is no passing of acid through the valve.
2. Flush the acid lines with sufficient clean water to diffuse the effect of acid in the line.
3. While working equip with required PPEs.
4. Dismantle the acid pipelines from flange joints or by cutting.
5. Replace the pipelines & do proper tightening of the joints.

14.2 Replacement of Diaphragm Valve

- a) Open the diaphragm valve from the acid line after due isolation fro both side flange.
- b) Replace the new valve putting appropriate Gaskets for sealing in both ends.
- c) In case of damage of diaphragm, replace the diaphragm by opening the top half of the valve.

14.3 Servicing of injector

- a) Close the suction & discharge valve of water line.
- b) Close the suction acid line.
- c) Open the injector part & check the ventury part for maintenance/replacement.

14.4 De-chocking of Acid line

- a) Take appropriate safety measure before working in acid line
- b) Keep sufficient cold water ready for dilution of acid.
- c) Dismantle the chocked acid lines & flush with water.
- d) Replace the acid line with new pipe or do necessary maintenance.

14.5 Acid Unloading from tanker

- a) Connect the acid unloading hose in acid tanker outlet pipe.
- b) Slowly open the valve to allow the acid to come up to the pump suction.
- c) Line up the acid transport line from pump outlet to BAST.
- d) Start the acid unloading pump to evacuate the acid from the tanker to the Bulk Acid Storage tank.

14.6 Acid Gauge glass servicing/replacement

- a) Close securely the isolation valve of the gauge glass assembly.
- b) Open the gauge glass assembly.

c) Replace the damaged gauge glass/replace the packing seals.

15. Hydrazine/Phosphate/Sod. Sulphite dosing Pump

- ❖ Hydrazine dosing Pump- 0.75kw-04nos
Phosphate dosing Pump-1.5 KW, 4nos
- ❖ Sod. Sulphite dosing Pumps.
Make- V.K. Industries Pvt. Ltd, Model- Pr-15
Type- Reciprocating

15.1 Overhauling of Hydrazine/phosphate/sod. Sulphite dosing pump.

- a) Decouple the pump from motor after removing coupling guard & pipe joints.
- b) Dismantle liquid end, drive end parts of pump.
- c) Check the worm wheel, gear, eccentric etc.
- d) Check oil seals, gaskets, glands & bearings, if reqd. changed.
- e) Check ball valves.
- f) Fit all the parts properly & check free operation of pump & ball valves.
- g) Lubricate the pump with proper oil to reqd. level.
- h) Couple the pump with motor after alignment & made proper pipe joints.
- i) If reqd. changed the spider/coupling halves.
- j) During trial run check the pump performance.
- k) Fix the coupling guard in proper position.

15.2 Gland change/tightening of Hydrazine/phosphate/sod. Sulphite pumps.

- a) Loosen the gland follower.
- b) Remove old gland packing & replace by new ones.
- c) Tighten the gland follower.
- d) After running of pump final adjustment on gland to be done.

15.3 Decoupling & coupling of pump Hydrazine/phosphate/sod. Sulphite pumps.

- a) Remove the coupling guard.
- b) Dismantle motor coupling from pump coupling.
- c) If necessary, change the coupling halves/spider etc.
- d) Couple pump with motor after alignment.
- e) Replace the coupling guard again.

15.4 Hydrazine/phosphate/Sod. Sulphite tank agitator servicing

- a) Decouple motor from agitator shaft.
- b) If required, remove agitator tank cover.
- c) Dismantle agitator shaft/fan & check for straightness, looseness etc.
- d) Check the condition of bearing, if necessary changed.
- e) After necessary repair on shaft/fan, fit on the housing.
- f) Again place the cover in position & trial run to done.

16. CW system

- ❖ CW pumps-1470KW-06nos
Make- Kirloskar Brothers Ltd., Model- BHQ-92
Type-Vertical Turbine
CW pump inlet screen- 6 sets (5Nos/set)
Vent Valves- 200 & 100mm sizes

16.1 Overhauling of Vertical Pumps. (CW)

- a) Decoupling of motor from pump.
- b) Loosening of motor foundation bolts & lowering/positioning of motor at safe place (after cable & other accessories removal) with safety.
- c) If required removes motor half coupling & refit it properly.
- d) Draining of oil from the thrust bearing & shifted to designated place carefully.
- e) Necessary precaution to be taken to avoid draining oil on floor.
- f) Removal of all small pipelines & pressure gauge from the pump unit.
- g) Dragging of pump coupling with jacking arrangement.
- h) Opening of bearing housing & remove the check nut & lock nut etc.
- i) Removals of journal bearing/thrust collar & thrust bearing pads properly.
- j) Removal of bearing housing & then stuffing box.
- k) Loosening & removal of discharge flange of pump foundation.
- l) Removal of pump foundation tee.
- m) Removal of pump foundation.
- n) Removal of column pipes, spiders & line shaft etc.
- o) Removal of impeller unit.
- p) Dismantling of impeller unit.
- q) Cleaning & painting of all parts properly, if required.
- r) If required minor repair works to be done.
- s) Check the pump parts for trueness, erosion, clearance etc & replace with new ones.
- t) Assembling of impeller after all rectification and proper lift adjustment.
- u) Fitting of the pump parts in sequential manner properly.
- v) Bring oil from store & fill up to required level & check/rectify for any leakage.
- w) After proper fitting of pump, place the motor on pump.
- x) Align pump with motor.
- y) If required replace coupling bushes/pins/washers with new ones.
- z) Fit the different accessories to pump & motor properly.
- aa) After rotation check of motor, couples pump with motor.
- bb) Trial run of pump & assistance in condition monitoring and checking of performance.
- cc) All measurements/readings before & after corrections to be submitted.

16.2 Overhauling/Replacement of Thrust Bearing (CW)

- a) Decoupling of pumps.
- b) Removal of pumps & motor foundation bolt & nuts.
- c) Removal of all connecting pipelines & gauges & drain oil.
- d) Removal of pump coupling through jacking.
- e) Opening of the lock & bearing nuts (Check nut).
- f) Dismantling journal bearing & thrust bearing.
- g) Checking of these bearing parts, if required by new ones.
- h) Fitting of all parts properly.
- i) Checking/maintaining the required lift / float of the pump.
- j) Mounting of pump coupling, motor tools & prime mover & tightening.
- k) If coupling bushes/pins are damaged, change it by new one
- l) Alignment and coupling after rotation check.
- m) Fixation of the connecting pipes lines.
- n) Assistance in trial run.

16.3 Decoupling & Coupling of Motor (CW)

- a) Decoupled motor from pump coupling.
- b) Remove motor from its base.
- c) If required, remove motor coupling from its shaft by jacking.
- d) After motor servicing, place motor in its base with its coupling.
- e) Align motor coupling with pump coupling.

- f) If coupling bushes/pins are damaged, change it by new one.
- g) Couple pump & motor properly.

16.4 Change of gland/tightening.

- a) Loosen the gland follower.
- b) Remove old gland packing & replace by new ones.
- c) Tighten the gland follower.
- d) After running of pump final adjustment on gland to be done

16.5 Cleaning/maintenance of coarse screens (CW inlet)

- a. Lifting of coarse screens.
- b. Prior to lifting, isolation by stop log gate (if present) is to be done.
- c. Dismantling of coarse screens.
- d. Cleaning of coarse screens.
- e. Minor repair works i.e. welding/fitting, if required is to be carried out.
- f. Painting (if necessary) of coarse screens.
- g. Refitting & re-erection of coarse screens at it's position.

16.6 Overhauling of Hydraulic System for CW discharge valves

- j) Servicing/replacement of screw pumps-02 Nos.
- k) Cleaning of inlet & outlet filters (if reqd.).
- l) Servicing of manifolds.
- m) Servicing/ Replacement (if reqd.) of power cylinders.
- n) Servicing of pilot valves / directional valves.
- o) Servicing of safety valves.
- p) Replacement of oil in Hydraulic tank.
- q) Cleaning of Hydraulic tank.
- r) Hydraulic pipelines repair/replacement (if reqd.).
- s) Attending oil leakage (if any).

16.7 Overhauling/replacement of CW duct vent valves.

- a) Close the root isolation valve & vent valve inlet valve.
- b) Open covers plates of both vent valve tanks.
- c) Check the conditions of bulbs, diaphragms, bolts etc., if required change them.
- d) If necessary, check/correct operation of vent valve inlet valve.
- e) Again fit the cover plates properly.
- f) If required, replace the valve with new one.
- f) Open root valve & check for leakage.

17. BCW pumps

- ❖ BCW pumps- 275KW-6nos
Make- Kirloskar Brothers Ltd., Model-BHR-42
Type- Vertical Turbine

BCW pump inlet screen- 6 Sets (3 Nos/set)

BCW Plate heat ex-changers-5 Nos, Type- Vt-2505
Make – L & T Ahlborn

17.1 Overhauling of BCW Pumps. (BCW)

Scope same as CW pumps as mentioned above.

17.2 Overhauling/Replacement of Thrust Bearing (BCW)

Scope same as CW pumps as mentioned above.

17.3 Decoupling & Coupling of Motor. (BCW)

Scope same as CW pumps as mentioned above.

17.4 Change of gland/tightening

Scope same as CW pumps as mentioned above.

17.5 Cleaning/maintenance of coarse screens (BCW inlet)

Scope same as CW pumps as mentioned above.

18. RAW water pumps

- ❖ RAW water pumps-304KW-6nos
Make- Kirloskar Brothers Ltd., Model-BHR-52
Type-Vertical Turbine
RW pump inlet screen- 6 Sets (9 Nos/set)
RAW Duplex Strainers- 4 Nos.

18.1 Overhauling of VERTICAL PUMPS (RAW)

Scope same as CW pumps as mentioned above.

18.2 Overhauling /Replacement of Thrust Bearing (RAW)

Scope same as CW pumps as mentioned above.

18.3 Decoupling & Coupling OF MOTOR (RAW)

Scope same as CW pumps as mentioned above.

18.4 Change of gland/tightening.(RAW)

Scope same as CW pumps as mentioned above.

18.5 Cleaning/maintenance of coarse screens (RAW inlet)

Scope same as CW pumps as mentioned above.

18.6 Cleaning/maintenance of Duplex Strainer (RAW)

- a. Opening the cover of duplex strainer.
- b. Dismantling of duplex strainer.
- c. Cleaning of duplex strainer.
- d. Painting (if required) to be done.
- e. Refitting of duplex strainer.
- f. Tighten the cover bolts.

19. Service Water Pumps

- ❖ Service Water Pumps-, 3nos, 30KW
Make- Kirloskar Brothers Ltd, Model-KPD 65/20

19.1 OVERHAULING OF SERVICE WATER PUMP

Scope same as DM transfer Pump as mentioned above.

19.2 Motor decoupling & coupling (Service water pump).

Scope same as DM Transfer Pump as mentioned above.

19.3 Gland changing/tightening.(Service Water Pump)

Scope same as DM transfer Pump as mentioned above.

20 SUMP PUMPS

- ❖ SUMP PUMPS- 2.2KW & 3.7KW- 25nos
Make- Maxflow sump pumps Ltd.

Model- 50SMP2 & 65 SMP2

Type- Vertical non-clog type

20.1 OVERHAULING of Pump (SUMP PUMP)

Making arrangement for lifting of pump & motor.

All the systems are to be isolated.

Decoupling of the pump from the motor.

Removal of the oil chamber.

Opening of the discharge connection & foundation bolts.

Complete lifting/dismantling of pump parts from the sump.

Opening of the suction strainer, bowl, impeller, column pipes & shafts.

Opening of the thrust bearing housing.

Cleaning/painting (if required) of the various parts after rectification.

Assembling of the impeller in the bowl with proper tightening of lock nut & fitting of sleeves/bushes in the line shaft & spiders.

Fitting of the thrust bearing.

Adjustment of the float for just freeness of the pump & locking.

Mounting of the suction strainer & all lubrication fittings.

Lowering of the pump into the pit & tightening of the foundation & discharge flange.

Fitting of the oil chamber.

Fitting of the prime mover & coupling.

Trial run of pump, condition monitoring & rectification if required.

20.2. MOTOR DECOUPLING & COUPLING (SUMP PUMP)

- a) Making arrangement for lifting pump/motor.
- b) Decoupling motor from pump & remove motor from its base.
- c) Again placing motor in its base & align with pump coupling.
- d) Check/adjust lifting of pump impeller.
- e) If reqd. add shims/gasket to motor base for adjustment.
- f) If spider, ratchet pin, bush damaged, change it by new one.
- g) Coupled motor with pump coupling.

21. COOLING TOWER

- CT – 2 Nos.,
- Make- Paharpur Cooling Towers Ltd
Model- 1512-11, Capacity-33000CMH
- Shells- 11x2 = 22 Nos.
- CT Fans - 22 Nos (Type- Induced draft Cross flow)
- Gear Reducers – 22 Nos.(Type- Series 36)
- Deck – 22x2 = 44 Nos.
- Flow Control Valve – 44x2 = 88 Nos.

21.1. OVERHAULING/REPLACEMENT OF FC (DECK) VALVES

- a. Displace the concrete diffuser attach to FC valves.
- b. Dismantling of locking bar & operating handle.
- c. Removing valve stem guide, locking plate, gaskets etc.
- d. Checking of valve disc, stem/valve body gasket etc. & replace if required.
- e. Painting of valve body to be done.
- f. Fixing valve stem guide & gasket to valve body.
- g. Placing valve disc & washers on valve stem.
- h. Installing of locking bar & operating bar.
- i. Greasing valve stem threads.
- j. Checking for smooth operation of valve.

- k. If valve replacement is required, bring the valve from store & fit at it's position.
- l. Old valve/parts & greases to be shifted to required place as per instruction.

21.2 .Running maintenance of FC Valve

- a) Displace the concrete diffuser attach to FC valves.
- b) In case of Bolt failure of Valve bush assembly weld the assembly with the body
- c) Strengthen the bush by providing extra support to it.
- d) Take necessary precaution while working on PTW as surface will be slippery & there will be water pressure.

21.3. OVERHAULING OF CT GEARBOX

- a) Isolation of the particular shell for which servicing of the gear reducer is to be done.
- b) Arrangement of safe walkway to inter inside the shell.
- c) Arrangement for lifting/shifting of gearbox to be done.
- d) Dismantle the fan blades from its hub & shift it outside CT.
- e) Dismantle the hub from gearbox & shift to outside CT.
- f) Complete drainage of oil from gearbox & shifted to require designated place.
- g) Decouple the drive shaft from gearbox & motor end.
- h) Loosening of the foundation fasteners of gearbox and removal of the gearbox to required place with adequate safety arrangement.
- i) Dismantling of the gearbox & gears, bearings. The driver & driven gear shaft are to be removed along with the bearings.
- j) The bearings are to be removed through jacking only.
- k) Rectification of gears for any backlash / any damage.
- l) Fitting of the bearings through oil bath heating only.
- m) Assembling in the gear box housing so that proper meshing will be observed between the gears side by side freeness of the system is to be checked.
- n) All fasteners & o rings/oil seals etc to be changed (if required).
- o) Complete box up the gearbox housing.
- p) Shifting of the gearbox from service bay to inside CT & place on the foundation with safety.
- q) Leveling & tightening of the gearbox properly.
- r) Alignment of the drive shaft with gear box & motor to be done.
- s) If required replace the coupling bushes/yoke assembly/fasteners etc.
- t) Bring oil from store & filling oil in the gearbox up to the mark.
- u) Necessary care must be taken to prevent draining of oil on floor.
- v) Trial run of the gear box without fan, if no abnormality is noticed then the fan hub/blades are to be mounted & required pitch angle is to be maintained.
- w) If required replace damaged blade/blades with new ones.
- x) Trial run of the gearbox along with fan to be done & check for any abnormality like vibration & noise, if nothing noticed, then all walkway accessories lifting arrangements are to be drawn from CT cell.
- y) FC valves are to be opened for charging CW water in to the deck.
- z) Final trial run.

21.4. CT FAN BLADE PITCH SETTING

- a) Isolation of the particular shell for which CT blade work is to be done.
- b) Making of approach way to gearbox/blade with proper safety.
- c) Loosening/removing & prefixing of blades as per the required blade profile angle & tightening.
- d) Damaged bolts/nuts are to be replaced by new ones.
- e) All blades in one fan should be fixed to same pitch angle.
- f) Remove the walkway from the CT.

21.5 REPLACEMENT OF CT FAN BLADE.

- a) Isolation of the particular shell for which CT blade work is to be done.

- a. Making of approach way to blade with proper safety.
- b. Loosening/removing hub Plates of concerned blade/blades.
- c. Damaged blades/ bolts/nuts are to be replaced by new ones.
- d. Bring new blade/blades from site/main store to the CT.
- e. Fix the blade along with hub plates with proper tightening.
- f. Adjust all blades of fan to same pitch angle.
- g. Shift the damaged blades to store.
- h. Remove the walkway from the CT.

21.6 Replacement of CT Drive Shaft

- a) Dismantle the CT fan drive shaft from fan & motor
- b) Carefully remove the old shaft from its position to outside after removing the motor from its base.
- c) Insert the new shaft in its position.
- d) Do necessary alignment of the shaft with CT gear box & motor.

21.7. REPLACEMENT OF CT GEARBOX OILSEAL

- a. Isolation of the particular shell for which fan oil seal is to be changed.
- b. Making approach way to gearbox.
- c. Draining of oil & shifted to designated place.
- d. Dismantling of drive shaft of gearbox & making accessibility to oil seal.
- e. Removing oil seal & refitting after proper checking of shaft & oil seal housing.
- f. Alignment of drive shaft to motor & gearbox to be done.
- g. If required, replace the coupling rubber bushes/fasteners etc.
- h. Bring oil from store & filling of oil (used/new) up to level.
- i. Removing walkway from concerned CT.

21.8. DECOUPLING & COUPLING OF FAN AND MOTOR

- a) Isolation of the particular shell for which fan alignment/motor repair work is to be done.
- b) Making approach way to gearbox.
- c) Decoupling of motor & remove from its base, if required.
- d) Placing motor in its foundation after repair, if necessary.
- e) Align & couple drive shaft with motor & gearbox as per tolerance.
- f) If required, replace the coupling rubber bushes/yoke assembly & fasteners.
- g) Trial run of fan & check/correct for any abnormality.
- h) Removing walkway arrangement from CT.

21.9 Removal of Hub from Gear Box

- a) Isolation of the particular shell for which hub replacement is to be done.
- b) Making approach way to gearbox.
- c) Dismantling of all blades, hubs cover etc.
- d) Remove hub from shaft making required arrangement.
- e) Shift the hub to the CT basin.
- f) Removal of walkway.
- g) Shift the damaged hub to store.
- h) Shift scraps to store.

21.10 FAN HUB REPLACEMENT

- a) Isolation of the particular shell for which hub replacement is to be done.
- b) Making approach way to gearbox.
- c) Arrangement for lifting of hub to be done.
- d) Bringing hub from site/main store.
- e) Dismantling of all blades, hubs cover etc.
- f) Removal of hub from shaft & fitting of new/repair hub.

- g) Fitting of blades, hub, if necessary change bolts.
- i) Blade pitch setting & tightening of all blades to single angle.
- j) Trial run of fan & check/correct any abnormality.
- k) Removal of walkway.
- l) Shift the damaged hub to store.
- m) Shift scraps to store.

21.11 CLEANING OF CT DECKS.

- a) Isolate deck valves of either side for each fan.
- b) Collect the different foreign materials present in the decks & thrown them away from CT surface.
- c) Clean the holes & surfaces on the deck properly.
- d) Refix /check the sprinkler nozzles in the deck & if required replace them with new ones.
- e) Clean the total surface of concerned cooling tower.

21.12 Removal/Replacement of spiral target Nozzles

- a) Isolate the particular shell where the nozzles are to be replaced.
- b) Clean that particular shell before replacement of the nozzles.
- c) Remove the worn out nozzles from its position using special chisels etc.
- d) Take proper care so that the shell concrete will not break.
- e) Insert the nozzles in its position.

21.13. REPLACEMENT OF CT GEAR BOX.

- a) Isolation of the particular shell for which replacement of the gearbox is to be done.
- b) Arrangement of safe walkway & platform to inter inside & work inside the shell.
- c) Removals of the shaft coupling pins & bushes from the motor & gear reducer end.
- d) Removal of the fan blades from its hub & hub from its shaft.
- b) Complete drainage of oil from gearbox & shift to designated place.
- c) Necessary arrangement for lifting & shifting of gearbox from CT inside to outside to be done.
- d) Opening of the foundation fasteners and removal of the gearbox to outside of CT with adequate safety arrangement.
- e) Bring the new gearbox from site/main store & lift it to the CT deck surface safely.
- f) Transfer the gearbox to the concerned CT center.
- g) Place the gearbox on the foundation & fit the hub to the shaft with locking.
- h) Leveling & tightening of the gear box housing.
- i) Alignment of the drive shaft with gearbox & motor & coupling yoke assemblies in motor & gearbox ends.
- j) Bring oil from store & filling oil in the gearbox up to the mark.
- k) Trial run of the gear reducer without fan, if no abnormality is noticed then the fan hub & blades are to be mounted & pitch angle is to be readjusted as per requirement.
- l) Old/damaged gearbox to be shifted to central store.
- m) Trial run of the system for checking of any abnormality like vibration & noise, if no abnormality noticed, then all walkway accessories is to be drawn from cell immediately.
- n) Old/damaged gearbox to be shifted to store as per instruction.
- o) FC valves are to be opened for charging CW water in to the deck.
- p) Final trial run.

21.14 PAINTING OF CT GEAR BOX

- * Black epoxy Paint will be supplied by OPGC.
 - a. Making approach way to gearbox.
 - b. Cleaning of gearbox surface & accessories properly by wire brush/ emery paper etc.
 - c. If required clean the foundation bolts of gearbox also.
 - d. Paint all parts with primer & two coats of paint after drying of each coat.
 - e. Removal of walkway from CT.

21.15 REPLACEMENT/REPAIR OF OIL HOSE SYSTEM

- 1) Making approach way to gearbox.
- 2) Draining of oil from Gearbox.
- 3) Flux the gearbox with new oil.
- 4) Check the breather, if required clean it.
- 5) Removal of old oil hose & fitting of new one.
- 6) Check connected valves & pipes, if required replace them with new one.
- 7) Filling of oil & checking for oil leakage (if any).
- 8) Necessary precaution to be taken to avoid draining of oil in floor.
- 9) Removal of walkway from CT.

21.16 OIL REPLACEMENT IN CT GEARBOX

- a. Drain the oil from gearbox.
- b. Making approach way to gearbox.
- c. Flux the gearbox properly with new oil.
- d. Bring oil from store & shift the old oil to store.
- e. Remove the walkway from CT.
- f. Necessary precaution to be taken to avoid draining of oil in floor.

21.17 FASTENERS TIGHTENING OF CT FAN

- a. Making approach way to CT gearbox.
- b. Tighten the foundation bolts, coupling bolts of gearbox & motor & blade hub bolts.
- c. All other fasteners of gearbox & motor to be tightened.
- d. If required change the damaged bolts with new ones.
- e. Remove walkway from CT.

22 FIRE HYDRANT SYSTEM

- Hydrant pumps-03nos,
- Make- Worthington Pumps India (Pvt) Ltd.
- Capacity-110KW , Model-C14TC
- Hydrant valves- 80 NB size,198nos
- Water Monitor Valves-100mm, 8nos

22.1 Overhauling of fire hydrant pump

- a) Arrangement for lifting motor & pump parts to done with safety.
- b) Decoupling of motor / diesel driven unit from coupling.
- c) Loosening of motor foundation bolts & lowering of the motor after cable & other accessories removal.
- d) If reqd. removes motor half coupling & refix.
- e) Removal of all small pipelines & pressure gauge from the pump unit.
- f) Dragging of pump coupling.
- g) Opening of the check nut.
- h) Removal of bearing.
- i) Removal of stuffing box.
- j) Loosening & removal of discharge flange of pump foundation.
- k) Removal of pump foundation tee.
- l) Removal of headstock.
- m) Removal of column pipes, spiders & line shaft etc.
- n) Removal of impeller unit.
- o) Dismantling of impeller unit.
- p) Cleaning & painting of all parts, if required.
- q) Assembling of impeller after all rectification and proper lift adjustment.
- r) Fitting of system.
- s) Trial run and checking of performance.

- t) All measurements/readings before & after corrections to be submitted by party.
- u) Arrangement for lifting of pump / motor to be made by party.

22.2 REPLACEMENT/ SERVICING OF PUMP BEARING

- a) Decoupling of pump & removing of motor from its base after making necessary arrangement.
- b) If reqd. removes motor half coupling & refit.
- c) Removing of bearing casing & removing bearing by jacking arrangement.
- d) Changing of bearing, coupling bushes/pins if required.
- e) Checking/correction of cooling & lubrication system.
- f) Refitting of parts.
- g) Checking of axial lift of pump.
- h) Alignment of pump to motor & coupling.
- i) Gland tightening/checking after running.
- j) Trial run of pump, condition monitoring & rectification if required.

22.3 DECOUPLING & COUPLING OF PUMP MOTOR

- a) Decoupled motor from pump coupling.
- b) Remove motor from its base.
- c) If required, remove motor coupling from its shaft by jacking.
- d) After motor servicing, place motor in its base with its coupling.
- e) Align motor coupling with pump coupling.
- f) If coupling bushes/pins damaged, change it by new one.
- g) Couple pump & motor properly.
- h) Trial run of pump, condition monitoring & rectification if required.

22.4 Gland changing/tightening.(Hydrant Pump)

- a) Loosen the gland follower.
- b) Remove the old glands carefully.
- c) After proper cutting of required gland, insert in with same nos.
- d) Tighten the gland follower lightly.
- f) After running of pump final tightness adjustment to be done.

22.5 Inspection & testing of Hydrant system.

- a. Checking of proper operation of the hydrant & water monitor valves at different locations.
- b. Any defect of the valves to be recorded.
- c. Flushing of the each valves.

22.6 Servicing of Hydrant valves

- j. After proper isolation, valve to be dismantled.
- k. It's parts like spindle, gaskets, bolts, coupling washers to be checked.
- l. If required damaged parts to be replaced by new one.
- m. After fitting operation of valve to be checked.

22.7 Servicing of Water Monitor valves

- a. Dismantling of the complete assembly.
- b. Lubricate all moving parts.
- c. Replace/repair & refit bush bearings as per instruction.
- d. Check the healthiness of the nozzle & it's bore, if required replace it.
- e. Fitting of all parts & checking for smooth operation of valve.

23. JOCKEY PUMP

Jockey pumps- 02nos, make- Worthington Pumps
Capacity-5.76KW, Model-IAO 1266-67

23.1 Overhauling of Jockey pump

Scope same as fire hydrant pump as mentioned above.

23.2 REPLACEMENT/ SERVICING OF PUMP BEARING

Scope same as fire hydrant pump as mentioned above.

23.3 DECOUPLING & COUPLING OF MOTOR(Jockey Pump)

Scope same as fire hydrant pump as mentioned above.

23.4 Gland changing/tightening.(Jockey pump)

Scope same as fire hydrant pump as mentioned above.

24. SPRAY SYSTEM

Spray Pumps-02nos,
Make- Worthington Pumps
Capacity-130KW,
Model- IAO1264-65

Alarm Valves-150NB, 5nos
Deluge valves-150mm(11nos), Technico make
Multiple Control units-288nos
Actuator Control Units- 72nos

24.1 Overhauling of Spray pump

Scope same as fire hydrant pump as mentioned above.

24.2 REPLACEMENT/ SERVICING OF PUMP BEARING

Scope same as fire hydrant pump as mentioned above.

24.3 Gland changing/tightening.(Spray Pump)

Scope same as fire hydrant pump as mentioned above.

24.4. Servicing of Alarm Valve

- a. Dismantling of Y strainer, NRV, alarm mechanisms.
- b. Cleaning of all components properly & check for any abnormality.
- c. If required replace the NRV, sheet gaskets, flange gaskets, pressure gauge etc.
- d. Fitting of all components any proper sequence.
- e. Check for proper operation of alarm system.
- f. If required rectify it again.

24.5 Inspection & testing Of Deluge Valves.

- a. Physically inspect all the valves & its system.
- b. At first close down stream isolation gate valve & open the drain valve.
- c. Then release the system air by operating press to release control valve.
- d. Check for proper functioning of the deluge valves.
- e. Open the down stream isolation gate valve & close the drain valve.
- f. Reset the system pressure by operating press to reset control valve.
- g. Record/report header air & water pressure & any abnormality.
- h. The inspection & testing has to be carried out minimum once per month for all the eleven nos of valves.

24.6 Servicing of Deluge Valves

- a. Close the both side-isolating valves.
- b. Dismantle the complete valve components.
- c. Check for any damaged parts & if required replace them with new one.
- d. Check & ensure for smooth operation of alarm valve.
- e. Check healthiness of the air circuit, if required repair/replace it.

24.7 Servicing and checking of multiple/actuator control units

- a) Checking of control units of sprinklers, which are installed on cable galleries.
- b) Servicing of the units as per requirement.
- c) Cleaning of choke nozzles.
- d) Resetting of the unit after servicing.

24.8 Replacement of Nozzles in Sprinkler system (Area- along coal conveyor,
Out door transformer, Cable Gallery, Fuel oil tank, Hydrogen cylinder storage shed,DG building).

- a) For replacement of nozzles in sprinkler system, first isolate the root valve.
- b) Drain the water in the header.
- c) Remove the broken nozzle from the header.
- d) Replace the new nozzle in the designated pipe.
- d) Restore the Position of isolated valve.

24.9 Inspection & testing of TG Bearing Fire Protection System.

Inspection & testing of TG bearing fire protection system has to be done once in every month.

- a) Close the Main Control Valve.
- b) Close the Diaphragm Chamber Supply Control Valve and the System Air Supply Control Valve.
- c) Open the Main Drain Valve & System Drain Valve in the system. After water ceases to discharge, close the System Drain Valve. Leave the Main Drain Valve open.
- d) Depress the plunger of the Automatic Drain Valve to verify that it is open and that the Deluge Valve is completely drained.
- e) Clean the Strainer in the Diaphragm Chamber Supply connection by removing the clean-out plug and strainer basket. The Strainer may be flushed out by momentarily opening the Diaphragm Chamber Supply Control Valve.
- f) Open the System Air Supply Control Valve and allow the system to automatically re-establish its nominal air pressure of 21 psi.
- g) Reset the actuation system.

Manual Actuation: - Push the operating lever up.

Electric Actuation: - Reset the electric detection system to de-energize the Solenoid Valve.

- h) Open the Diaphragm Chamber Supply Control Valve and allow full pressure to build up in the Diaphragm Chamber.
- i) Operate (open) the Manual Control Station to vent trapped air from the Diaphragm Chamber. If necessary, first open the hinged cover, and then fully pull down on the operating lever. SLOWLY close the operating lever; by pushing it up, after aerated water ceases to discharge from the Manual Control Station drain tubing. Close the hinged cover.
- j) Verify the ability for the Deluge Valve Diaphragm to hold pressure as follows:
With the diaphragm chamber pressurized, temporarily close the Diaphragm Chamber Supply Control Valve, and monitor the Diaphragm Chamber Pressure Gauge for a drop in pressure. If a drop in pressure is noted, the Deluge Valve Diaphragm is to be replaced and/or any leaks must be corrected before proceeding to the next step. If the Diaphragm Chamber Pressure Gauge does not indicate a drop in pressure, re-open the Diaphragm Chamber Supply Control Valve and proceed to the next step.
- K) Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine / correct the cause of the leakage problem. If there are no leaks, the Deluge Valve is ready to be placed in service and the Main Control Valve must then be fully opened.

24.10 Dismantling & re-erection of TG Bearing Fire Protection system during AOH.

- a) The piping of TG bearing Fire protection system has to be dismantled during AOH as per requirement.
- b) The pipes are fitted with victaulic coupling arrangement.
- c) Dismantle the pipes from the coupling & keep carefully in safe place.
- d) After getting clearance, again re-erect the pipes.
- e) The pipe size varies from 50NB to 65Nb.
- f) No gas cutting or welding work is involved with the work.

24.11 Dismantling & re-erection of Sprinkler piping for transformer during AOH.

- a) The out door transformers are protected with High velocity water spray System.
- b) The Sprinkler pipes are fitted with coupling & flange joints.

- c) As per requirement the pipings of the transformers are to be dismantled during AOH only.
- d) After getting clearance the pipes are to be re-erected.

24.12 Rectification of Flange leakage from Sprinkler line at 15mtr height.

- a) The Medium velocity water spray system is installed for fuel oil tanks at ITPS.
- b) The maximum height of the tank is eighteen meters.
- c) For maintenance (like attending flange leakage, sprinkler replacement) of the system scaffolding is to be prepared up to the appropriate height.

25 Underground fire fighting pipeline

25.1 Repair of underground fire fighting pipeline

- a) Locating under ground leakage points by earth digging
- b) If required concrete is to be removed.
- c) Dewatering wherever required at the leakage points.
- d) Cutting of damaged MS pipe line is to be done which is in party's scope
- e) Welding of pipeline, which is in party's scope.
- f) New pipe is to be brought from store / site which is in party's scope.
- g) Wrapping & coating/black epoxy painting to be done(as per instruction).
- h) After rectification earth is to be refilled
- i) Unit of measurement is per pit.

25.2 Replacement of underground fire fighting pipeline

- a) Locating under ground leakage points by earth digging
- b) If required concrete is to be removed.
- c) Dewatering wherever required at the leakage points.
- d) Cutting of damaged MS pipe line is to be done which is in party's scope
- e) Welding of pipeline, which is in party's scope.
- f) New pipe is to be brought from store / site which is in party's scope.
- g) Wrapping & coating/epoxy black painting to be done (as per instruction).
- h) After rectification earth is to be refilled
- i) Unit of measurement is per pipe (6 mtr each).

26. CHLORINE SYSTEM

CHLORINE BOOSTER PUMPS-2nos

Model- KRN 443WW (KBL), capacity-7.5KW

26.1 Servicing of Chlorine Booster Pumps

Scope same as D.M. Transfer pump as mentioned above.

26.2 Motor decoupling & coupling (Cl2 Booster pump).

Scope same as DM transfer pump as mentioned above.

26.3 Servicing/cleaning of Filters

- a) After isolation of the chlorine lines open the filters & clean properly.
- b) After cleaning securely tight the fittings do that there will be no leakage.

27. PREVENTIVE CHECKS OF OFF-SITE EQUIPMENTS

27.1 Preventive checks of CT & FIRE FIGHTING Equipments

Check the equipments in Cooling Tower & Fire fighting pump house on every Wednesday for oil level, gland leakage etc as per direction of Engineer-in-charge. If required do oil toughing up in the equipments wherever required.

27.2 Preventive checks of CW, BCW & RW Pumps.

Check the equipments in CW,BCW & RW on every Thursday for oil level, gland leakage etc as per direction of Engineer-in-charge.If required do oil toughing up in the equipments wherever required.

27.3 Preventive Checks of DM Plant Equipments

Check the equipments in DM Plant area on every Friday for oil level, gland leakage etc as per direction of Engineer-in-charge. If required do oil toughing up in the equipments wherever required.

MISCELLANEOUS WORKS

ITEM 1(A) FABRICATION & ERECTION OF PIPING SYSTEM: -

Erection of piping shall system include withdrawal of materials from stores, loading & unloading, transportation, safe storage, cleaning by wire brushing / water flushing, cutting preheating, bending, setting, alignment, erection, welding, providing support, fitting to the required equipment / flange etc. & pressure testing etc. The assembly /erection shall include erection of valves, flanges, orifice, blanks & other instrument fittings etc. if any. If the piping length involved is less than 5 mtrs for a particular size of pipe, payment shall be made on the basis of nos. of weld joints carried out as per item no.2. No separate payment for the erection of pipe, valves, orifice, flow nozzle, other supports & fittings shall be made. Special electrodes will be supplied free of cost.

NOTE: -

- a) For the pipe above 200 NB size but below 500 NB, the rates applicable shall be 18 % above the base rate of 200 NB pipe, for every 50 NB increase pipe size as **per formula-A as mentioned below.**

$$RT= R (1+C(D-200)/50)$$

Where RT= Rate for the pipe above 200NB size but below 500NB

R= Base rate for 200NB size pipe.

C=0.18, co-efficient for pipe above 200NB but below 500NB.

D= Size of the pipe in NB.

- b) For pipe above 500 NB size, the rate applicable shall be 12 % above the base rate of 500 NB pipe, for every 50 NB increase in pipe size as **per formula –H as mentioned below.**

$$Rb= R (1+Cb (D-500)/50)$$

Where Rb= Rate for pipe above diameter 500NB

R= Base rate for 500NB.

Cb= 0.12, co-efficient for pipe above 500NB size.

D= Size of pipe in NB.

- c) For pipes/tubes below 200 NB size, the rate applicable shall be directly proportionate to the rate of 200 NB pipe (e.g. For 40 NB pipe it will be 200 NB rate x 40/200) & so on.

- d) The rate shall be applicable for pipe thickness up to & including 10mm.

- e) For thickness above 10 mm, for every 1 mm increase in thickness the unit base rate shall be increased by 3 % as per **formula – C as mention below.**

$$RT= R (1+C2 (T1-10))$$

Where RT= Rate for pipes above 10mm thickness.

R= Base rate for 200NB size pipe.

C2= 0.03, co-efficient for pipes of thickness more than 10mm.

T1= Thickness of the pipes.

- f) These rates are applicable to the rate of piping system equal to or more than 5 meters.

- g) No separate payment shall be made scaffolding etc. or any such arrangement, necessary to be made for efficient erection of the job.

- h) The rates include cutting leveling, fitment, preheating, welding & erection of valves, flanges, Tees, elbows. Piping fittings etc. if any in the piping system.

ITEM 1 (B): DISMANTLING OF PIPING SYSTEM: -

The job involves dismantling of piping system by gas cutting / hacksaw cutting, disconnecting of threaded & bolted joints & transportation of scraps to a suitable place as instructed by concerned engineer. Rates applicable shall be 50% of the rates against item 1(A).

ITEM 2: CUTTING & WELDING: -

The rates shall be applicable for cutting and welding of lay up of pipelines whose length is less than 5 mtr. Or making some modifications on existing pipelines or equipment / structural equipments wherever cutting, beveling and welding is involved. These rates shall also be applicable for branch joint also wherever branching is taken (i.e. no special rate shall be applicable for branch fabrication. Necessary locking of pipes for replacement will be made.

The radiography /stress relieving shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If joints fail in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for the second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. No separate payment to be made for scaffolding. Rate for cutting & welding will be limited to 10 mm alloy / carbon/S.S and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4 % for every mm beyond 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding.

ITEM – 3: RECTIFICATION OF FLANGE LEAKAGE: -

Leaky flanged joints shall be rectified by removal of bolts & nuts, cleaning the mating surface providing new gasket & tightening the bolts. The line when commissioned or tested should be leak proof.

NOTE:-

- a) For the flange joints above 200 NB size the rate applicable shall be 20% above the base rate of 200 NB flange joint, for every 50 NB increase in the flange size **as per formula-G as mentioned below.**

$$Rs = R (1 + Cs (D - 200) / 50)$$

Where Rs= rate for the flange above 200NB size.

R= Base rate for 200NB flange

Cs=0.2, co-efficient for flange above 200NB.

D= Size of the flange in NB.

- b) For flange joints below 200 NB size, the rate applicable shall be directly proportionate to the rate of 200 NB pipe (e.g. For 40 NB pipe it will be 200 NB rate x 40/200).
- c) Rate shall be applicable for all types of flanges of all materials of construction & pressure ratings.
- d) The flanges may be on pipelines / equipment / heat exchangers / tanks etc.
- e) Gaskets required are to be cut from metallic / non- metallic / oil gasket sheet including punching of holes. Gaskets & nut – bolts shall be provided by ITPS.
- f) The scope of work includes all types of joints (except welding joints) viz, flange/screw joints union etc. Manhole joints shall also be treated as flange joints.
- g) Odd flange joints like square / rectangular etc. are to be treated as circular flange joints by comparing the perimeter to nearest standard circular flange joint.
- h) The flange should be leak proof after commissioning / charging the line failing which the contractor is to attend the same free of cost.

ITEM – 4: FABRICATION & ERECTION OF STRUCTURAL: -

The job involves fabrication & erection of structural, like platform& its ladders, handrails, supports, miscellaneous structural items etc. Fabrication & erection are to be carried out at different heights & various locations within factory premises. Required materials, drawings & job details will be provided by ITPS. Billing for the quantity up to 10 Tonnes will be as per cutting & welding rates of Item 2. For quantity above 10 Tonnes, billing shall be as per Tonnage.

ITEM – 4(A): FABRICATION: -

The job includes receipt of structural from ITPS stores, transportation to site / place of use, & fabrication as per drawing / sketch / instruction of the concerned engineer. Type of welding electrode to be used & thickness of weld shall be as per direction of the concerned engineer & to be arranged by the contractor. The entire structure shall be free from sharp edges, slags, & burrs. Two coats of red oxide paint are to be applied by the contractor, after the fabrication work, for which no extra charge shall be made.

ITEM –4(B): ERECTION: -

The job covers transportation of fabricated structure to site & erection / assembly etc. Assembly, bolting, welding, alignment etc. come in the scope. The contractor will do grouting. However grout material will be supplied by ITPS. ITPS shall provide as free issue materials, structural steels including angle, channels, plates, pipes, fasteners like nut – bolt etc. The contractor has to arrange other consumables like gas, electrodes, paint, clamps tools & tackles etc.

No separate payment for scaffolding will be made.

ITEM –5: APPLICATION OF PAINTING: -

Protective coating may be required to be applied to pipes, equipment, structural at various locations & elevations inside the plant. The scope of work includes cleaning the surface to remove dirt oil, grease, rust, scale & other contamination etc. by blasting, chipping, scrapping, wire brushing etc., applying one coat of primer paint & two coats of finishing enamel paint .The interval of surface preparation & painting shall be minimum & in no case longer than 4 hours. The application procedure shall be in accordance with the prescribed recommendations of the paint manufacturers & IS: 1477 Part-II. ITPS shall supply paint as free supply material. However the agencies may coat the rates for this item as (I) including the cost of paint & thinner, (ii) excluding the cost of paint & thinner. All other materials like brush, wire brush etc., tools & tackles are to be arranged by the contractor at his own cost.

- I) APPLICATION OF PAINTING (WITH COST OF PAINTS)
- II) APPLICATION OF PAINTING (WITHOUT COST OF PAINTS)

ITEM –6: ERECTION OF SCAFFOLDING: -

The scope of works includes fabrication & erection of scaffolding inside & out side of ash handling. Water treatment plants etc. to facilitate inspection & other job to be carried out by ITPS. The scaffolding should be rigid. They can be made out of MS tubes / pipes / bamboos / planks etc. Clamps & new ropes are to be used for preparing the scaffolding. Wherever required, the contractor has to provide platform by using good wooden planks, which can withstand a minimum of 4 people of about 300 kg. Load. All materials required for executing the above job should be arranged by the contractor at his cost. While erecting the scaffolding, the contractor should exercise utmost caution, so that instruments, pipelines etc. are not damaged. Scaffolding outside the pipes / equipment shall be two meters length & two meters in width. If it is required to cover a large area, another scaffolding has to be erected by the contractor. The payment shall be per meter height of erection from the base of the scaffolding upto the top most platform only covering a minimum base area of 4 sq. mtrs.

ITEM – 7: REPLACEMENT OF VALVES (MOT. OPERATED, CONTROL, MANUAL, NRV, & STEAM TRAP) CLASS 800 & BELOW: -

The work involve in taking out the valve from the position and returning the same to the stores or any other place as directed by maint. engineer. Bolts and nuts are be cleaned by applying graphite grease on the threads, which will be supplied by OPGC. Erection of repaired/new valves into position and make it leak proof at the flange joints. If necessary, the gaskets may be replaced by new gaskets. In case welded type valves, during replacement additional charges for joint welding shall be applicable as per item-2 of miscellaneous jobs. The radiography/ ultrasonic/post heating/pre heating/stress relieving if required shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If joint fails in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. Rate for cutting & welding will be limited to 10mm alloy/carbon/ss and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding.

NOTE: -

- a) For valves above 200NB size, the rates applicable shall be 25% above the base rate of 200NB pipe, for every 50NB increase in pipe size **as per formula – F as mentioned below.**

$$R_v = R (1 + C_v (D - 200) / 50)$$

Where R_v = Rate for the valve above 200NB size

R = Base rate for 200NB flange.

C_v = 0.25, co-efficient of valve above 200NB

D = Size of the valve in NB.

- b) For valves in pipelines below 200NB size, the rates applicable shall be in direct proportionate to the rate of the 200NB pipe valve (for e.g. for 100NB pipe, it shall be 200NB rate X 100/200 and so on.).
- c) Unit rate shall be applicable for all types of valves and all materials of construction & pressure ratings.
- d) While erecting the valves, wherever necessary new gaskets shall be provided at no extra cost. Gasket/gasket sheet shall be provided by OPGC free of cost. Fixing of gasket, bolts, nuts and making the joint leak proof are included in the scope of job.
No separate payment will be made for erection of valves.

ITEM – 8: SERVICING OF VALVES (MOT. OPERATED, MANUAL, NRV & STEAM TRAP) CLASS 800 & BELOW:-

- a) Removal of actuators (in case of mot. operated valves.)
- b) Removal of old gland packing, diaphragm, dismantling the bonnet/spindle/disc/seat is to be done as per requirement.
- c) Complete servicing of the above components including blue matching.
- d) Reassembly including replacement of new gasket/gland packing/diaphragm/rubber rings etc.
- e) Checking for freeness of valve.
- f) In case, the rectified valves do not work properly or hold pressure, contractor has to rectify the same free of cost. In case seat leak is not rectified, no payment will be made.
- g) Spares, gasket, gland packing etc. will be provided by OPGC.

NOTE: -

- e) For valves above 200NB size, the rates applicable shall be 25% above the base rate of 200NB pipe, for every 50NB increase in pipe size **as per formula – F as mentioned below.**

$$R_v = R (1 + C_v (D - 200) / 50)$$

Where R_v = Rate for the valve above 200NB size

R = Base rate for 200NB flange.

C_v = 0.25, co-efficient of valve above 200NB

D = Size of the valve in NB.

- f) For valves in pipelines below 200NB size, the rates applicable shall be in direct proportionate to the rate of the 200NB pipe valve (for e.g. for 100NB pipe, it shall be 200NB rate X 100/200 and so on.).

ITEM-9:-CHANGING OF VALVE GLANDPACKINGS FOR MANUAL /MOTORISED /CONTROL VALVES OF ALL CLASSES: -

It is required to open the valve gland follower to take out the damaged packing rings, replace them by new rings & place the gland follower in position for valves of different sizes. Packing rings/packing ropes shall be provided by OPGC as free issue materials.

ITEM-10: OVERHAULING & LOAD TESTING OF HOT/CHAIN PULLEY BLOCK/ELECTRIC HOIST: -

10-(A): OVERHAULING OF ELECTRICAL HOIST: -

The gearboxes, brakes, all bearings, traveling wheels, wire ropes & other components are to be checked thoroughly & serviced. Change of lubricants & lubricating of wire rope are to be done wherever required & as per advice of engineer in charge. After overhauling, proper operation of the crane to be ensured. Spares required shall be supplied by OPGC free of cost. Minor repair arising out of wearing parts have to be done by the contractor & the same is considered as part of the scope of work. The waste lubricants & scraps are to be shifted to designated location.

10-(B): LOAD TESTING OF HOT /CHAIN PULLEY BLOCK 1T,2T,3T,5T,7.5,10T& 15T :

The chain pulley blocks are to be checked for proper operation prior to load test & load tested at 1.25 times its individual capacity or as per the direction of engineer in charge.

The test load shall be supplied by OPGC free of cost. However necessary arrangements, transportation of test loads to the testing place & return to designated place are to be done by the contractor. The servicing & load testing shall be repeated, if the equipment does not give satisfactory result & to the satisfaction of the testing engineers & safety officers of OPGC.

NOTE:- After servicing / load testing of lifting machine, the date of testing & the load for which it is tested has to be stamped on the equipment by paint clearly.

10-(C): LOAD TESTING OF ELECTRIC HOIST: -1T, 2T, 3T, 5T, 7.5,10T & 15T:

The Electric Hoist with chain blocks shall to be physically checked for operation of limit switches/lubrication of ropes etc & it is to be rectified if required. Then hoists are to be tested individually at 1.25 times of its capacity or as per instruction of competent authority. The test load shall be given by OPGC & the contractor has to make their own arrangement for transporting the test loads to different spots & returning them back again as per requirement. The test load shall be kept in lifted condition for at least 1-½ hours & the lift clearance to the ground shall be measured at the interval of 10 mins. Further, along with the test load the crane shall be operated in long & cross travels. On satisfactory results the job is said to be completed,

Any defects noticed while testing the hoist is to be rechecked & same procedure shall be for which no extra cost shall be payable.

NOTE: - After servicing & load testing of lifting machine, the date of testing & the load for which it is tested has to be stamped on the equipment by paint clearly.

Boiler Licence recertification:

Complete all the paper work pertaining to renewal of Boiler license.

Submission of application at Directorate Office F& B Odisha for Re-certification.

Liaisoning with Director office to get the certificate.

Boiler Tube Leak Repair including liasoning -Scope upto 10joints:

Detection of Leakage point .

Erection of Scaffolding to attend the leakage(Material under OPGC Scope)

Leakage tube cutting and removal and edge preparation for new tube s.

Fitment of new tube and complete welding.

Radiography of welding joint.

Assistance for hydro test.

Supply of IBR Welder:

The welder Should be approved IBR welder , and should have valid welding license approved by the Directorate of F&B Odisha.

The Welding set arrangement (TIG welding) is under the scope of Vendor.

AHP AOH job scope

Clinker Grinder Over hauling(AOH)

Removal of Hydro ejector and piping system and associated pipe lines.

Removal of chain & sprocket and associate gears.

Removal of clinker grinder assembly from position

Dismantling of roller assembly including bearing and gland.

Inspection and replacement of worn out part.

Assembly of Clinker grinder & fitting of drive and trial run.

Feed Gate Housing Overhauling(AOH):

Removal of side cover and Disconnection of power cylinder.

Removal of feed gate wage rollers.

Removal of feed gate and inspection.

Necessary repairing by replacement of metal strip

Check the clearances and assemble the feed gate . Check passing by water filling.

Power Cylinder Overhauling(AOH):

Removal of Power Cylinder from position.

Disementaling of PS, unspection of internals.

Replacement of damaged parts including diaphragm, seal etc.

Assembly of Power Cylinder and trial run.

Driver to Operate- Hydra,Truck & LMV Driver as per requirement(HMV & LMV licence) :

The driver should have adequate experience in driving (At least five year) Hydra,Truck & Light motor vehicle.
The operator has to have valid driving license for all the above three category vehicles.

Daily checking of the above specified vehicle.

Minor maintenance required to keep the vehicle healthy.

Carry out all the rules that come time to time related to Vehicle safety.

Replacement of Condenser Bellow

1. Arrangement of Scaffolding and platform to remove the Bellow from position(Approximate height 10mtr).Material of Scaffolding will be under the Scope of OPGC.
2. Locking the CW pipes before removal of Old bellow.
3. Dismantling of Old bellow and surface cleaning before fitment of new bellow.
4. Installation of New bellow and unlocking the pipes.
5. Trial run with CW pump in service and checking for no leakage .

**Annual Overhauling of Mechanical Equipments
(Mills, Feeders, Fans and misc. works) of 210MW Unit**

MILLS,FANS & FEEDERS

1. FABRICATION, REMOVAL & WELDING OF DAMAGED SCREW CONVEYOR RIBBONS, CHAIN LINKS, STIFFNER PLATES OF MILL DURING REPAIR /OVERHAUL

- a) Ensure PTW.
- b) Open mill shell, P A duct and screw conveyor manholes.
- c) Remove the old worn out/broken ribbon with chains.
- d) Fabrication of screw conveyor ribbon to required size, align new ribbon and weld with existing helix with a back of plate.
- e) Fabricate required size chains from EN8 rod and weld chain links with hot air tube.
- f) The above work includes opening & closing of required manhole doors and extra payment will not be done for manhole doors opening and closing.
- g) Raw material like ribbon plate, rod for chain fabrication and special electrodes shall be provided by OPGC.
- h) Check sheet to be filled by the fitter before & after the final job.

NB-Rate shall be quoted on Mill basis.

2. REPLACEMENT OF ENTIRE SCREW ASSEMBLY(ONE SIDE OF MILL)

- a) Ensure PTW.
- b) Removal of the bearing and bearing housing of the screw conveyor.
- c) Removal of the hot air duct by gas cutting.
- d) All fastenings of the screw conveyor with mill shell i.e. drive bars are to be removed by gas cutting.
- e) Withdrawal of the existing damaged screw conveyor.
- f) Inserting the new /repaired screw conveyor.
- g) Align hot air tube and fix drive bars.
- h) Mount new/old bearing in screw conveyor.
- i) Maintain the clearances after final alignment as per instruction of E-I-C.
- j) Weld the drive bars and nut.
- k) Box up the manholes.

3. REPAIR OF SPARE SCREW CONVEYOR OUTSIDE MILL

- a) Ensure PTW.
- b) Removal of old/damaged ribbon/chain link /worn out liner plate/angle etc.

- c) Hard facing of the screw conveyor joint and refitting of new angles.
- d) New helix shall be refitted and chains to be fabricated and refitted.
- e) Angles shall be welded at suitable distance.
- f) Arc welding shall fill any wear and tear in the hot air tube. Grinding shall be done to achieve good finishing.

NB:- OPGC shall supply readymade ribbons. However, chains are to be fabricated from EN8 rod supplied by OPGC.

4. OPENING OF MAN HOLE DOOR:-

- a) Ensure PTW
- b) Open the manhole door as directed by the engineer in charge.
- c) Close the manhole doors after completion of job/inspection etc by putting proper rope/gasket as may be the case. Contractor will quote rate per manhole basis.

4.1 SHELL MAN HOLE DOOR:-

4.2 SIDE MAN HOLE DOORS IN HOT AIR BOX & DUCT

5. REPLACEMENT OF CERAMIC PACKING ROPE FOR P.C. OUTLET PIPE BEFORE CLASSIFIER FEED ASSY. & REFUSAL DUCT CLASSIFIER EXPANSION JOINT:-

- a) Ensure PTW
- b) Loosen the fasteners of non-metallic bellows erected in feed pipe and PF duct.
- c) Loose the bolts and insert new ceramic rope(supplied by OPGC).
- d) Tight sufficient to arrest coal leakage.
- e) Finally put the non-metallic bellows and tighten all the bolts.
- f) Check for any leakage after running of the mill.

5.1 P.C. outlet pipe before classifier feed assy.

- a) Refusal duct classifier expansion joint.
- b) P.C. outlet gates flange joints
- c) Feed pipe feeder O/L expansion joint

6. INSPECTION & TIGHTENING OF LINER/ANCHOR/SHELL/ TRUNION BOLTS ETC.:-

- a) Ensure PTW
- b) Inspection & tightening of mill liner bolts, anchor bolts, hot air box bolts, trunion bolts, girth gear bolts & shell bolts during AOH.
- c) Required nuts & bolts will be provided by OPGC. Contractor will be paid as per no of bolts tightened/replaced by them.
- d) Rates to be quoted accordingly. All types of nuts & bolts are treated as same in this scope e.g. 8.8 to 10.9 class M24,M36 etc.
Total number of bolts in one mill is approx.1200.

6.1 Rate to be quoted for entire bolts in mill.

7. SHELL LINER REPLACEMENT:-

7.1 COMPLETE LINER REPLACEMENT

- a) Ensure PTW
- b) Shell to be rotated to suitable position for easy removal of shell liners.
- c) Opening of the shell doors as required for the work.
- d) Loosening the liner bolts & removal of old liners.

- e) Liners to be replaced with new ones & to be bolted new bolts/nuts/washers as per instruction of E-I-C.
- f) Torque tightening as per instruction of the E-I-C.
- g) Sound hood structure is to be reassembled, man hole doors to be closed.
- h) Rechecking of tightness of the liner bolts after mill is rotated for 7 to 8 hours.
- i) Check sheet to be filled by the fitter before & after the final job.

NB- Total number liners are 560 approximately in BBD4760 mill.

7.2 PER LINER: IF FULL QUANTITY IS NOT TO BE REPLACED THAN RATES APPLICABLE SHALL BE PER LINER BASIS.

NB-Rate shall be quoted on PER LINER basis.

8. BALL CHARGING AND SEGGREGATION :-

- a) Ensure PTW.
- b) Removal of all balls from the mill by opening shell door.
- c) Shift the empty ball drums from warehouse area to the ball filling area of the mill.
- d) Segregation of the ball as per the different sizes and balls are to be filled in drum.
- e) Under size (i.e. Below 30 mm) to be segregated (Either by segregation grill or ball segregation machine) & put into separate drums .
- f) Shifting of the new ball drums from ware house .
- g) Approx 20T of the ball are to be replaced in each mill. There will not be any extra payment for this.
- h) Make suitable safe lifting arrangements for lifting the ball drums to the ball-feeding funnel/shell manhole. Arrange for manual/motorized winch incase overhead hoist is not operative.
- i) Lift the ball drums to the ball feeding funnel/shell manhole and fill the funnel by opening the drum.
- j) Fill coal approx.5 MT in the mill before charging the ball, if segregation of balls in mill are done.
- k) Operate the ball feeding sequence and charge the balls in to the mill in case mill in operation. Operate the gates manually in case the sequence is not operative.
- l) Lower down the empty drums to 'O' M and shift them to stacking area as per the direction of E-I-C.

NB-Contractor shall quote rate on the basis of per mill.

NB- Party has to arrange Forklift and Hydra for the shifting of the Ball drums.

9. INSPECTION & SERVICING OF MAIN REDUCER TO DRIVING SHAFT COUPLING:-

- a) Ensure PTW.
- b) Open the coupling guard.
- c) Open the coupling by opening coupling bolts & back plate bolts.
- d) Entire grease to be cleaned & the waste grease to be transferred to drum.
- e) Coupling hub outer is to be taken out along with the oil seals & 'O' rings.
- f) Inspection of the gear teeth & checking of coupling gap
- g) Greasing to be done in the coupling.
- h) Reassembly of the whole thing after completion of the work. There should not be any grease leakage after trial run. In case of leakage, contractor has to do the job free of cost. Spares will be provided by OPGC.
- i) Check sheet to be filled by the fitter before & after the final job.

10. INSPECTION & SERVICING OF OTHER DRIVE COUPLINGS

10.1 AUX. REDUCER TO MAIN MOTOR

- a) Ensure PTW
- b) Contractor has to open the coupling guard
- c) Open the coupling after opening the necessary coupling bolts.
- d) Entire grease to be cleaned & the waste grease to be transferred to drum.
- e) Inspect the Coupling and replace any oil seals & 'O' rings if required.
- e) Greasing to be done in the coupling
- g) Assembly the coupling.

10.2 MAIN MOTOR TO MAIN REDUCER

- a) Ensure PTW
- b) Contractor has to open the coupling guard
- c) Open the coupling after opening the necessary coupling bolts.
- d) Entire grease is to be taken out.
- e) Coupling outer hub is to be taken out along with the oil seals & 'O' rings.
- f) Flexible springs shall be cleaned properly.
- g) Inspect the coupling and box up.
- h) Inject new grease.

10.3 AUX. MOTOR TO AUX. REDUCER (FLUID COUPLING)

- a) Ensure PTW
- b) Contractor has to open the coupling guard
- c) Open the coupling after checking the seals & oil level
- d) Check the alignment, replace the fusible plugs.

10.4 AUX. MOTOR TO AUX. REDUCER (PIN BUSH COUPLING)

- a) Ensure PTW
- b) Open the coupling and inspect the pins and bushes.
- c) Replace the damaged pins and bushes.
- d) Box up the coupling.

10.5 OIL REPLACEMENT OF FREE WHEEL OUTSIDE GEARBOX.

- a) Ensure PTW.
- b) Remove the oil from the free wheel and fill new oil to the required level.

11. SERVICING OF AUX. REDUCER

- a) Ensure PTW
- b) Drain oil from reducer and remove top half after removing sound hood panels.
- c) Clean the bottom of gearbox and the spray nozzles.
- d) Inspect the condition of gears and bearings.
- e) Put the top half of the gearbox.
- f) Fill the old/new oil in the aux. Reducer

12. SERVICING OF MAIN REDUCER

- a. Ensure PTW
- b. Drain oil from reducer and remove top half.
- c. Clean the bottom of gearbox.

- d. Inspect the condition of gears, seals and bearings.
- e. Clean the oil spray nozzles.
- f. Put the top half of the gearbox.
- g. Fill the old/new oil in the main reducer.
- h. Run the lube oil pump and check the oil flow to the bearings.

13. SERVICING OF MAIN REDUCER LUB OIL PUMPS / REPLACEMENT OF COUPLING

- a) Ensure PTW
- b) Dismantling of the LOP from the pump motor assembly.
- c) Dismantling & servicing of the pump with the new seals & bearings.
- d) Assembly of the pump to the lube oil system.
- e) Replacement of damaged coupling.
- f) Trial run & checking for oil leaks.

14. CLEANING/REPLACEMENT OF OIL FILTERS/STRAINERS (MAIN & MAIN REDUCER)

- a) Ensure PTW
- b) Isolation of the filter by closing the valve.
- c) Open the vent of filter housing to depressurize.
- d) Open top cover of filter housing and remove filter.
- e) Clean the filter with air and diesel.
- f) Install new/old filter and tighten housing bolts as per instruction of E-I-C..
- g) Open equalizing valve and fill the filter with oil.
- h) Check the improvement in after filter pressure.

15. SERVICING OF GIRTH GEAR & DRIVE PINION

- a) Ensure PTW
- b) Clean the teeth of girth gear & drive pinion from grease with diesel.
- c) Rotate the mill in inching mode and check backlash & blue contact.
- d) Record the readings at various locations as per direction of E-I-C.
- e) Clean the blue from the gear and pinion.
- f) Final box up.

16. SERVICING OF THE GIRTH GEAR GREASE PUMP

- a) Ensure PTW
- b) Decouple the pump from the motor.
- c) Remove the pump from the barrel.
- d) Open the pump, clean the internal gears & inspect the seals/bearings for any damage.
- e) Inspect the shaft bearings & adjust the stroke if required.
- f) Couple the motor with pump and run the pump.
- g) Box up.

17. CLEANING OF MAIN LUBE OIL COOLER (WITHOUT HYDRO TEST)

- a) Ensure PTW .
- b) Isolate PHE from water and oil side.
- c) Dismantle the cooler from piping and base frame.
- d) Draining the oil from the cooler.

- e) Removal of plates of PHE with proper care not to damage the gaskets and cleaning of the debris from the plates and refitting of the same with new / old Gaskets supplied by OPGC.
- f) Reconnecting the pipelines, replacing old or damaged gaskets.
- g) Cooler to be hydro tested at the recommended pressure & to be boxed up.

18. FABRICATION, REMOVAL & WELDING OF DAMAGED CONVEYOR BODY LINERS

- a) Ensure PTW
 - b) Open screw and main PA duct manholes.
 - c) Identify the eroded portion of screw conveyor/trunion liner.
 - d) Fill up, if necessary by providing plates and hard face as per instruction of E-I-C.
 - e) Box up manholes.
- NB:-Hard facing electrodes and plates shall be supplied by OPGC.

19. BALL FEEDING GATE SERVICING

- a) Ensure PTW
- b) Removal of actuator from gate shaft, dismantling of gate after taking out all flange bolts.
- c) Gate blade to be separated by removing all bolts from top & bottom cover.
- d) Cleaning of blades, all Vee grooves by diesel & compressed air.
- e) Damaged seals & gaskets to be replaced by new ones, shaft threaded area to be cleaned & greased.
- f) Assembling & operation checking by manually /through actuator.

20. ALIGNMENT OF AUX. REDUCER TO MAIN MOTOR

- a) Ensure PTW
- b) Dismantle the coupling.
- c) Alignment to be checked by proper mounting of dial gauges through suitable fixtures.
- d) Any deviation found to be corrected by suitable addition / deletion of shims.

21. ALIGNMENT MAIN MOTOR TO MAIN REDUCER.

- a) Ensure PTW
- b) Dismantle the coupling.
- c) Alignment to be checked by proper mounting of dial gauges through suitable fixtures.
- d) Any deviation found to be corrected by suitable addition / deletion of shims.

22. ALIGNMENT OF MAIN REDUCER TO PINION SHAFT

- a) Ensure PTW
- b) Dismantle the coupling.
- c) Alignment to be checked by proper mounting of dial gauges through suitable fixtures.
- d) Any deviation found to be corrected by suitable addition / deletion of shims.

23. MILL SHELL LEVEL INSPECTION.

The Rates are to be quoted on per Mill basis

24. SEAL AIR FAN:-

24.1 SEAL AIR FAN COUPLING REPLACEMENT /ALIGNMENT

- a) Ensure PTW
- b) Coupling to be opened & motor to be shifted for easy removal of coupling.
- c) New coupling to be placed after heating in oil up to 60-70 deg C.

- d) If it is gear coupling, then it should be greased properly after checking the alignment of motor with fan.

24.2 DECOUPLING & ALIGNMENT SEAL AIR FAN :-

- a) Ensure PTW
- b) Decouple the motor and fan.
- c) Remove the coupling in motor only.
- d) Fit the old/new coupling with old/new motor.
- e) Align the motor with the fan.

(This is the requirement when motor is to be dismantled for rewinding or motor Bearing replacement etc. & reassembly.)

24.3 REPLACEMENT OF SEAL AIR FAN BEARING.

- a) Ensure PTW
- b) Decouple motor and fan. Lift and shift motor to facilitate shaft removal.
- c) Remove coupling hub. Remove suction filters, suction cone and silencer piping to provide access to impeller.
- d) Dismantle impeller from hub.
- e) Remove bearings on the shaft.
- f) Dismantle hub from shaft.
- g) Replace/rectify shaft/impeller.
- h) Box up shaft and install new bearings
- i) Install coupling hub. Connect suction piping.
- j) Lift and install motor and check alignment with respect to fan.
- k) Couple motor and assist in taking trial run and vibration measurement.
- l) The payment shall be on the basis of no. of Seal air fan.

24.4 SERVICING OF SEAL AIR FAN AUTO DAMPER

- a) Ensure PTW
- b) Remove the cover plate of the damper and inspect the damper internals for Wear/clearances in full shut position.
- c) Rectify the same and check damper freeness.
- d) Box up the damper.

24.5 SERVICING OF THE SEAL AIR FAN FILTER

- e) Ensure PTW
- f) Remove seal air fan primary and secondary filters.
- g) Clean them by air till they are free of dirt.
- h) Replace any defective filter.
- i) Box up the filter housing.

24.6 REPLACEMENT OF SEAL AIR GASKETS

- a) Ensure PTW
- b) Gasket backup plates to be removed & damaged gaskets to be replaced with new ones.
- c) Place the back up plate on the gasket.
- d) Tighten all the bolts and ensure no overloading of seal air fan.

24.7 SEAL AIR FAN SUCTION DAMPER SERVICING.

- a) Ensure PTW

- b) Opening of the intermediate piece to the damper for access to the damper.
- c) Free the damper mechanically by repeatedly operating it manually.
- d) Replace gland packing and gaskets and box up the intermediate piece.

25. SERVICING OF GIRTH GEAR SEAL AIR FAN FILTER.

- a) Ensure PTW
- b) Filter element is to be cleaned by compressed air.
- c) Clean the seal air fan discharge piping of any dust.
- d) In case of damaged filter same is to be replaced by new ones
- c) Fix the filter and tighten the foundation bolts.

26. GG SEAL AIR FAN DECOUPLING & MOTOR REASSEMBLY

- a) Ensure PTW
- b) Remove the fan impeller from motor.
- c) Install the impeller on the new/old motor.
- d) Box up the fan.

27. SUPPORT BEARING:-

27.1 REPLACEMENT OF OIL HOSES IN SUPPORT BEARING

- a) Ensure PTW
- b) Open inspection door on support bearing housing.
- c) Remove the old worn out hoses.
- d) Replace them with new hoses.
- e) Run pumps to detect any leakage.
- f) Box up the inspection door.
- g) The rates are to be quoted on per hose basis.

27.2 MAIN LUB OIL UNIT TANK SERVICING.

- a) Ensure PTW
- b) Drain and empty main tank by collecting oil in barrels.
- c) Open inspection doors and clean the tank internals thoroughly.
- d) Inspect the internals for any crack or rusting and take suitable preventive measure including welding/painting as per direction of E-I-C.
- e) Close inspection doors and fill oil in to tank till the desired oil level is achieved.
- f) Clean the work area and shift old oil barrels to store.

27.3 MAIN BEARING LUBE OIL PUMP SERVICING (HP, B & S, LP)

- a) Ensure PTW
- b) Decouple the pump from motor after shifting the motor.
- c) Disconnect the pump from suction and discharge side.
- d) Replace the coupling if required.
- e) Dismantle the pump and check internals.
- f) Replace defective oil seals/ gears/pistons/bearings/screw etc.
- g) Box up the pump and trial run to be made up to the satisfaction E-I-C.
- h) The rates are to be quoted on per mill basis.

27.4 SERVICING OF MAIN LUBE OIL UNIT RECIRCULATION /HP LINE SUCTION VALVE

- a) Ensure PTW
- b) Contractor has to open the valve & service the same.

- c) Spring tension to be adjusted, if required.
- d) Box up the valve.

27.5 SUPPORT BEARING OIL NOZZLE CLEANING / REPAIR

- a) Ensure PTW
 - b) Open the access door.
 - c) Clean the nozzles after removing from the place.
 - d) Repair/replace the nozzles if required.
 - e) Check the oil flow after running the pump.
 - f) Box up the access doors.
- Rate shall be quoted per mill basis.

28. MILL SHELL

28.1 TRUNNION SEAL REPLACEMENT:-

- a) Ensure PTW
- b) Loosen and remove felt holding plate bolts.
- c) Remove holding plates.
- d) Remove old worn out felt.
- e) Install new felt seal throughout the trunion after heating with oil.
- f) Fix metallic plates above felt and tighten bolts. Replace the defective bolts if required.
In case of damaged aluminum oil deflector, the same is to be replaced with New one by removing the support bearing top cover.
- g) Check for leakage while mill is service and uniformly tighten all bolts.

28.2 SEAL BOX INSPECTION AND CLEANING

- a) Ensure PTW
- b) Open seal air box manhole.
- c) Clean seal box for accumulated coal dust.
- d) Inspect the internals for any erosion and facilitate access for delta-P line chocking removal.
- e) Box up the manholes after clearance from E-I-C.

28.3 GIRTH GEAR HOUSING SEAL REPLACEMENT:-

- a) Ensure PTW
- b) Loosen all bolts of seal around the housing.
- c) Remove the existing seal and clean the surface.
- d) Prepare and fix new seal in position.
- e) Replace defective holding studs.
- f) Tighten seal holding bolts.
- g) Check for any leakage while mill is running and rectify it by tightening bolts uniformly.

28.4 TRUNION LINER AND DP TUBE REPLACEMENT(ONE SIDE OF MILL)

- a) Ensure PTW
- b) Open mill shell, screw conveyor and main PA duct manholes.
- c) Cut the main PA duct for removal of the liner.
- d) Remove screw conveyor.
- e) Cut and remove the worn out trunion liner & DP tubes along with guard and nozzle.
- f) Place the DP tubes on base plate and fix them in position by tack welding & coupling with pipe in the seal box. Install nozzles and guard. Charge the lines and check for any leakages.
- g) Place the trunion liner plate and fix them in position by welding.

- h) Restore the cut PA duct portion.
- i) Box up all manholes.

29. DRIVE BAR REPLACEMENT

- a) Ensure PTW
- b) Opening of manholes.
- c) Support hot air tube by temporary supports.
- d) Broken drive bar pieces are to be cut & removed after removal of coal from conveyor body.
- e) New drive bars are to be put & properly aligned
- f) Drive bars nuts are to be welded after alignment.
- g) Weld nut protection guard on tie rods.
- h) Remove temporary supports and box up manholes.

30. UNDER SIZE (<20MM) BALL SEGREGATION FROM MILL SHELL

- a) Ensure PTW
- b) Opening the shell / man hole doors.
- c) Unloading of the ball from the mill.
- d) Under size (i.e. Below 30 mm) to be segregated (Either by segregation grill or ball segregation machine) & put into separate drums .
- e) Ball drums are to be placed at suitable location as directed by the E-I-C.

NB-:1) Billing shall be made on Tonnage basis for undersize balls segregated From mill.

2) Extra Payment shall be made as per ITEM-8 for charging of Segregated balls in mill on prorated basis.

31. RAW COAL FEEDERS

31.1 DRIVING PULLEY/ TAKE-UP PULLEY BEARINGS AND SEAL REPLACEMENT

- a) Ensure PTW
- b) Open feeder end doors and side doors.
- c) Open bearing end cover and remove bearings using suitable pullers.
- d) New bearings supplied by department will be mounted after through cleaning of bearing shaft.
- e) Checking of belt tracking.
- f) Box up the feeder.
- g) Check sheet to be filled by the fitter before & after the final job.

31.2 INLET SPAN ROLLERS, TENSION ROLL& WEIGH ROLL BEARINGS AND SEAL REPLACEMENT

- a) Ensure PTW
- b) Damaged bearing to be replaced with proper care using suitable pullers.
- c) New bearings supplied by OPGC will be mounted after thorough cleaning of bearing shaft.

31.3 FEEDER DOOR OPENING & CLOSING

- a) Ensure PTW
- b) Contractor has to open the doors properly without damaging bolts, rubber gaskets & other fixtures.
- c) Refit the same as directed by E-I-C.

31.4 ENDLESS BELT REPLACEMENT.

- a) Ensure PTW.
- b) Inlet & outlet gates must be closed
- c) Remove both the end doors & side doors with care.

- d) Insert blocking below tension roller arm for support.
- e) Disconnect the grease hoses & the load shell etc.
- f) Remove the weighing roller & calibration weights.
- g) Insert pulley removal tool if required below the tension roller
- h) Remove the tension roller.
- i) Remove weigh span roller from any side
- j) Remove inlet span rollers bearing retainer plates from one side & remove rollers one by one from the opposite side
- k) Remove drive pulley & bearing cover .
- l) Take out the main drive shaft along with primary & secondary gearbox.
- m) Remove inlet skirt.
- n) Replacement of damaged bearing
- o) Insertion of new belt & reassembly.
- p) Box up the feeder after completion of above jobs.
- q) Run the feeder and ensure belt tracking.

31.5 LOAD CELL REPLACEMENT

- a) Ensure PTW
- b) Open the side doors after disconnecting the hard ware
- c) To take out the load cells & replace the same with the new ones.
- d) Closing the side doors.

31.6 SERVICING OF CLEANOUT CONVEYOR

- a) Ensure PTW
- b) Opening the feeder doors after ensuring the closing of feeder inlet & out let gates
- c) Opening the gear box for inspection & servicing including replacement of bearing & oil seals
- d) Chain tension adjustment /replacement with new chain links.
- e) Oil replacement.
- f) Box up after completion of the above jobs.

31.7 SHEAR PIN REPLACEMENT

- a) Ensure PTW.
- b) To open the end cover of the clean out conveyor
- c) Remove the broken shear pin after unlocking from the bevel gear arrangement
- d) To put back new shear pin & coupling (if found damaged).

31.8 MAIN DRIVE UNIT SERVICING

- a) Ensure PTW.
- b) Remove feeder end doors.
- c) Remove feeder drive shaft from gearbox.
- d) Inspect internals and replace shafts, bearings and oil seals.
- e) Box up gearbox and couple with motor.

31.9 INLET SIDE SKIRT & END PLATES ,COAL ON BELT PADDLE SWITCH, DISCHARGE PLUG

- a) Renewal /repair/servicing as per the direction of the engineer-in -charge including opening /closing of the manhole doors.

31.10 FEEDER BELT TRACKING.

- a) Ensure PTW
- b) Opening of Feeder doors
- c) Tracking and leveling of the belt
- d) Box up.

31.11 SERVICING OF FEEDER CHAIN GATE:-

- a) Ensure PTW
- b) Remove the gate flap after removing the cover.
- c) Check the clad roller bearings and replace if required.
- d) Check the condition of the pinion.
- e) Recondition the hole on the flap for pinion meshing. By welding and grinding.
- f) Box up the gate.
- g) Check for free operation.

31.12 COAL REMOVAL INCASE OF FEEDER CHOCKING.

- a) Ensure PTW
- b) Remove the coal from the feeder belt.
- c) Clean the inside of the feeder.
- d) Clean the coal from the feeder floor area to zero meter through waste chute.

32. FEEDER OUTLET GATE(R.C. GATE): -

32.1 SERVICING OF THE FEEDER OUTLET GATE (R.C.GATE)

- a) Ensure PTW.
- b) Remove feeder outlet gate holding studs.
- c) Decouple gate from power cylinder and remove gate assy.
- d) Open the gates and inspect all the parts.
- e) Copper cleaning bars have to be taken out, polished & put back. Springs are to be checked & proper compression to be applied.
- f) Assembly all the parts of the gate.
- g) Provide gaskets in the mating parts.
- h) Install the gates in the place and couple the power cylinder.
- i) Check freeness of the gate.

32.2 REPLACEMENT OF THE OUTLET GATE (R.C.GATE)

- a) Ensure PTW
- b) Remove feeder outlet gate holding studs.
- c) Decouple gate from power cylinder and remove gate assy.
- d) Open the gates and inspect all the parts.
- e) Copper cleaning bars have to be taken out, polished & put back. Springs are to be checked & proper compression to be applied.
- f) Assembly all the parts of the gate.
- g) Provide gaskets in the mating parts.
- h) Install the new gates in the place and couple the power cylinder.
- i) Check free ness of the gate.

33. CLASSIFIER OUTLET GATE

33.1 SERVICING/SPINDLE REPLACEMENT:-

- a) Ensure PTW

- b) Open P.C gate inspection door, top and bottom covers.
- c) Clean the guide rods.
- d) Check guide rods, guide bushes, scraper plates, gate guides and gate body for any damage and rectify/replace the same.
- e) Operate the gate manually and check freeness.
- f) Box up gate.

33.2 REPLACEMENT OF P.C. GATES

- a) Ensure PTW
- b) Remove seal air connection to gate.
- c) De link the gate from actuator.
- d) Loosen the bolts of the gates for removal.
- e) Erect new gates in position after putting new gaskets/ropes.
- f) Tighten all the gate bolts.
- g) Couple actuator to gate body and operate to check freeness.
- h) Connect seal air piping and box up.

34 CLASSIFIER:-

34.1 CLASSIFIER CLEANING DAMAGED LINER REPLACEMENT:-

- a) Ensure PTW
- b) Open the classifier manholes (Top and sides).
- c) Clean all the vanes from foreign materials.
- d) Clean all the foreign materials from the cone portion.
- e) Box up all manholes.

34.2 CLASSIFIER & MILL TO CLASSIFIER CHUTE DAMAGED LINER REPLACEMENT.

- a) Ensure PTW
- b) Open the classifier manholes.
- c) Make temporary arrangements to access all parts of mill to classifier chute.
- d) Remove the damaged liners and put new liners supplied by OPGC.
- e) Remove temporary platforms and debris.

34.3 SERVICING OF CLASSIFIER VANES AND ADJUSTMENT

- a) Ensure PTW
- b) Open classifier manholes.
- c) Inspect the condition of vanes and bushings.
- d) Clean the bushing area thoroughly.
- e) Inspect the handle and lock nut.
- f) Operate the vanes and ensure freeness.
- g) Adjust the vanes position as per direction of E-I-C.
- h) Box up manholes.

34.4 CLACK BOX SERVICING

- a) Ensure PTW
- b) Check the reject flap and rectify if any damage is found in the rubber flap.
- c) Clack box chocking, if found, to be cleared.
- d) Box up the manhole.

35. CHOKING REMOVAL IN DELTA-P LINE

- a) Ensure PFW
- b) Open delta-P line near support bearing.
- c) Flush the line with service air.
- d) Poke the line with metallic wire in case of any chocking.
- e) Flush again with service air till chocking is cleared.
- f) Box up the piping.

36. SCREW CONVEYOR BEARING SERVICING/REPLACEMENT

- a) Ensure PTW
 - b) Support screw conveyor shaft by temporary means.
 - c) Remove Plummer block holding nuts and end plate.
 - d) Remove screw conveyor bearing sleeve lock nut and remove bearing.
 - e) Install new/old bearing in new/old Plummer block.
 - f) Insert bearing on the shaft and tighten the lock nut.
 - g) Align Plummer block so that shaft sits at the center of stuffing box.
 - h) Box up the Plummer block.
- The payment shall be done on the basis of number of the bearings serviced/replaced.

37. REPLACEMENT OF MAIN REDUCER BEARING/GEAR (INPUT/ INTERMEDIATE / OUTPUT SHAFT)

- a) Ensure PTW
 - b) Decouple main reducer from drive and driven side.
 - c) Drain oil from the reducer and remove top half after removing sound hood panel.
 - d) Remove the shaft with defect gear, bearings and oil seals.
 - e) Remove the coupling if required.
 - f) Install new bearings/gear with new/old shaft as per instruction of E-I-C.
 - g) Box up the reducer.
 - h) Align with respect to drive and driven ends and couple.
 - i) Fill reducer with oil and run lubrication system to check oil supply to all bearings.
- The payment shall be done on the basis of nos. of shafts serviced. (Each shaft has 2 bearings)

38. REPLACEMENT OF AUX. REDUCER BEARING/GEAR (INPUT / INTERMEDIATE / OUTPUT SHAFT)

- a) Ensure PTW
 - b) Decouple aux. Reducer from drive and driven side.
 - c) Drain oil from reducer and remove top half.
 - d) Remove the shaft with defective gear/ bearings/oil seals.
 - e) Replace the gear/bearing/seal as per the instruction of E-I-C.
 - f) Box up the aux. reducer.
 - g) Couple the reducer after alignment.
- The payment shall be done on the basis of nos. of shafts serviced. (Each shaft has 2 bearings)

39. REMOVAL AND REFIXING OF COUPLING AND ALIGNMENT

39.1 AUX. REDUCER TO MAIN MOTOR

- a) Ensure PTW
- b) Remove the coupling guard.
- c) Remove the defective coupling and install new coupling after oil bath heating.
- d) Couple after alignment.
- e) Apply grease and Box up.

39.2 MAIN MOTOR TO MAIN REDUCER

- a) Ensure PTW.
- b) Remove the coupling guard.
- c) Open the top cover of the main reducer.
- d) Remove the Input shaft with the coupling.
- e) Remove the defective coupling and install new coupling by oil bath heating.
- f) Couple after alignment.
- g) Apply grease and box up.

39.3 MAIN REDUCER TO PINION SHAFT

- a) Ensure PTW
- b) Remove the coupling guard.
- c) Open the top cover of the gearbox.
- d) Remove the output shaft.
- e) Replace the coupling and box up the reducer.
- f) Couple after alignment.

40. REPLACEMENT OF PINION SHAFT/ BEARINGS:-

- a) Ensure PTW
- b) Decouple main reducer and pinion shaft.
- c) If required, remove the output shaft from the main reducer for removal of the coupling half from pinion shaft.
- d) Remove the coupling from the pinion shaft and top half of the bearing housing.
- e) Lift the shaft and remove the defective sleeves and bearings.
- f) Check the clearance of bearings, replace if required.
- g) Check labyrinth seals.
- h) Replace with new bearings with sleeves.
- i) Mount the coupling and box up.
- j) If required, the pinion shaft shall be shifted to '0' mtr. for replacement of the bearings.
- k) Align and couple the pinion shaft with main reducer.

41. GREASE PANEL SERVICING.

- a) Ensure PTW
- b) Remove the distributor with its associated piping and filter.
- c) Clean the distributor and filter.
- d) Check the distributor hoses for damage and if necessary replace them.
- e) Remove the nozzles in grease panel and clean thoroughly by diesel/air.
- f) Box up the unit.
- g) Run the grease pump and check the grease flow uniformly.

42. GREASE BARREL CHANGING

43. SERVICING OF DAMPERS:

The scope of the work as follows:

- a) Ensure PTW
- b) The contractor has to completely disassemble the bearing holder, follower plate, bearing, gland and gland packing of the affected flaps. If required the stub shaft, slave shaft, drive shaft and drive lever are also to be removed after making suitable arrangements.

- c) Repair the worn out shafts and levers by welding deposits and subsequent grinding and machining. The electrodes for this purpose shall be supplied free of cost .
- d) Any damage to any other components are also to be suitable repaired as per instruction of the Engineer-in-charge. If required any damper flap, shaft etc. are to be replaced. Any welding, cutting, scaffolding shall be in the scope of the contractor. Checking of damper freeness in open and close position with manual/motor/pneumatic device.

Note:- The size of the dampers are given below and the contractor has to quote accordingly

BAD/CAD/MIXBOX DAMPER (Size: 860mmx860mm)

HAD/PAD (Size: 1727mmx1829mm, 870mmx2310mm)

FANS (FD Fans, ID Fans & PA Fans)

FD FAN

ITEM-1: CLEANING OF SILENCER & FAN INTERNALS

- a) Ensure PTW
- b) Opening of access doors of fan & silencer.
- c) Cleaning of impeller, impeller blades, static blades spiral casing, silencer suction screen, diffuser chamber & keeping the impeller ready for NDT.
- d) Rigiflex coupling checking & bolt tightening.
- e) DP checks on impeller & blades and closing the access door after completion of work.
- f) Repairing the suction screen (if required)
- g) Painting of suction screen (if required)

ITEM-2: SERVICING OF FDFAN LUBE OIL SYSTEM

2.1: SERVICING OF LUBE OIL UNIT & CHANGING OF LUBE OIL: -

- a) Ensure PTW
- b) Draining of lube oil from filters, coolers & oil tank etc and keep it in a clean drum for refilling or for reused
- c) Cleaning of filters.
- d) Acid cleaning & neutralizing of oil tank & piping (if required).
- e) Filling of fresh oil/old oil in the oil tank.
- f) Arresting of oil leakages (if any) from oil seals of the pumps or from other joints found when the lube oil system put into service.
- g) Removal of all unserviceable materials & cleaning the area.
- h) Servicing of 3- way valves, regulator etc.

2.2: SERVICING OF OIL COOLER (WITH HYDRO TEST)

- a) Ensure PTW
- b) Removal of the cooler from foundation after isolating it from bcw and oil lines, Dismantling, cleaning, hydro test of the cooler tubes with necessary arrangement, plugging of the tubes if tube leakage is there & reassembly of the oil cooler and bring back to normalcy.

2.3: ALIGNMENT OF LUB OIL PUMP:

- a) Ensure PTW

- b) Alignment of lub oil pumps with motor
- c) Checking of the bolt
- d) Tightening of the bolt.
- e) OIL pump coupling guard fitting

ITEM-3: SERVICING OF THE SHAFT SEAL & PROTECTION COVER ASSY. DIFFUSER STATIC BLADES: -

- a) Ensure PTW.
- b) Removal of shaft seals on DE side of the fan.
- c) Dismantling of the end plate assembly, opening of manhole & opening of shaft cover inside.
- d) Preparing new gasket & assembling of the end plate & clamping of the same.
- e) Remixing of the shaft end cover & seal assemblies.
- f) Lifting the bullet cover & inspection for oil leakage. Replacement of the oil hose if leakage is from oil hose.
- g) Clean the diffuser, static blades, hub screen plates & undertake minor repair if any.

ITEM-4: REMOVAL & REPLACEMENT OF THE RUBBER EXPANSION / JOINT ON SUCTION SIDE: -

- a) Ensure PTW
- b) Checking & dismantling of the rubber expansion joint.
- c) Removing the worn-out rubber expansion joint.
- d) Cutting the new rubber sheet to correct dimension & re-fixing.
- e) Repair the fixing clamp & replace the fasteners.

ITEM-5: REMOVAL & REPLACEMENT OF THE RUBBER EXPANSION / JOINT ON DISCHARGE SIDE:-

- a) Ensure PTW
- b) Checking & dismantling of the rubber expansion joint.
- c) Removing the worn-out rubber expansion joint.
- d) Cutting the new rubber sheet to correct dimension & re-fixing.
- e) Repair the fixing clamp & replace the fasteners.

**ITEM-6: DISMANTLING/REASSEMBLY WORKS FOR SERVICING OF FAN BEARING/BLADE BEARING/
SERVOMOTOR :-**

- a) Ensure PTW
- b) Open the diffuser end rubber bellow expansion joints.
- c) Open expansion joint at impeller housing.
- d) Decouple intermediate shaft after opening the silencer end man hole.
- e) Disconnect all oil supply piping/hose to the bearing & servomotor.
- f) Disconnect blade pitch control power cylinder. Check the blade clearances at open & close with oil supply on before opening oil hoses.
- g) Remove the conical duct pieces after the diffuser between the diffuser & transition piece support/secure it properly.
- h) Remove foundation bolts of the diffuser.
- i) Contractor will carefully pull the diffusers towards the outlet duct so that impeller can be withdrawn.
- j) Remove the blades after removing their fasteners & store them properly. Open bullet cover & remove the servomotor & blade bearing housing (impeller hub or impeller assembly).
- k) Remove the main bearing housing from its foundation after decoupling it from intermediate shaft & place all the components suitably at a safe place where further maintenance is planned as per the direction of the EIC.

- l) Attending servicing work in main bearing housing, servomotor & blade bearing housing as per the requirement.
- m) Reassemble with required checks (checking of blades tip and root clearances in open & close condition, stroke length adjustment etc), alignment & box up and bring back the system to normalcy.

ITEM-6.1: OVERHAULING OF MAIN BEARING ASSY: -

- a) Ensure PTW
- b) Overhauling of bearings in the main bearing assy. & replacement of INA ring, simmer ring (Contractor will engage experienced personnel for doing the above job as per the guidelines) & steps for removal/replacement of INA ring/simmer ring & bearing as per the requirement & advice at the time of such job. He will engage only those persons who have done such job in the past. All the risk & responsibility for a bad job will be at the contractors' cost.
- c) Contractor will reassemble the bearing; fan etc after the job has been attended to the satisfaction of engineer in charge.

ITEM-6.2: SERVICING OF SERVO MOTOR ASSY:-

- a) Ensure PTW
- b) Opening the servo motor assy. & replacement of bearing.
- c) Checking & oil replacement,
- d) Complete servicing of the servomotor assy.
- e) Check sheet to be filled up as supplied by the EIC.

ITEM-6.3: SERVICING OF BLADE BEARING ASSY:-

- a) Ensure PTW
- b) Opening the Blade bearing r assy. & replacement of bearing.
- c) Checking & grease replacement,
- d) Complete servicing of the blade bearing assy.
Check sheet to be filled up as supplied by the EIC.

ITEM-7: RIGIFLEX COUPLING BOLT REPLACEMENT: -

- a) Ensure PTW
- b) Check the coupling bolts (both fan side & motor fside), connecting bolts for the intermediate shaft (both fan side & motor side), all checks to be done from inside the bearing housing to out side motor.
- c) Replace the coupling bolts after rearranging the flat springs & realignment of fan & motor.

ITEM-8: REPLACEMENT OF RIGIFLEX COUPLING

- a) Ensure PTW
- b) Decouple the motor side coupling as per requirement after removing the coupling guard.
- c) Remove the foundation bolts of the motor. Position the motor in a suitable position to remove the coupling.
- d) Remove the coupling from the motor shaft/fan shaft.
- e) Fix the new coupling (by heating in oil)
- f) Reposition the motor for alignment
- g) Coupling of motor with shaft and align it properly. Fix the coupling guard.

ITEM- 9: REPLACEMENT BEARING & OIL SEAL OF LUBE OIL PUMPS: -

- a) Ensure PTW

- b) Decoupling of the pump
- c) Replacement of damaged bearing & oil seal.
- d) Reassembly & alignment.

ITEM-10: SERVICING OF LINK ROD MECHANISM OF SERVOMOTOR: -

- a) Ensure PTW
- b) Opening the manhole doors.
- c) Servicing / replacing the bearing (if any).
- d) Checking straightness of the actuation shaft, link rod, cylindrical pins & bearing foundation bolts adjust /replace the hinge head screw.
- e) Checking of servo – motor travel & resetting.
- f) Attending to oil leakage if any & box up.

ITEM-11: CHECKING & REPLACEMENT OF OIL HOSE: -

- a) Ensure PTW
- b) Damaged high / low / return oil hoses shall to be replaced as per direction of EIC.
- c) Run the pump and ensure no oil leakage.

ITEM-12: STROKE LENGTH ADJUSTMENT OF SERVOMOTOR

- a) Ensure PTW
- b) Opening of manhole doors.
- c) Decouple the link mechanism from the power cylinder.
- d) Operate the servomotor and adjust the stroke length as per direction of EIC.
- e) Couple with the power cylinder.
- f) Boxing up of the manhole doors

ITEM-13: ALIGNMENT OF FAN WITH MOTOR:-

- a) Ensure PTW
- b) Alignment to be done by using the dial gauge

ID FAN

ITEM-1: CLEANING OF FAN INTERNALS

- a) Ensure PTW
- b) Opening the access doors of fan & spiral casing.
- c) Cleaning of impeller, spiral casing, suction duct etc. (water washing) & keeping the impeller ready for NDT.
- d) DP checks on impeller/blades and closing the access door after completion of work.

ITEM-2: SERVICING OF THE LABYRINTH SEAL ASSY (DE & NDE): -

- a) Ensure PTW
- b) Removal of insulation at the labyrinth seal areas on DE & NDE side of the fan.
- c) Dismantling of the labyrinth seal assy. on both sides.
- d) Remove old gasket, put new one & assembly of the labyrinth seal & clamp with new ceramic clothe at both ends.
- e) Refixing of insulation.

ITEM-3: SERVICING OF BEARING (DE & NDE): -

- a) Ensure PTW
- b) Dismantling of coupling assy. of the fan to hydro coupling.
- c) Dismantling of flexible water hose, oil inlet hose; return oil pipelines & removal of thermo-couples.
- d) Loosening of the plunger screw of the housing cap.
- e) Dismantling of the bearing-housing cap of both expansion & non-expansion bearings.
- f) Dismantling of liner cap of bearings & removal of thrust plates.
- g) Jacking up of the rotor to have clearances for the bearing removal.
- h) Removal of the water pipes of the liner base.
- i) Removal of liner base of both bearings.
- j) Checking of liner assy. thrust collar thrust plates for burns & scratches & removing them.
- k) Replacing of thrust plates if failed.
- l) Drain the oil from bearing housing.
- m) Checking & replacement oil rings.
- n) Cleaning of the liner base & mounting on the housing base to seat correctly (Replacement of liner if damaged)
- o) Lowering rotor correctly into place.
- p) Assembling of thrust plates & liner cap.
- q) Checking of axial & oil clearance for the bearings.
- r) Fixing of housing cap for both DE & NDE bearings.
- s) Fill oil as per requirement in the bearing housing.
- t) Connecting back lube oil pipe lines, flexible water hoses, oil hoses etc. to the bearings.
- u) Checking the alignment of the motor - fan & correction if needed.
- v) Fixing back the coupling assy.
- w) Trial run of the fan & checks the performance.
- x) Attend any defects after trial run.
- y) Check sheet to be filled by the fitter before & after the final job.

ITEM-4: BEARING INSPECTION (DE & NDE): -

- a) Ensure PTW
- b) Dismantling of flexible water hose, oil hose etc.
- c) Opening the top cover.
- d) Removal of liners for inspection, fine scraping if required.
- e) Checking the oil rings & replacement if needed.
- f) Boxing up of the bearing, connection of the water & oil hoses etc.
- g) Checking tightness of foundation bolts & plunger screws.

ITEM-5: REPAIR OF FAN LINERS (WEIR PLATES): -

- a) Ensure PTW
- b) Opening of manhole door.
- c) Repair of the liners by weld deposit.
- d) Ensure equal deposit of weld material in all the weir plates.
- e) Close the manholes.
Electrodes shall be supplied by OPGC.

ITEM- 6: REPAIR OF CASING LINERS: -

- a) Ensure PTW
- b) Opening the manhole door.
- c) Repair of the casing liner by cutting and welding.
- d) Closing of man hole door and box up.

NB:- Electrodes shall be supplied by OPGC.

ITEM- 7: SERVICING/CLEANING OF THE PHE: -

- a) Ensure PTW
- b) Isolate the cooler from water and oil side.
- c) Draining of oil.
- d) Dismantling the oil cooler pipe
- e) Cleaning / flushing of tubes by nylon brush.
- f) Boxing up of the cooler with new 'o' rings.
- g) Box up the cooler and place in position.

ITEM- 8: SERVICING OF HYDRO – COUPLING

- a) Ensure PTW
- b) Decoupling the hydro coupling.
- c) Check the old oil & replace if required.
- d) Remove the top cover, clean the tank.
- e) Checking of fusible plug, pump & oil line flanges & attend to the defects.
- f) Checking of input side bearings & exposed fasteners.
- g) Box up the top cover.

Coupling with proper greasing & refixing of coupling guard

ITEM- 9 : INSPECTION OF HYDRO – COUPLING

- a) Ensure PTW
- b) Decoupling the hydro coupling.
- c) Check the old oil & replace if required.
- d) Remove the top cover, clean the tank.
- e) Checking of fusible plug, pump & oil line flanges & attend to the defects.
- f) Checking of input side bearings & exposed fasteners.
- g) Box up the top cover.
- h) Coupling with proper greasing & refixing of coupling guard.

ITEM-10: CHECKING OF WELDING & BOLT TIGHTNESS FROM SHAFT TO IMPELLER

- a) Ensure PTW
- b) Removal of top half of casing, removal of cone covers, replacing the fastening bolt, checking the welding by DP or any welding NDT test method, repair if needed & bringing back to normalcy. (If casing is already opened for, 50 % of the rate shall be paid).

ITEM-11: REPAIR & REPLACEMENT OF STATIC SEAL (DE & NDE).

- a) Ensure PTW
- b) Removal of the static seals of both sides, replace the fasteners, use cutting & welding whenever required.

ITEM-12: ALIGNMENT OF HYDRAULIC COUPLING & MOTOR.

- a) Ensure PTW
- b) Removal of all the couplings, measure the fan hydraulic coupling & motor level, put shims whenever required in alignment, bringing back to normalcy after putting grease in the coupling holes.

ITEM-13: ALIGNMENT OF FAN WITH HYDRAULIC COUPLING: -

- a) Ensure PTW
- b) Make necessary arrangement for alignment of fan with hydro coupling.
- c) Align the fan with the coupling to the full satisfaction of E-I-C.
- d) Couple the fan with hydro coupling after filling with grease.

ITEM-14: REPLACEMENT OF GEAR COUPLING (MOTOR SIDE)

- a) Ensure PTW
- b) Decoupling of gear coupling after removing coupling guard.
- c) Shifting of motor to required position for removing the gear coupling.
- d) Removal of gear coupling both halves from motor shaft & hydro coupling shaft
- e) Mount new coupling after oil bath heating.
- f) Alignment of the motor with fan.
- g) Fill the coupling with required amount of grease and box up it.
- h) Fix the coupling guard.

PA FAN

ITEM-1: SERVICING OF LUBE OIL UNITS & CHANGING OF LUBE OIL.

- a) Ensure PFW
- b) Draining the lube oil from filters, coolers & tanks.
- c) Acid cleaning & neutralization of oil tank & piping (if required).
- d) Maintenance of valves & NRVs.
- e) Filling of fresh oil into the tank after cleaning of the tank properly.
- f) Arresting of oil leakage (if any) from oil pump seal or from unions or flanges etc
- g) Removing all unserviceable material & cleaning the area.
- h) Check sheet to be filled by the fitter before & after the final job.

ITEM-2: ALIGNMENT OF LUB OIL PUMP:

- a) Ensure PFW
- b) Alignment of lub oil pumps with motor
- c) Checking of the bolt
- d) Tightening of the bolt.
- e) OIL pump coupling guard fitting.

ITEM-3: SERVICING OF THE LABYRINTH SEAL ASSY (DE & NDE)

- a) Ensure PFW
- b) Removal of insulation at the labyrinth seals on DE & NDE side of the fan.
- c) Dismantling of the labyrinth seal assy. on both sides.
- d) Preparing new gasket & assembly of the labyrinth seal & clamping
- e) Refixing of new ceramic cloth & clamping.
- f) Checking of sealing fans mounted to rotor shaft on both end of bearings.

ITEM-4: SERVICING OF PA FAN BEARING (DE & NDE): -

- a) Ensure PFW
 - b) Dismantling of pin type coupling assy. of the fan.
 - c) Dismantling of flexible water hose, oil inlet hose, return oil pipe lines & removal of thermo-couples.
 - d) Loosening of the plunger screw of the housing cap.
 - e) Dismantling of the bearing-housing cap of both expansion & non-expansion bearings.
 - f) Dismantling of liner cap of bearings & removal of thrust plates.
 - g) Jacking up of the rotor to have clearances for the bearing removal.
 - h) Removal of the water pipes of the liner base.
 - i) Removal of liner base of both bearings.
 - j) Checking of liner assy. thrust collar thrust plates for burns & scratches & removing them.
 - k) Replacing of thrust plates if failed.
 - l) Cleaning of the liner base & mounting on the housing base to seat correctly. (Replacement of liner if damaged)
 - m) Lowering rotor correctly into place.
 - n) Assembling of thrust plates & liner cap.
 - o) Checking of axial & oil clearance for the bearings.
 - p) Fixing of housing cap for both DE & NDE bearings.
 - q) Connecting back lube oil pipe lines, flexible water hoses, oil hoses etc. to the bearings.
 - r) Checking the alignment of the motor - fan & correction if needed.
 - s) Fixing back the pin type coupling assy.
 - t) Trial run of the fan & checks the performance.
 - u) Attending to further defects, found after trial run.
- The payment shall be done on per mill basis

ITEM-5: REPLACEMENT OF IMPELLER LINERS (WEAR PLATES): -

- a) Ensure PFW
 - b) Transportation of new liners from stores to site.
 - c) Opening of manhole.
 - d) Removal of old liners (if damaged).
 - e) Replacement of old liners with new ones (new liners & bolts will be supplied by OPGC).
 - f) Closing of manhole door.
- NB: Rate shall be quoted for replacing entire liners per fan.

ITEM-6: HARD FACING OF FAN CASING/IMPELLER: -

- a) Ensure PFW
- b) Repair the casing as per scope in and hard face the most affected area of impeller and casing as per instruction of E-I-C.

- c) Hard facing / joining electrode etc. will be supplied by OPGC.
NB: Rate shall be quoted for depositing kg of electrode.

ITEM-7: CUTTING & WELDING OF CASING PLATE / IMPELLER.

- 7.1 Cutting
- 7.2 Welding.

ITEM-8: SERVICING OF OIL COOLER (WITH HYDRO TEST):-

- a) Ensure PFW
- b) Isolate the cooler from water and oil side.
- c) Draining of oil.
- d) Dismantling the oil cooler.
- e) Cleaning the tubes by nylon brush.
- f) Boxing up of the cooler with new 'o' rings.
- g) Hydro test of the cooler tubes to the required pressure.
- h) Block the tube ends if leakage found.
- i) Repeat the hydro test till no oil leakage observed.
- j) Box up the cooler and place in position

ITEM-9: REPAIR & REPLACEMENT OF STATIC SEAL (DE & NDE)

- a) Ensure PTW
- b) Removal /replacement of the static seals (DE & NDE).
- c) Replacement of holding clamp
- d) Check the seal clearance.

ITEM-10: ALIGNMENT OF FAN WITH MOTOR

- a) Ensure PTW
- b) Decoupling of fan from motor.
- c) Align the fan with motor to the full satisfaction of E-I-C.

ITEM-11: SERVICING OF INLET GUIDE VANES:-

- a) Ensure PFW
- b) Opening the bearing end cover, cleaning & replacing the graphite bearings.
- c) To make the dampers free & check the operation by IGV power cylinders.
- d) Repair / replace the IGV flaps (if required).
- e) Adjustment of stroke, clearance & overlap as per requirement & instruction of the engineer in charge.

ITEM-12: COMPLETE REPLACEMENT OF IGV:

- a) Ensure PFW
- b) The IGV to be opened.
- c) The new IGV to be fitted as per the instruction of the EIC.

ITEM-13: REMOVAL & REFIXING OF THE TOP CASING.

- a) Ensure PFW
- b) Removal of the parting plane bolts.
- c) Removal of seals.
- d) Lifting of the casing & placing on suitable place for repair etc.
- e) Reassembly of the casing after repairing and putting ceramic rope/cloth on the parting plane & ceramic
 - a. cloth on the labyrinth seal.
- f) Tightening of the parting plane bolts.
- g) Ensure no leakage of air.
- h) If any hot tightening is required after running of the fan same shall be done as per instruction of E-I-C.
The crane/hydra/Lifting device for casing lifting shall be provided by OPGC.

ITEM-14: ASSEMBLY OF ROTOR (Outside):

- a) Ensure PFW
- b) Remove the rotor assembly from the position.
- c) Removal of the Impeller and cone from the rotor
- d) Install the new/ reconditioned impeller and cone on rotor
- e) Proper tightening to be done.
- f) The decision of the EIC is final.

ITEM-15: REPLACEMENT OF THE ROTOR ASSEMBLY:

- a) Ensure PFW
- b) Removal of the Top Casing.
- c) Decoupling of the fan and motor
- d) Removal of the bearing & bearing housing
- e) Removal of Rotor .
- f) Installation of new /reconditioned Rotor assembly
- g) Reassemble the fan the fan in reverse order of disassembly
- h) Alignment and coupling are the part of the job
- i) Trial run and attending the defect like hot air leak
- j) Proper tightening to be done.
- k) If any defect is observed which is attributable to poor workmanship , it has to be carried out free of cost.
- l) The decision of the EIC is final.

ITEM-16: EQUIPMENT CONDITION MONITORING / BALANCING OF THE FAN:

- a) The scope of work providing the manpower for the balancing work. The manpower includes deployment of skilled fitter and welder .
- b) The balancing work involves the opening of the manhole door , installation of the balance weight by welding.
- c) The work is to be carried out as per the direction of EIC.

ITEM-17: REMOVAL & REFIXING OF THE TOP and BOTTOM CASING.

- a) Ensure PFW
- b) Removal of the parting plane bolts.
- c) Removal of seals.
- d) Lifting of the top casing & placing on suitable place for repair etc.
- e) Removal of the rotor assembly after decoupling and removal of bearing assembly
- f) Removal of the foundation bolt
- g) Removal of the Bottom casing by suitable lifting arrangement
- h) Installation of the new bottom casing and leveling
- i) Installation of the foundation bolt
- j) Installation of the Rotor Assembly
- k) Bearing inspection and replacement if required
- l) Reassemble the top casing
- m) Alignment of the fan with motor and coupling.
- n) Tightening of the parting plane bolts.
- o) Ensure no leakage of air.
- p) In case any leakage exist same is to be attended , that is the part of the job.
- q) If any hot tightening is required after running of the fan same shall be done as per instruction of E-I-C.

MISCELLANEOUS JOBS

ITEM 1:FABRICATION & ERECTION OF PIPING SYSTEM: -

Erection of piping shall system include withdrawal of materials from stores, cleaning by wire brushing / water flushing, cutting preheating, bending, setting, alignment, erection, welding, providing support, fitting to the required equipment / flange etc. & pressure testing etc. If the piping length involved is less than 5 mtrs for a particular size of pipe, payment shall be made on the basis of length of welding and cutting as per **item no.2**. No separate payment for the erection of pipe, valves, orifice, flow nozzle, other supports & fittings shall be made. Special electrodes will be supplied free of cost.

NOTE: -

- i) For the pipe above 200 NB size but below 500 NB, the rates applicable shall be 18 % above the base rate of 200 NB pipe, for every 50 NB increase pipe size as per **formula-A**.
- j) For pipe above 500 NB size, the rate applicable shall be 12 % above the base rate of 500 NB pipe, for every 50 NB increase in pipe size as per **formula -H**.
- k) For pipes/tubes below 200 NB size, the rate applicable shall be directly proportionate to the rate of 200 NB pipe (e.g. For 40 NB pipe it will be, **(200 NB ratex40/200)** & so on.
- l) The rate shall be applicable for pipe thickness up to & including 10mm.
- m) For thickness above 10 mm, for every 1 mm increase in thickness the unit base rate shall be increased by 3 % as per **formula - C**
- n) For argon root run where required, percentage factor on the unit base rate shall be increased by 20 % as per **formula -D**
- o) These rates are applicable to the rate of piping system equal to or more than 5 meters.
- p) No separate payment shall be made scaffolding etc. or any such arrangement, necessary to be made for efficient erection of the job.
- q) The rate includes cutting leveling, fitment, preheating, welding & erection of valves, flanges, Tees, elbows. piping fittings etc. if any in the piping system.
Refer measurement of piping work below.

ITEM 2:- DISMANTLING OF PIPING SYSTEM: -

The job involves dismantling of piping system by gas cutting / hack saw cutting, disconnecting of threaded & bolted joints & transportation of scraps to a suitable place as instructed by concerned engineer. Rates applicable shall be 50% of the rates against item 1(A).

ITEM 3:CUTTING & WELDING: -

The rates shall be applicable for cutting and welding of laid up of pipe lines whose length is less than 5mtr. Or making some modifications on existing pipelines or equipment / structural wherever cutting, beveling and welding is involved. These rates shall also be applicable for branch joint also wherever branching is taken (i.e. no special rate shall be applicable for branch fabrication. Necessary locking of pipes for replacement will be made.

The radiography /stress relieving shall be arranged by the contractor on chargeable basis separately. Electrodes for high pressure welding shall be provided by ITPS. General welding electrodes are to be provided by the contractor. If a joint fails in radiography for first time, the contractor has to arrange for the repair of weld joint without any cost to OPGC. If the weld joint fails for the second time the cost of radiography shall be deducted from the contractor's bills and the contractor has to repair the joint free of cost. Cutting & welding of Carbon steel/Alloy steel/SS plates for fixing inside boilers as per instruction of Engineer in charge are also included in the scope of work. No separate payment to be made for scaffolding. Rate for cutting & welding will be limited to 10 mm alloy / carbon/S.S and compensated at the rate of 3% for every mm up to 20mm & at the rate of 4 % for every mm beyond 20mm & at the rate of 4% for every mm beyond 20mm. In some cases if gas cutting is not permitted, the same is to be done by grinding. The contractor will quote in running mtr. for welding and cutting.

ITEM-4: CUTTING

- I) CARBON STEEL

ITEM-5: WELDING (NON IBR)

- I) CARBON STEEL

ITEM-6: APPLICATION OF PAINTING: -

Protective coating may be required to be applied to pipes, equipment, structural at various locations & elevations inside the plant. The scope of work includes cleaning the surface to remove dirt oil, grease, rust, scale & other contamination etc. by blasting, chipping, scrapping, wire brushing etc., applying one coat of primer paint & two coats of finishing enamel paint .The interval of surface preparation & painting shall be minimum & in no case longer than 4 hours . The application procedure shall be in accordance with the prescribed recommendations of the paint manufacturers & IS: 1477 Part-II. ITPS shall supply paint as free supply material.

ITEM 7: REPLACEMENT WITH BALL VALVES

The existing valves shall be removed by gas cutting from oil and water lines and new ball valves shall be welded in the same location. Any extra pipe required shall also be welded for proper fitment. The ball valve sizes are from 1/2 " to 2" sizes. Rate shall be quoted per valve.

ITEM 8: SERVICING / REPLACEMENT OF COOLING WATER LINE VALVES UPTO 4 INCH SIZE

ITEM 9: PATCH WELDING AT DIFFERENT LOACTION, OUTLET GATE,RETURN CHUTE,CENTRAL FEED PIPE ETC.

ITEM10 : ERECTION OF SCAFFOLDING WORK FOR PA FAN DUCT,BELLOW WORK

FORMULA-H

For piping erection Above 500NB size

 $R_b = R \{1 + C_b(D-500)/50\}$ whereR_b=Rate for the pipe of dia. above 500NB

R=Base rate for the 500NB pipe

D=NB of the pipe

FORMULA-I

R=Base rate for 500NB butterfly valves & its gear box servicing

 $R_1 = R \{1 + C(D-500)/50\}$

D=Size of the valve

C=0.1, Coeff for the valve above 500NB size

**BLANK PRICE BID**

Name of the work: "AMC for Mechanical Maintenance of Main Plant at ITPS (for two years) and Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit"

a) AMC for Mechanical Maintenance of Main Plant at ITPS (for two years)

1) Boiler & Air- Preheater					
Sl No.	Description	Qty (per Year)	UOM	Unit rate (Rs.)	Amount (Rs.)
10	Servicing of SOOT Blowers(Wall Blowers)	112	PC		
20	Servicing of SOOT Blowers(LRSB)	36	PC		
30	Servicng Rotry&Travrse Gearbx(WallBlowrs)	10	PC		
40	Servicing of Rotary&Travrse Gearbx(LRSB)	10	PC		
50	Clean&Check Traverse Mechnism(WallBlowr)	50	PC		
60	Clean &Checking Traverse Mechanism(LRSB)	30	PC		
70	D-HEAD VALVE SERVICING & SETTING	20	EA		
80	Flange gasket replacement	50	PC		
90	REPLACEMENT OF D-HEAD VALVE	10	EA		
100	Repair of Sample Cooler	12	PC		
110	COAL NOZLE ELBOW ORIFICE HARD FACING AOH	60	M2		
120	SS PLATE WELDING AOH	40	M		
130	CS PLATE WELDING AOH	40	M		
140	SERVICING OF OIL GUN SERVICING IN AOH	40	EA		
150	MAN HOLE PEEP HOLES CERAMIC ROPE REPLACE	40	EA		
160	PIPE LINE SUPPORT RAPAIR REPLACEMENT	10	EA		
170	APH SECONDARY AIR OUTLET DAMPER SERVICING	1	EA		
180	SCANNER AIR DAMPER REPAIR SERVICING	4	EA		
190	Servicing of power Cylnr(BAD/SADC/MBD)	1	PC		

200	Servicing of power CylnDr(PAD/CAD/HAD)	1	PC		
210	Servicing PowerCylnDr(BurnrTilt/IGV Etc)	8	PC		
220	ID (I/L O/L) ESP (I/L O/L) GATE GREASING	8	EA		
230	CUTTING CARBON STEEL	1000	M		
240	CUTING OF ALLOY STEEL(IBR)	60	M		
250	CUTTING STAINLESS STEEL	100	M		
260	WELDING (IBR)- CARBON STEEL	100	M		
270	WELDING OF ALLOY STEEL(IBR)	100	M		
280	WELDING (IBR)-STAINLESS STEEL	100	M		
290	WELDING (NON IBR)-CARBON STEEL	1000	M		
300	RECTIFICATION OF FLNG LEAKGE(200NB SIZE)	6	EA		
310	FABRICATION OF STRUCTURAL	50	MT		
320	ERECTION OF STRUCTURAL	50	MT		
330	Application painting with cost of paints	50	M2		
340	APP OF PAINTING(WITHOUT COST OF PAINTS)	800	M2		
350	ERECTION OF SCAFFOLDING OUT SIDE BOILER	1600	M3		
360	ERECTION OF SCAFFOLDING IN SIDE BOILER	600	M3		
370	RPLCE VALVE CL-1500&Abv200NB MOT OPRTD	4	EA		
380	RPLCE VALVE CL-800&Belw200NB MOT OPRTD	4	EA		
390	Servicing of valve 2.5' TO 4'	5	EA		
400	Servicing of valve upto 6"	2	EA		
410	Servicing of valve 6" & Above	2	EA		
420	VALVE GLAND PACKING REPLACEMENT UP TO 4"	10	EA		
430	VLAVE GLAND REPLACEMENT 6" & ABOVE.	3	EA		
440	PATCH WELDING OF COAL PIPE	150	EA		
450	ARRESTING OF COAL LEAKAGE (ON LINE)	400	EA		
460	REPLACEMENT OF BURNER TILT SHEAR PIN	24	EA		
470	Clean LFO/HFO Trf pump suction strainer	80	EA		
480	Clean HFO Unload pump suction strainer	2	EA		
490	SERVING HFO/LDO PRESURISNG&UNLOADNG PUMP	8	EA		
500	SERVICING OF DRAIN OIL PUMP	4	EA		
510	SERVICING OF BOILER FILL PUMP	4	EA		
520	REPLC of BRNG&MSEAL PRSRPMP&ULPMPHFO/LDO	8	EA		
530	Radiography	2	D		
540	STRESS RELIEVING	2	D		
550	Ultrasonic	2	D		
560	RPAIR/RPLACMNT UNION JOINT IN IMPLS LINE	8	EA		
570	RPLACMNT NEEDLE VALVES IN IMPULSE LINES	20	EA		
580	Fixg wool Bdrum,tnk,s/w/opiplne,vlv,pbnd	200	M2		
590	Fixing of roofing/floors sheet	200	M2		
600	CASTABLE REFRACTORY /POURABLE INSULATUON	4	MT		
610	Shiftng scrap materials to central store	20	MT		
620	APH SERVICING LUBE OIL PUMPS	20	EA		
630	APH LUBE OIL COOLER SERVICING HYDRO TEST	6	EA		
640	APH LUBE OIL PUMP ALIGNMENT	20	EA		
650	APH-Replacement of new/repared Lube Oi	16	PC		
660	APH-Replacement of LOVEJOY Coupling	16	PC		

670	APH REPLCMNT OF LOVEJOY COUPLING SPIDER	16	EA		
680	APH SERVICING OF RELIEF VALVE	16	EA		
690	APH CLEANING OF GUIDE BEARING AREA	200	BAG		
700	APH OVER RUN CLUTCH SERVICING REPLACEMNT	4	EA		
710	APH SRVCNG FLD COUPLNG/AIRMTR/LUBRICATOR	4	EA		
720	APH REPR SOOTBLWR LNKGMCH/REDCN&WORM GR	4	EA		
730	APH ATTENDING JAMNG SWIVL JNT/D-HEAD VLV	4	EA		
740	APH SERVICING OF D-HEAD VALVE	4	EA		
750	APH REPLACEMENT OF SWIVEL JOINT VALVE	4	EA		
760	APH RENEWAL OF KAOWOOL OF GUIDE BEARING	2	EA		
770	APH FILTER CLEANING OF GB/SB LOP IN APH.	192	EA		
780	APH REMOVAL OF FOREIGN MATERIAL FROM APH	4	EA		
790	APH ALIGNMENT OF MOTOR TO MAIN REDUCER	4	EA		
Total(Boiler & APH)					
790	AMC Mech Maint semikileld manday	2000	EA		
790	AMC Mech Maint skileld manday	600	EA		
790	Supply of IBR Welder	10	No		
790	Overhaul EOT/HOT/Chain Pulley Upto3Tons	4	EA		
790	Overhaul EOT/HOT/Chain Pulley 5.0 Ton	2	EA		
790	Load Testing-HOT/Chain Pulley Back -3ton	4	PC		
790	Load Testing-HOT/Chain Pulley Back -5ton	2	PC		
Total (Boiler & APH- Misc. Jobs)					
Total cost for Boiler & APH including misc jobs					
2) Milling System & Fans					
1	FD FAN SILIENCER INTERNALS CLEANING	1	EA		
2	SERVICING OF MAIN LUBE OIL UNIT	1	EA		
3	FD FAN OIL COOLER SERVICING & HYDRO TEST	2	EA		
4	CLEANING OF OIL FILTERS(DISCHARGE SIDE)	24	EA		
5	CLEANING OF OIL FILTERS(SUCTION SIDE)	16	EA		
6	FD FAN SERVICING OF THE LUBE OIL PUMPS	12	EA		
7	FD FAN SHAFT SEAL DIFUSR STAT BLD SRVCNG	1	EA		
8	FD FAN RUBBER EXPANSION BELOW REPLACEMNT	2	EA		
9	FD FAN REM&REPL RUBR EXPJOINT DISCHSIDE	2	EA		
10	FD FAN MAIN BEARING ASSEMBLY OVERHAULING	1	EA		
11	FD FAN SERVO MOTOR SERVICING	1	EA		
12	FD FAN BLADE BEARING ASSY.SERVICING	1	EA		
13	FD FAN COUPLING BOLT REPLACEMENT	2	EA		
14	FD FAN RIGIFLEX COUPLING REPLACEMENT	1	EA		
15	FD FAN SERVCNG RECIRCULATION/RELIEF VLVE	2	EA		
16	FD FAN REPLACEMENT OF COUPLING/CHECKING	40	EA		
17	FDFAN RPLC BRNG&OIL SEAL OF LUB OIL PUMP	4	EA		
18	FD FAN REPLACEMENT OF LUB. OIL PUMP	4	EA		
19	FD FAN SERVICING OF LINK ROD MECHANISM	4	EA		
20	FD FAN CHECKING & REPLACMENT OF OIL HOSE	12	EA		
21	FD FAN STROKE LENGTH ADJUST SERVOMOTOR	8	EA		
22	FD FAN ALIGNMENT OF FAN WITH MOTOR	2	EA		
23	ID FAN CLEANING OF FAN INTERNALS	2	EA		

24	ID FAN SRVCNG LABYRINTH SEAL ASS(DE&NDE)	1	EA		
25	ID FAN RPLC CLTH LABYRNTH SEAL AssDE&NDE	2	EA		
26	ID FAN BEARING (DE & NDE) SERVICING	2	EA		
27	ID FAN BEARING INSPECTION (DE &NDE)	2	EA		
28	ID FAN REPLACE OF FAN LINERS-WEAR PLATES	1	EA		
29	ID FAN REPAIR OF FAN LINERS(WEAR PLATES)	1	EA		
30	ID FAN CASING LINER REPAIR	4	M		
31	ID FAN INSTALLATION OF PHE (Preventive)	24	NO		
32	ID FAN HYDRO COUPLING SERVICING	1	EA		
33	ID FAN HYDRO COUPLING INSPECTION	1	EA		
34	ID FAN IMPELLER BOLT TIGHTNESS CHECKING	2	EA		
35	ID FAN STATIC SEALS DE & NDE REPLACEMENT	2	EA		
36	ID FAN HYDRO COUPLING TO MOTOR ALIGNMENT	2	EA		
37	ID FAN & HYDRO COUPLING ALIGNMENT	2	EA		
38	ID FAN Equipmnt Conditn Monitor/Balancing	2	PC		
39	ID FAN Replace Gear coupling(Motor Side)	1	PC		
40	ID FAN ReplaceGear coupling(Fan Side)	1	PC		
41	ID FAN Checking Gear Coupling(MotorSide)	8	PC		
42	ID FAN Checking Gear Coupling(Fan Side)	8	PC		
43	ID FAN REPLACEMENT OF BCW HOSE	4	EA		
44	ID FAN REPLACEMENT OF GROMMET PAD	4	EA		
45	ID FAN TORQUE TGHNG OF BEARING(DE&NDE)	4	EA		
46	PA FAN INSPECTION OF FAN IMPELLER	36	EA		
47	PA FAN SRVCNG LUBEOIL UNIT CHNG LUBOIL	4	EA		
48	PA FAN SERVICING OF THE LUB OIL PUMPS.	12	EA		
49	PA FAN SERVICING OF RECIRCLN/ RELIEF VLV	6	EA		
50	PA FAN ALIGNMENT OF LUBE OIL PUMP	12	EA		
51	PA FAN REPLCMT OF OIL SEAL/BEARING LOP	12	EA		
52	PA FAN REPLCMT OF NEW/REPAIR LOP	8	EA		
53	PA FAN CLEAN/REPLC SUCTN STRNR/DSCH FLTR	96	EA		
54	PA FAN REPLACEMENT OF LOVEJOY COUPLING	12	EA		
55	PA FAN REPLACMT OF LOVEJOY COUPLNG SPIDR	36	EA		
56	PA FAN SRVCG LABYRINTH SEAL ASSY DE&NDE	4	EA		
57	PA FAN RPLCMNT CLTH LABRNTH SEAL DE&NDE	4	EA		
58	PA FAN SERVICING OF BEARING (DE & NDE)	4	EA		
59	PA FAN BEARING INSPECTION (DE & NDE)	4	EA		
60	PA FAN RPLCMNT IMPELLER LINER WEAR PLATE	2	EA		
61	PA FAN HARD FACING OF CASING / IMPELER	120	KG		
62	PA FAN CUTTING OF CASING PLATE/IMPELLER.	500	M		
63	PA FAN WELDING OF CASING PLATE/IMPELLER.	500	M		
64	PA FAN SRVCNG OIL COOLER WITH HYDRO TEST	2	EA		
65	PA FAN SRVCNG OILCOOLER WTHOUT HYDROTEST	2	EA		
66	PA FAN REPAIR&REPLCMT STATIC SEAL-DE&NDE	6	EA		
67	PA FAN ALIGNMENT OF FAN WITH MOTOR	4	EA		
68	PA FAN SERVICING OF INLET GUIDE VANES/checking	24	EA		
69	PA FAN COMPLT REPLCMNT OF INLT GUIDEVANE	1	EA		
70	PA FAN CHK WLDG&BOLTTIGHT SHAFT TO IMPLR	24	EA		

71	PA FAN REMOVAL & REASSEMBLY TOP CASING.	2	EA		
72	PA FAN ASSEMBLY OF ROTOR	2	EA		
73	PA FAN REPLACEMENT OF ROTOR ASSY.	1	EA		
74	PA FAN EQU CONDITN MONITORING/BALANCING	36	EA		
75	PA FAN REPLACEMENT OF BCW HOSE	12	EA		
76	PA FAN REPLACEMENT OF GROMMET PAD	24	EA		
77	PA FAN TORQUE TIGHTENG OF BEARING DE&NDE	48	EA		
78	P AFAN ATTENDING MANHOLE DOOR LEAKAGE	120	EA		
79	REPAIR/REPLC SCRW CONVYR RIBON,CHAINLINK	42	EA		
80	REPLACEMENT OF ENTIRE SCREW ASSEMBLY AOH	1	EA		
81	REPAIR OF SPARE SCREW CONVEYOR AOH	2	EA		
82	MILL Internal Inspectn &Preventive Maint	48	PC		
83	Opening of Shell Manhole Door	12	PC		
84	Open Side Manhole Door in HotAirBox&Duct	164	PC		
85	REPL CERM PKG PC OLPIPE BEF CLSSF FEDASY	6	EA		
86	REPL CERM PKG REFUS DUCT CLSSF EXP JOINT	12	EA		
87	REPL CERM PKG P.C. OLGATE FLANGE JOINT	12	EA		
88	REPL CERM PKG FEDPIPE FEDR OL EXP JOINT	72	EA		
89	LINER SHEL TRUNION ANCHOR BOLT TIGHTNING	1400	EA		
90	Inspctn&Tightning entire bolts in MILL	6	PC		
91	BALL CHARGING AFTER SEGGREGATION IN MILL	6	EA		
92	Shell Liner Replacement(per Liner)	200	PC		
93	Shell Liner Replacement(Entire Liner)	1	EA		
94	Shell Liner Replacement(Ball Charging)	150	MT		
95	SERVICING MAIN REDUCR DRIVE SHFT COUPLING	7	EA		
96	SERVICE AUX REDU TO MAIN MOTOR COUPLING	6	EA		
97	SERVICE MAIN MOTOR TO MAIN REDUCER COUPL	6	EA		
98	AUX MOTOR TO AUX REDUCER FLUID COUPLING	6	EA		
99	AUX MOTOR TO AUX REDUCER PIN BUSH COUPL	16	EA		
100	SERVICING OF AUX. REDUCER	3	EA		
101	SERVICING OF MAIN REDUCER	6	EA		
102	SERVICING OF MAIN REDUCER LUB OIL PUMPS	12	EA		
103	Oil filter replacement	144	PC		
104	SERVICING OF GIRTH GEAR & DRIVE PINION	3	EA		
105	SERVICING OF THE GIRTH GEAR GREASE PUMP	12	EA		
106	CLEANING OF MAIN LUBE OIL COOLER (PHE)	6	EA		
107	CleanMainReducrLubOilCoolrWthoutHydroTst	6	PC		
108	DAMAGED CONVEYOR BODY LINER FABRICATION	80	KG		
109	BALL FEEDING GATE SERVICING	6	EA		
110	ALIGNMENT OF AUX. REDUCER TO MAIN MOTOR	6	EA		
111	ALIGNMENT MAIN MOTOR TO MAIN REDUCER	6	EA		
112	ALINMENT OF MAIN REDUCER TO PINION SHAFT	6	EA		
113	MILL SHELL LEVEL INSPECTION	3	EA		
114	SEAL AIR FAN COUPLING REPLACE ALIGNMENT	6	EA		
115	DECOUPLING ALIGNMENT SEAL AIR FAN	18	EA		
116	SEAL AIR FAN BEARING REPLACEMENT	4	EA		
117	SERVICING OF SEAL AIR FAN AUTO DAMPER	24	EA		

118	SERVICING OF THE SEAL AIR FAN FILTER	42	EA		
119	REPLACEMENT OF SEAL AIR GASKETS	4	EA		
120	SEAL AIR FAN SUCTION DAMPER SERVICING	6	EA		
121	SERVICING GIRTH GEAR SEAL AIR FAN FILTER	24	EA		
122	GG SEAL AIR FAN DECOUPLING REASSEMBLY	4	EA		
123	SUPPORT BEARING OIL HOSE REPLACEMENT	12	EA		
124	MAIN LUB OIL UNIT TANK SERVICING	6	EA		
125	MAIN BEARING LOP SERVICING (HP B & S LP)	42	EA		
126	MILL SUPPORT BEARING LINER REPLACEMENT	1	EA		
127	SERVICING OF MAIN LUBE OIL UNIT	4	EA		
128	SUPPORT BEARING OIL NOZ. CLEANING REPAIR	24	EA		
129	MILL SHELL TRUNNION SEAL REPLACEMENT	2	EA		
130	GIRTH GEAR HOUSING SEAL REPLACEMENT	2	EA		
131	SEAL BOX INSPECTION AND CLEANING	36	EA		
132	TRUNION LINER AND DP TUBE REPLACEMENT	1	EA		
133	MILL DRIVE BARS REPLACEMENT	32	EA		
134	BALL SEGREGATION FROM MILL SHELL	20	TO		
135	FEEDER PULLEY BEARINGS SEAL REPLACEMENT	12	EA		
136	I/L SPAN TENSION ROLLER BRNGS SEAL REPLC	24	EA		
137	COAL FEEDER DOOR OPENING & CLOSING	250	EA		
138	COAL FEEDER ENDLESS BELT REPLACEMENT	8	EA		
139	COAL FEEDER LOAD CELL REPLACEMENT	8	EA		
140	COAL FEEDER CLEANOUT CONVEYOR SERVICING	8	EA		
141	COAL FEEDER SHEAR PIN REPLACEMENT	36	EA		
142	COAL FEEDER MAIN DRIVE UNIT SERVICING	6	EA		
143	CFEDR IL SIDSKT,EPLTS,COB PDL SWT,DISPLG	6	EA		
144	COAL FEEDER BELT TRACKING	60	EA		
145	SERVICING OF COAL FEEDER CHAIN GATE	8	EA		
146	REMOVAL OF FOREIGN MATERIAL FROM FEEDER	12	EA		
147	COAL REMOVAL IN CASE OF FEEDER CHOKING	24	EA		
148	FEEDER OUTLET GATE (R.C GATE) SERVICING	4	EA		
149	CLASSIFIER OUTLET GATE SERVICING	24	EA		
150	REPLACEMENT OF P.C. GATES	1	EA		
151	CLASSIFIER CLEANING	72	EA		
152	MILL TO CLASSIFIER CHUTE CLEANING	72	EA		
153	CLASSIFIER VANES SERVICING & ADJUSTMENT	4	EA		
154	CLASSIFIER CLACK BOX SERVICING	42	EA		
155	CHOKING REMOVAL IN DELTA-P LINE	8	EA		
156	SCREW CONVEYOR BEARING REPLACEMENT	12	EA		
157	MAIN REDUCER BEARING GEAR REPLACEMENT	6	EA		
158	REPLC AUXRED CR BRNG/GEAR(IN,OUT,INTSHFT)	6	EA		
159	AUX REDUCER MAIN MOTOR COUPLING ALIGNMNT	4	EA		
160	MAIN MOTOR MAIN REDUCER COUPLING ALIGMNT	4	EA		
161	MAIN REDUCER PINION SHAFT COUPLING	4	EA		
162	REPLACEMENT OF PINION SHAFT/ BEARINGS	4	EA		
163	FREE WHEEL GEAR BOX OIL REPLACEMENT	24	EA		
164	FREEWHEEL BEARING REPLACEMENT	4	EA		

165	GREASE PANEL SERVICING	28	EA		
166	GREASE BARREL CHANGING	24	EA		
167	MILL GREASING PER MILL	96	EA		
168	FEEDER GREASING PER FEEDER	48	EA		
169	GREASE/OIL/BALL DRUMS SHIFTING	150	EA		
170	Replcmnt of HAD/PAD(1727x1829,870x3210)	1	PC		
171	Replacement of BypassAirDamper(860x860)	1	PC		
172	Replacement of MixBoxDamper(860x860)	1	PC		
173	Replacement of BAD/CAD/MBD/PAD(860x860)	1	PC		
174	Replacmnt of HAD/PAD(1721x1829,870x2310)	1	PC		
175	REPLACEMENT WITH BALL VALVES	22	EA		
176	Repair of BAD/CAD/MBD/PAD(860x860)	20	PC		
177	Repair of HAD/PAD(1721x1829,870x2310)	20	PC		
Total (Milling System & Fans)					
1	CUTTING CARBON STEEL	300			
2	WELDING OF CARBON STEEL	300			
3	Apply enamel paint without cost of paint	200			
4	Erection of Scaffolding	1000			
5	AMC Mech Maint semikileld manday	500			
6	AMC Mech Maint skileld manday	240			
Total (Milling System & Fans) - Misc. jobs					
1	Arresting coal dust leakages-on line	120	EA		
2	Arresting coal dust leakages-Patch welding	80	EA		
3	Filters Cleaning of ID FAN H/C	48	EA		
4	Bellow replacement (metallic/fabric)	8	EA		
5	Overhauling of Electrical Hoist- up to 3 Ton	2	EA		
6	Overhauling of Electrical Hoist- up to 5 Ton	1	EA		
7	Overhauling of Chain Pulley Block- up to 3 Ton	2	EA		
8	Overhauling of Chain Pulley Block- up to 10-25 Ton	4	EA		
9	Load Testing of Electrical Hoist- up to 3 Ton	2	EA		
10	Load Testing of Electrical Hoist- up to 5 Ton	1	EA		
11	Load Testing of Chain Pulley- up to 3 Ton	4	EA		
12	Load Testing of Chain Pulley- up to 5 Ton	1	EA		
13	Load Testing of Chain Pulley- up to 10-25 Ton	4	EA		
Total (Milling System & Fans)- Additional Job					
Total cost towards Milling system & fans including Misc. & additional jobs					
3) Turbine & Auxilliaries					
1	MOT VAPOUR EXTRACTION FEA SERVICING	4	EA		
2	Replacement of Gear coupling	2	PC		
3	CLEANNG THRUST BEARING FILTER & BOX UP	300	EA		
4	SRVICNG 3 WAY VALVE(CHANGE OVER VALVE)	2	EA		
5	CENTRIFUGE BOWL CLEANING	140	EA		
6	SERVICING OF CENTRIFUGE OIL PUMP	10	EA		
7	SERVICING OF CENTRIFUSE BOOSTER PUMP	10	PC		
8	REPLACE/SERVICE CENTRIFUGE FRICTION PAD	10	SET		
9	REPLACEMENT OF CENTRIFUGE BRAKE PAD	10	EA		

10	SERVICING OF CENTRIFUGE MAIN PUMP	6	EA		
11	SERVICING OF CENTRIFUGE VIEWING GLASSES	20	EA		
12	REPLACEMENT OF CENTRIFUGE GEAR BOX OIL	12	EA		
13	SERVICING CENTRIFUGE 3WAY CONTROL VALVE	2	EA		
14	RPLCMNT/SRVCNG OF CENTRIFUGE WORM GEAR	2	EA		
15	FILLING OF TURBINE OIL	120	DR		
16	SHIFTING OF TRUBINE WASTE OIL DRUM	90	DR		
17	REPLACEMENT OF LPT SAFETY DIAPHRAGM	6	EA		
18	ATTENDING GLAND LEAKAGE-CONDSR,HW,DBFL	4	EA		
19	RENEWAL PUMP COUPLING-CONDSR,HW,DBFL	4	EA		
20	SERVICING PUMP-CONDSR,HW,DBFL	4	EA		
21	SRVCNG DPLINE FLUSH PUMP-CONDSR,HW,DBFL	4	EA		
22	SERVICING OF SAFTY VALVE IN TG AREA	2	EA		
23	GAUGE GLASS LEAKAGE OF HP HEATERS 5&6	4	EA		
24	COMPLETE SERVICING OF MAIN AIR EJECTOR	2	EA		
25	REPLACEMENT OF GASKET MAIN AIR EJECTOR	4	EA		
26	REPLACEMENT NOZZLE GASKET MAIN EJECTOR	8	EA		
27	INSPECTION OF NOZZLE MAIN AIR EJECTOR	4	EA		
28	INSTALL GAUGE GLASS OF MAIN AIR EJECTOR	4	EA		
29	HPBP ATTENDING ANY OIL LEAKAGES	4	EA		
30	HPBP DRAINING,CLENING&OIL FILING IN TANK	4	EA		
31	HPBP STROKE ADJUSTMENT BP/BPE/BD VALVE	2	EA		
32	HPBP ATTENDING GLAND LEAKAGES	4	EA		
33	HPBP Replacement of Gland Packing	4	PC		
34	Replcmt/Servicing Of BFP Mech Seal(DE)	12	PC		
35	Replcmt/Servicing Of BFP Mech Seal(NDE)	12	PC		
36	Replc/Servicing BoosterPmp Mech Seal(DE)	10	PC		
37	Replc/Servicing BoosterPmp Mech Seal(NDE)	10	PC		
38	Replc/Servicing BearingsDE&NDEofBoostrPmp	10	PC		
39	HPBP RNWL/RPLC/SRVG BRNG(DE/NDE)BOSTRPMP	8	EA		
40	ALIGNMENT BFP TO VOITH COUPLING	10	EA		
41	ALIGNMENT VOITH COUPLING TO MOTOR	6	EA		
42	BFP MOTOR TO BOOSTER PUMP ALIGNMENT	10	EA		
43	REPLACEMENT OF BFP CATRIDGE	3	EA		
44	BFP SUCTION SIDE SEAL RING REPLACEMENT	14	EA		
45	BFP REPLCMNT DISCHARGE COVER O-RING(NDE)	4	EA		
46	BFP Cleaning of water jacket	12	PC		
47	BFP Acid Cleaning of BCW Piping	15	PC		
48	BFP MECH SEAL COOLER CLEANING PAINTING	4	EA		
49	BFP SUCTION STRAINER INSPECTION CLEANING	8	EA		
50	BFP- CLEANING OF DUPLEX FILTER	160	EA		
51	BFP-DECOUPLING & COUPLING OF LOP MOTOR	6	EA		
52	BFP-REPAIR TUBE LEAKAGE OF LO/WO COOLER	2	EA		
53	BFP-SERVICING OF 3 WAY VALVE	2	EA		
54	BFP-ATTENDING BC LEAK OFF FLANGE LEAKAGE	30	EA		
55	BFP-ATTENDING UNION LEAKAGE	52	EA		
56	BFP-RECONDITIONING OF MECHANICAL SEAL	5	EA		

57	REPLACEMENT OF COMPLETE OIL FROM BFP	14	EA		
58	ATTENDING ANY LEAKAGE IN THE BFP SYSTEM	50	EA		
59	BFP-SCOOP SERVICING/REPLACEMENT	1	EA		
60	Complete Servicing of booster pump	4	PC		
61	REPLAC/SERVICOIL CATCHER FEDPMP/BSTRPMP	5	EA		
62	SERVICING OF BFP CATRIDGE	2	EA		
63	COMPLETE SERVICING OF CEP	1	EA		
64	CEP-REPLACEMENT OF PUMP BEARING	1	EA		
65	CEP-INSPECTION OF PUMP BEARING	2	EA		
66	CEP-REPLACEMENT OF GLAND PACKING	4	EA		
67	CEP-REPLACEMENT OF GLAND SLEEVE	2	EA		
68	CEP-CLEANING OF SUCTION STRAINER	6	EA		
69	CEP-LUBE OIL COOLER COIL LEAKAGE:-	4	EA		
70	CEP-ALIGNMENT OF CEP WITH MOTOR	2	EA		
71	CEP-REMOVAL OF MOTOR	1	EA		
72	SERVICING OF HOT WELL MAKE UP PUMP	10	EA		
73	REPLACE HOT WELL MAKE UP PUMP BEARING	4	EA		
74	REPLACE GLAND PACKING HOTWELL MKUP PUMP	6	EA		
75	SERVICING OF DIRTY OIL PUMP	2	EA		
76	COUPLING REPLACEMENT OF DIRTY OIL PUMP	1	EA		
77	REPLACE MECH. SEAL OF DIRTY OIL PUMP	2	EA		
78	EOT CRANE RAIL TIGHTENING	2	EA		
79	COMPLETE GREASING OF THE EOT CRANE	2	EA		
80	BRAKE ADJUSTMENT OF EOT CRANE	4	EA		
81	GENERATOR SEAL OIL PUMP SERVICING	2	EA		
82	GENERATOR SEAL OIL COUPLING REPLACEMENT	4	EA		
83	REPLACMNT MECH SEAL OIL SYSTEM GENERATOR	2	EA		
84	SEAL OIL DUPLEX FILTER CLEANING	20	EA		
85	GEN SEAL OIL VAPOUR EA	4	EA		
86	SERVICING OF GEN SEAL OIL VACUUM PUMP	4	EA		
87	GEN SEAL OIL ATTENDING OIL LEAKAGES	8	EA		
88	SEAL OIL PUMP & MOTOR ALIGNMENT	4	EA		
89	STATOR WATER PUMP SERVICING	4	EA		
90	COUPLING REPLACEMENT OF STATOR WATER SYS	4	EA		
91	REPLACE MECH. SEAL OF STATOR WATER SYS	4	EA		
92	Cleaning of duplex filter of SW Sys	5	PC		
93	REPLACE GAUGE GLASS OF EXPANSION TANK	2	EA		
94	DECOUPLING&ALIGNMENT SW MOTOR WTH PUMP	4	EA		
95	RPLCMNT RUBBERPAD COUPLING STATOR WATER	4	EA		
96	SRVICNG HYDRGN/CRBN DIOXD FILNG STATNVLV	4	EA		
97	SRVICNG HYDROGEN PRESSURE REGULATOR	4	EA		
98	HYDROGEN LEAK DETECTION	4	EA		
99	Servicing of safty valve of SW Sys	2	PC		
100	REPLACEMENT OF HYDROGEN/CO2 FILLING PIPE	4	EA		
101	HYDROGEN DRIER REPLACEMENT OF COMPRESSOR	2	EA		
102	HYDROGEN DRIERMAKE UP FREON GAS CHARGING	10	EA		
103	HYDROGEN DRIERCOMPLETE GAS CHARGING	6	EA		

104	HYDROGEN DRIER CONDENSER CLEANING	2	EA		
105	COMPLETE SERVICING OF AIR COMPRESSOR	16	EA		
106	AIRCOMP SERVICE/REPLACE LPSIDE CYLINDER	6	EA		
107	AIRCOMP SERVICE/REPLACE HPSIDE CYLINDER	6	EA		
108	AIRCOMP SERVICING OF LP VALVE ASSY	60	EA		
109	AIRCOMP SERVICING OF HP VALVE ASSY	60	EA		
110	AIRCOMP SERVICING OF ONE VALVE	4	EA		
111	AIRCOMP SERVICE/REPLACE LP PISTON ASSY	20	EA		
112	AIRCOMP SERVICE/REPLACE HP PISTON ASSY	20	EA		
113	AIRCOMP REPLACEMENT OF CRANKSHAFT	4	EA		
114	AIRCOMP REPLACEMENT CROSSHEAD & BEARING	4	EA		
115	AIRCOMP REPLACE CONNECTING ROD & BEARING	12	EA		
116	AIRCOMP ACID CLEANING OF WATER JACKET	8	EA		
117	AIRCOMP OIL MAKE- UP	64	EA		
118	AIRCOMP REPLACEMENT MAIN BEARINGS	8	EA		
119	AIRCOMP REPLACEMENT OF STUFFING BOX	2	EA		
120	AIRCOMP SERVICE/REPLACE WIPER RING ASSY	18	EA		
121	AIRCOMP Replacement of gland assy	18	PC		
122	AIRCOMP Servicing of Lube Oil Pump	6	PC		
123	AIRCOMP REPLACEMENT OF LOP COUPLING	6	EA		
124	AIRCOMP RENEWAL OF V BELTS	32	EA		
125	AIRCOMP BELT TENSIONING	32	EA		
126	AIRCOMP SERVICING SAFETY VALVE (UPTO 3")	8	EA		
127	AIRCOMP CLEANING OF AIR RECEIVER TANK	8	EA		
128	AIRCOMP ATTENDING LEAKAGE IN INTERCOOLER	24	EA		
129	AIRCOMP REPLACE INTERCOOLER TUBE ASSY	6	EA		
130	AIRCOMP ATTENDING LEAKAGE AFTER COOLER	20	EA		
131	AIRCOMP REPLACEMENT AFTER TUBE BUN ASSY	4	EA		
132	AIRCOMP REPLACE OUTR COVR HP/LP CYLINDER	4	EA		
133	AIRCOMP RENEWAL OF LUB OIL	10	EA		
134	AIRCOMP CLEANING OF MOISTURE SEPARATOR	8	EA		
135	AIRCOMP REPLACEMENT OF MUFFLER	4	EA		
136	AIRCOMP PRESSURE TESTING AIR RECVER TANK	8	EA		
137	AIRCOMP REPLCEMNT/RECONDITION CRANK CASE	4	EA		
138	AIRCOMP ATTEND OIL LEKG INSID CRANKCASE	8	EA		
139	AIRCOMP ATTEND AIR/BCW/OILLINE LEKG CTUB	16	EA		
140	AIRCOMP ATEND LEKG LP/HP SUCT/DISCH VLVE	16	EA		
141	AIRCOMP CLEANING OIL FILTER AND STRAINER	18	EA		
142	REMOVAL OF SILICA GEL IN ADP TOWER	4	EA		
143	ADP REPLACEMENT OF BLOWER	6	EA		
144	ADP SERVICING/REPLACEMENT OF 2-WAY VALVE	4	EA		
145	ADP SERVCING/REPLACEMNT OF 4-WAY VALVE:-	4	EA		
146	ADP Servicing of Power Cylndr	6	PC		
147	ADP CLEANING PRIMARY&SECONDARY FILTER	6	EA		
148	ADP SERVICING OF SOLEEAID VALVE	4	EA		
149	COMPLTE OVERHAULNG OF COMPRESSOR(AC-880)	8	EA		
150	PARTIAL OVERHAULING OF COMPRSR(AC-880)	8	EA		

151	VALVES SERVICING (AC_880)	2	EA		
152	COMPLETE OVERHAULING OF COMPRSSR(AC-470)	2	EA		
153	PARTIAL OVERHAULNG OF COMPRESSOR(AC-470)	4	EA		
154	VALVES SERVICING (AC470)	2	EA		
155	condenser tube cleaning of AC Plnt	6	PC		
156	RPLAC TFLN SEAT COMPRSR DISCRG SHUTOFVLV	4	EA		
157	SERVICING OF LIQUID LINE ANGLE VALVE	3	EA		
158	REPLACE TEFLON SEAT OF LIQUID LINE VALVE	4	EA		
159	FLANGE GASKET CHNG DISCHVLV/LQDLIN ANVLV	5	EA		
160	SERVICNG COMPRESSR SUCTION SHUT OFF VALVE	3	EA		
161	LEAD WOOL GLAND PACKING	4	EA		
162	SERVICING OF LOADING SOLENOID VALVES	5	EA		
163	REPLACE SOLENOID COIL OF LOADING VALVE	3	EA		
164	REPLACE OF REFRIGERATN SOLENOID VALVE	4	EA		
165	MAKING OF COPPER TUBE FLARE	5	EA		
166	MAKE UP GAS CHARGING	12	EA		
167	FULL GAS CHARGING	6	EA		
168	SERVICNG OF THERMOSTATIC EXPANSION VALVE	3	EA		
169	GASKET REPLACE THERMOSTATC EXPANSN VALVE	3	EA		
170	CLEANING/REPLACEMENT OF 'Y' STRAINER	4	EA		
171	SERVICNG LOADNG/UNLOADNG VLVE OF COMPRSSR	6	EA		
172	BELT REPLACE OF COMPRESSOR(C-105/C-92)	6	EA		
173	Belt Tensioning of AC Plnt	25	PC		
174	SHAFT SEAL OR ITS 'O' RING REPLACEMENT	4	EA		
175	REPAIR/REPLACE PISTON/ CONNECTING ROD	4	EA		
176	PRESSURE TESTING OF THE CONDENSER	3	EA		
177	RPLAC SAFTY VALV/PURGNG VALVE OF CONDNSR	3	EA		
178	RPLAC BRSS ANGLE VALV 1/2" SIZE COMPRSSR	2	EA		
179	GASKT RPLAC LOADNG VALV/OIL PUMP COMPRSR	3	EA		
180	ACID CLEANING OF CHILLER	3	EA		
181	CLEANING CHILLED WATER MAKE UP TANK	2	EA		
182	REPLACEMENT OF FLOAT VALVE CHILLER	1	EA		
183	DECOUPLING OF BELT CHILLER	10	EA		
184	FILLING OF ALL THERMOSTAT WELLS	2	EA		
185	ACPLANT OIL REPLACEMENT OF COMPRESSOR AC	4	EA		
186	ACPLANT MAKE UP OIL CHARGING COMPRESSOR	3	EA		
187	ACPLANT-CHILLED WATER PUMP OVERHAULING	6	EA		
188	ACPLANT-REPLCE PUMP GLNDS/GLND BUSH STUD	6	EA		
189	ACPLANT-GREASING OF PUMP BEARING	6	EA		
190	ACPLANT -Rplc of DE side bearing	3	PC		
191	ACPLANT-REPLACEMENT OF COUPLING PAD	3	EA		
192	ACPLANT-REPLACEMENT OF NDE SIDE BEARING	2	EA		
193	ACPLANT-PUMP ALIGNMENT	2	EA		
194	ACP-RPLAC ISOLTNG VLV/PIPE OF PRSSR GAUG	3	EA		
195	ACPLANT-ARRESTING WATER LEAKAGE	6	EA		
196	ACP AHU-WASHING	8	EA		
197	ACP AHU-ACID CLEANING	6	EA		

198	ACP AHU-BELT REPLACEMENT	12	EA		
199	ACP AHU-BELT TENSIONING	12	EA		
200	ACP AHU-DECOUPLING OF BELT	8	EA		
201	ACP AHU-TACK WELDING OF IMPELLER BLADES	6	EA		
202	ACP AHU-Repair Servcing of Dischrg dampr	8	PC		
203	ACP AHU-REPAIR SERVCING OF SUCTION DAMPR	8	EA		
204	ACP AHU-REPLACEMENT OUTLET CANVAS CLOTHS	6	EA		
205	ACP AHU-STITCHING OF CANVAS CLOTHS:-	6	M		
206	ACP AHU-BEARING REPLACEMNT AHUSHAFT(NDE)	6	EA		
207	ACP AHU-BEARING REPLACEMNT AHUSHAFT (DE)	4	EA		
208	ACP AHU-REPLACEMENT AHUSHAFT & BALANCING	4	EA		
209	ACP AHU-REPLACEMENT IMPELLERS &BALANCING	4	EA		
210	ACP AHU-REPOSITIONING OF SLIPPED PULLEY	6	EA		
211	ACP AHU-SERVICING OF MODULATING VALVE	4	EA		
212	ACP AHU-CLEARING OF AHU TRAY CHOKING	4	EA		
213	ACP AHU-REMOVAL OF FOUL SMELL FROM AHU	4	EA		
214	CLNING MICROV FILTR(72 EAS)OF CNTRL ROOM	1	SET		
215	CLNING MICROV FILTR(18EAS)SWTCH YARD AHU	1	SET		
216	CLEANING OF PREFILTERS OF EACH AHU	4	EA		
217	CLEANING SUPPLY AIR GRILLS OF CNTRL ROOM	6	SET		
218	REFIXNG FALN AIR GRILE/STRIP FALS CEILNG	4	EA		
219	REPAIR OF HUMIDIFICATION KIT	2	EA		
220	CLEAN MICRV FILTR&PRE-FILTR EXCTATN ROOM	2	SET		
221	CLEAN MICRV FILTR FRSH AIR EA CNTRL ROM	2	SET		
222	CLN MICRVFLTR&PREFILTR FRSHAIREA SRVCBLD	1	SET		
223	AC ComRoom-PNTNG RUSTD PRTN&BODY STRTHNG	3	EA		
224	ROOMAC-SERVICE OF VACUUM PUMP	2	EA		
225	SWYRD COLINGTWR-CLEAN SYSTEM(REM ALGEA)	3	EA		
226	DG-FILLING OF DIESEL IN THE TANK	14	EA		
227	DG-REPLACEMENT OF LUBRICATING OIL	3	EA		
228	DG-CLEAN RADIATOR&CHARGE MAKE UP WATER	3	EA		
229	B CHECK MAINTENANCE OF DG SET	3	EA		
230	MAIN AIR EJECTOR AIR MEASUREMENT	3	EA		
231	INSPECTION OF NOZZLE OF STARTING EJECTOR	12	EA		
232	ATTENDING STEAM LEAKG OF STARTING EJECTR	25	EA		
233	STARTING EJECTOR SERVICING	1	EA		
234	HPBP SERVICING SAFETY VALVE OF OIL PUMP	2	EA		
235	HPBP RPLACMNT BLADDER 30LTR ACCUMULATOR	4	EA		
236	HPBP RPLACMNT BLADDER 10LTR ACCUMULATOR	2	EA		
237	HPBP PRESSURE SETTING	4	EA		
Total(Turbine & Auxilliaries)					
1	CUTTING CARBON STEEL	250	M		
2	WELDING OF CARBON STEEL	250	M		
3	Apply enamel paint without cost of paint	200	M2		
4	Erection of Scaffolding	1000	M2		
5	AMC Mech Maint semikileld manday	500	EA		
6	AMC Mech Maint skileld manday	300	EA		

Total(Turbine & Auxilliaries)- Misc jobs						
1	Driver to Operate- Hydra,Truck & LMV Driver as per requirement(HMV & LMV licence)	280	M. day			
2	Replacement of Condenser Bellow	1	No			
3	TG EOT Crane operator	280	M. day			
Total(Turbine & Auxilliaries)- Additional Job						
Total cost towards Turbine & Auxiliaries including Misc jobs & Additional Job.						
4) Ash Handling Plant						
1	OVERHAULING OF ASH SLURRY PUMP	24	EA			
2	ASP-ATTENDING CASING LEAKAGE PUMP	4	EA			
3	ASP-REPLACEMENT OF FLAT BELT	12	EA			
4	ASP-REPLCEMNT OF SUCTION/DISCHRGE ADPTOR	12	EA			
5	ASP-REPLACEMENT OF GLAND PACKINGS.	12	EA			
6	ASP-Replacement of Lubricating oil	6	EA			
7	ASP-Servicing of pump pulley	4	EA			
8	ASP-Servicing of motor pulley	4	EA			
9	OVERHAULING AHP DRAIN PUMP	2	EA			
10	CLEANING AHP DRAIN PUMP SUMP PIT	1	EA			
11	AHP DRAIN PUMP-REPLACEMT GLAND PACKINGS.	2	EA			
12	AHP DRAIN PUMP-Repcomnt of V belt	2	PC			
13	ADL&RWL-RPLAC CPLNG SLEV/RING/RING GASKT	200	EA			
14	ADL&RWL-REPLACEMENT OF MS/ CI PIPE	100	EA			
15	ADL&RWL-REPLACEMENT OF MS/ CI BEND	16	EA			
16	Inspection of ash disposal&recycling line	12	MON			
17	Dechok Ash Slry Piplin Frm AHP toAshPond	50	EA			
18	ADL&RWL-Laying of HDPE Pipeline	200	EA			
19	ADL&RWL-Dismantling of HDPE Pipeline	100	EA			
20	CG-GLAND PACKNG REPLACE/BEARNG SRVICNG	14	EA			
21	ALIGNMENT OF CLINKER GRINDER,GB,FC&MOTOR	4	EA			
22	CG-ADJUSTMNT/FITNG DRIVNG CHAIN SPROCKET	8	EA			
23	CLINKER GRINDER-GREASING OF CHAIN	4	EA			
24	CG-REPLACE LUBRICATING OIL FLUID COUPLNG	2	EA			
25	ASH Hopper-Servicing of Power Cylnr	2	PC			
26	BAH FG-GLAND PACKNG REPLACE POWER CYLNDR	4	EA			
27	BAH FG-SERVICING OF SOLEEAID VALVE	8	EA			
28	BAH-REMOVE FOREIGN MATERIALS FRM HOPPER	100	EA			
29	DECHOK BOTTOM ASH PIPELINE BAH-ASP	60	EA			
30	BAH-REPLACE HOPPER INSPECTION GLASS ASSY	10	EA			
31	BAH-CLEAN SEAL TROUGH CHAMBER	4	EA			
32	FAH-REPLACE Expsnion Below of Hopper	10	PC			
33	FLY ASH HOPPER -REMOVE FOREIGN MATERIALS	70	EA			
34	FAH-REPLACEMENT POKE DOOR BOLT & GASKET	120	EA			
35	OVERHAULING OF ASH WATER PUMP	9	EA			
36	BEARING REPLACEMENT OF ASH WATER PUMP	6	EA			
37	GLAND PACKING REPLACE OF ASH WATER PUMP	6	EA			

38	DECOUPLNG,ALIGNMNT&COUPLNG AWP&MOTOR	6	EA		
39	OVERHAULING OF SEAL WATER PUMP	2	EA		
40	BEARING REPLACEMENT OF SEAL WATER PUMP	4	EA		
41	GLAND PACKNG REPLACE OF SEAL WATER PUMP	4	EA		
42	DECOUPLNG,ALIGNMNT&COUPLNG OF SWP&MOTOR	4	EA		
43	OVERHAULING OF TRANSFER WATER PUMP	4	EA		
44	DECOUPLNG&COUPLNG OF TRANSFR WATER PUMP	3	EA		
45	REPLCE GLAND PACKNG OF TRANSFR WATR PUMP	6	EA		
46	Clean100%ash watr recycling pump sump pit	2	EA		
47	Preventive checks of AHP Equipments	48	WK		
48	prevntiv check of Ash watr Recycling Pump	12	EA		
49	Dry Ash-Preventve Maint Air Compressor	52	D		
50	Dry Ash-Overhauling Air Compressor	8	EA		
51	Dry Ash-Service Air Drier Screw Compressor	2	EA		
52	Dry Ash-Inspection&Bearing replacmnt SC	6	EA		
53	Dry Ash-Clean Filter,oil replace(3mon)SC	4	D		
54	Dry Ash-Inspctn/repair Inter cooler SC	8	EA		
55	Dry Ash-Replacemnt of belt of Air Comp	4	EA		
56	Dry Ash-Service Suctn/Dischrg Air SwComp	14	EA		
57	Replace main dome valv Ash Convyng Vessl	8	EA		
58	Replace Main dome Seal Ash Convyng Vessl	8	EA		
59	Replace Vent dome valv Ash Convyng Vessl	8	EA		
60	Replace Vent dome Seal Ash Convyng Vessl	8	EA		
61	Overhauling of Ash Conveyng Vessels	8	EA		
62	Replace Plate Valve Ash Conveyng Vessel	8	EA		
63	Servicng/Replace of Pneumatic Cylinder	8	EA		
64	Arresting Ash leakage frm Ash convyng line	50	EA		
65	Replacement of Ash conveying Pipe line	100	M		
66	Replacement of Ash diversion chute	4	EA		
67	DUST CONDITIONER-Servicing Rotary Feeder	4	EA		
68	DUST CONDITIONER-Replacement of Chain	6	EA		
69	DUST CONDITIONER-Rplce Watr Pipe Nozzles	5	EA		
70	DUST COND-Servicing/Repairing Tele chute	2	EA		
71	Servicing of Fluidizing Blower	24	EA		
72	Servicing of Water booster pump FB	4	EA		
Total (Ash handling plant)					
1	Fabrication & Erection of PipngSys 350nb	1200	M		
2	Fabrication & Erection of PipngSys 300nb	50	M		
3	Fabrication & Erection of PipngSys 250nb	250	M		
4	FABRCATION ERECTION PIPING SYSTEM 200 NB	150	M		
5	Fabrication & Erection of PipngSys 150nb	150	M		
6	Fabrication & Erection of PipngSys 100nb	40	M		
7	Fabrication & Erection of PipngSys 80nb	100	M		
8	Dismantling of Piping system 350nb	1200	M		
9	Dismantling of Piping system 300nb	50	M		
10	Dismantling of Piping system 250nb	250	M		
11	Dismantling of Piping system 200nb	150	M		

12	Dismantling of Piping system 150nb	150	M		
13	Dismantling of Piping system 100nb	40	M		
14	Dismantling of Piping system 80nb	100	M		
15	CUTTING CARBON STEEL	800	M		
16	WELDING OF CARBON STEEL	800	M		
17	Rectification of Flange Leakage	20	EA		
18	Fabrication of Steel Structure	24	MT		
19	Erection of Steel Structure	24	MT		
20	Apply enamel paint with cost of paint	50	M2		
21	Apply enamel paint without cost of paint	300	M2		
22	Erection of Scaffolding	2000	M2		
23	Load Testing-Electrical Hoist upto 5ton	2	PC		
24	Load Testing-Electrical Hoist Abv5-10Ton	2	PC		
25	AMC Mech Maint semikileld manday	400	EA		
26	AMC Mech Maint skileld manday	200	EA		
27	Clinker Grinder Over hauling(AOH)	4	No		
28	Feed Gate Housing Overhauling(AOH)	4	No		
29	Power Cylinder Overhauling(AOH)	4	No		
Total (Ash handling plant) - Misc. jobs					
1	PM of ash slurry pump	48	No		
2	PM of clinker grinder	16	No		
3	PM of seal water pump	4	No		
4	PM of ash water pumps	18	No		
5	PM of dust conditioner	12	No		
6	PM of silo reciprocating compressor	6	No		
Total (Ash handling plant) - Additional job					
Total cost towards Ash handling plant including Misc. & Additional jobs					
5) BOP Area					
1	Overhauling of BCW Make up pump	3	EA		
2	Dcouplng/couplng of motr BCW Makeup Pump	3	EA		
3	Change/tightening gland BCW Makeup Pump	6	EA		
4	Overhauling of DMPP	4	EA		
5	Decouplng/couplng of motor DM Plant Pump	4	EA		
6	Change/tightening Gland of DM Plant Pump	6	EA		
7	Overhauling of Filter Back Wash Pump	4	EA		
8	Dcouplng/couplng motor FiltrBackWashPump	4	EA		
9	Chang/tightning Gland FiltrBackWashPump	6	EA		
10	Overhauling of portable pump	6	EA		
11	Dcouplng/couplng of motr PortbleWatrPump	6	EA		
12	Chang/tightning of Gland PortablWatrPump	6	EA		
13	Bridge wheel/bearng replace Clarfocultr	2	EA		
14	Brdg/Agtatr GB Svcng/Rplac Clarifoculatr	2	EA		
15	Bridge Agitatr servicng Clarifoculatr	1	EA		
16	Overhaul FlashMixturAgitatr Clarifocultr	4	EA		
17	Decople&Coplng Agtatr/GeaBox Clarifcultr	5	EA		
18	Overhauling of Mixed bed/backwash blower	3	EA		

19	Belt replace mixed bed/back wash blower	2	EA		
20	Motor Dcouplng&Couplng BackWsh/MixdBedBlwr	2	EA		
21	Overhauling of lime Agitators	2	EA		
22	Lime agitator gear box servicing	1	EA		
23	Decouplng&couplng of lime agitator motor	1	EA		
24	Alum agitator servicing	1	EA		
25	Dcouplng&couplng AlumMotor with GearBox	1	EA		
26	Overhauling of Neutralising pit pump	6	EA		
27	MotorCplng/dcpng,aligmntNeutrlsngPitPmp	6	EA		
28	Overhauling DM water transfer pump	2	EA		
29	Motor dcouplng&couplng DMWatrTransfrPump	3	EA		
30	Gland tight/replce of DMWaterTransfrPump	3	EA		
31	Overhauling of De-gassed water pump	4	EA		
32	MotrCoplng,decoplng&aligmntDgassdWatrPmp	4	EA		
33	Gland tight/replace of DegassedWaterPump	4	EA		
34	Overhauling of acid transfer pump	6	EA		
35	Motor decoupl,coupling,align Acid pump	3	EA		
36	Agitator servicng MixdBed/CausticAgitatr	4	EA		
37	Repr/Rplac TankLvlGaug MixdBed/CastcAgit	6	EA		
38	Regen Area- Replacemnt MSRL/CPVC pipe	500	M		
39	Regen Area-Replacement of Diaphragm Vlv	40	EA		
40	Regen Area-Servicing of injector	4	EA		
41	Regen Area-De-chocking of Acid line	10	EA		
42	Acid Unloading from tanker	40	EA		
43	Acid Gauge glass servicing/replacement	15	EA		
44	Ovehaul Hydrzn/phos/sod.Sulpht DosngPump	16	EA		
45	Gland Replace/Tightening Dosing Pump	10	EA		
46	Decouplng&couplng Sulphite Dosing pump	4	EA		
47	Servicing Hydrzn/phospt/Sulphte TankAgtr	8	EA		
48	Preventive Checks of DM Plant Equipments	48	D		
49	Overhauling of CW Pump	2	EA		
50	Replacement of Sleeve under ST. Box CW	1	EA		
51	Dcouplng&Couplng of Motor of C.W.Sys	4	EA		
52	Replace/tightening of Gland of C.W.Sys	10	EA		
53	Overhaul hydraulic sys for CWdischargValv	4	EA		
54	Overhaul/replace of CW duct vent valves	15	EA		
55	Overhauling of BCW Pumps	2	EA		
56	Replacement of Sleeve under ST. Box BCW	2	EA		
57	De-coupling & coupling of Motor BCW Pump	6	EA		
58	Gland changing/tightening of BCW pumps	12	EA		
59	Overhauling of RAW Water pump	2	EA		
60	De-coupling & coupling of Motor RAWWP	3	EA		
61	Replacement of Sleeve under STBox RAWWP	1	EA		
62	Change/tightening Gland of RAW WaterPump	6	EA		
63	Cleaning/maintainance coarsescreen RWP/CWP	12	EA		
64	Overhauling of service water pump	2	EA		
65	Motor dcoupling&couplng ServiceWaterPump	2	EA		

66	Gland change/tightning ServiceWaterPump	2	EA		
67	Overhauling of Sump Pump	15	EA		
68	Motor decoupling & coupling of Sump Pump	4	EA		
69	Overhauling/Replacement of FC(Deck)valve	4	EA		
70	Running maintenance of FC Valve	2	EA		
71	Overhauling of CT Gear Box	1	EA		
72	CT EA blade pitch setting	6	EA		
73	Replacement of CT EA Blade	1	EA		
74	Replacement of CT Drive Shaft	1	EA		
75	Replacement of CT Gear Box Oil Seal	22	EA		
76	De-coupling & coupling CT EA motor	10	EA		
77	Removal of Hub from CT Gear Box	2	EA		
78	CT DECK CLEANING	24	AU		
79	REPLACEMENT OF SPIRAL TARGET NOZZLE	50	EA		
80	EA Hub Replacement CT	1	EA		
81	Replacement of CT Gear Box.	1	EA		
82	Painting of CT gearbox.	2	EA		
83	Repair/replacement of CT oil hose System	6	EA		
84	OIL REPLACEMENT OF CT GEAR BOX	10	EA		
85	Tightening of CT EA fasteners.	22	EA		
86	Overhauling of fire hydrant pump	3	EA		
87	De-coupling & coupling of FH pump Motor	6	EA		
88	Gland changing/tightening (FH.Pump)	6	EA		
89	Inspection & testing of hydrant system	8	EA		
90	Servicing of Fire Hydrant valves	50	EA		
91	Servicing of water monitors Fire Hydrant	2	EA		
92	Overhauling of jockey pump	2	EA		
93	De-coupling & coupling Jokey Pump motor	4	EA		
94	Gland changing & tightening Jokey Pump	4	EA		
95	Overhauling of Spray pump	2	EA		
96	Gland changing/tightening (Spray Pump)	2	EA		
97	Servicing of Alarm Valve Spray Pump	4	EA		
98	Inspection&checking Spray Pump DelugeVlv	4	EA		
99	Servicing of Spray Pump deluge valve	15	EA		
100	Service&check multiple/Actuatr CU SprayP	1	EA		
101	Replacement of Nozzles in sprinkler sys	20	EA		
102	Inspect&Testing TG Bearing Fire Prot Sys	4	D		
103	Dismntl&Reerect TG Bearing Fire prot sys	2	EA		
104	Dismntl&Reerect SprinklerPipe Transformr	1	EA		
105	Rectify Flange Leakage Sprinkler 15m	1	EA		
106	Repair underground fire fightng pipeline		EA		
107	Replace underground FireFightingPipeline	2	M		
108	Servicing of chlorine booster pumps	2	EA		
109	Motor decouplng&coupling(ChlorineBostrPump)	2	EA		
110	Checks of CT & FIRE FIGHTING Equipments	48	D		
111	Preventive checks of CW,BCW & RW Pumps.	48	D		
Total (BOP area)					

1	CUTTING CARBON STEEL	800	M		
2	WELDING OF CARBON STEEL	800	M		
3	Apply enamel paint without cost of paint	600	M2		
4	Erection of Scaffolding	2000	M2		
5	Replacement of valve 600NB	2	PC		
6	Replacement of valve 350NB	12	PC		
7	Replacement of valve 250NB	10	PC		
8	Replacement of valve 200NB	10	PC		
9	Replacement of valve 150NB	10	PC		
10	Replacement of valve 100NB	10	PC		
11	Replacement of valve 80NB	30	PC		
12	Servicing of Valve 600NB	2	EA		
13	Servicing of Valve 350nb	10	EA		
14	Servicing of Valve 250nb	15	EA		
15	Servicing of Valve 200nb	10	EA		
16	Servicing of Valve 150nb	10	EA		
17	Servicing of Valve 100nb	20	EA		
18	Servicing of Valve 80nb	20	EA		
19	Gland Replacement 3/8-1inch	6	EA		
20	Gland Replacement 1.5-2inch	6	EA		
21	Gland Replacement 2.5-8inch	6	EA		
22	Gland Replacement 10-141inch	6	EA		
23	Overhaul EOT/HOT/Chain Pulley Upto3Tons	3	EA		
24	Overhaul EOT/HOT/Chain Pulley 5.0 Ton	4	EA		
25	Overhaul EOT/HOT/ChainPuly Above5to10Ton	1	EA		
26	Ovrhaul EOT/HOT/ChainPuly Above10to25Ton	1	EA		
27	Load Testing-HOT/Chain Pulley Back -3ton	3	PC		
28	Load Testing-HOT/Chain Pulley Back -5ton	4	PC		
29	Load test hoist/chain pully block(5-10T)	1	PC		
30	Load Testing-Electrical Hoist upto 3ton	1	PC		
31	Load Testing-Electrical Hoist upto 5ton	3	PC		
32	Load Testing-Electrical Hoist Abv5-10Ton	3	PC		
33	Load Testng-Electrical Hoist Abv10-25Ton	1	PC		
34	Pressure Vessel Testing (5M3 Capacity)	1	EA		
35	AMC Mech Maint semikileld manday	600	EA		
36	AMC Mech Maint skileld manday	300	EA		
Total (BOP area)- Misc. jobs					
1	Servicing of Gravity sand filter gear box	20	No		
2	Anion /cation exchanger brine wash	8	No		
3	Anion /cation/mixed bed strainer bottom replacement	8	No		
4	Servicing of Fire fighting air compressor	4	No		
5	Overhauling of hydrant diesel pump	1	No		
6	Overhauling of spray diesel pump	1	No		
7	Servicing of BCW NRV	6	No		
8	Servicing of RW NRV	2	No		
9	Servicing of NPP NRV	4	No		
10	PM of Cooling tower fan	22	No		

11	PM of BCW pump	12	No		
12	PM of CW pump	6	No		
13	PM of RW pump	6	No		
14	Raw water header vent valve	4	No		
15	Replacement of silica gel	6	No		
16	Fabrication & Erection of PipngSys 250nb	500	M		
17	FABRCATION ERECTION PIPING SYSTEM 200 NB	500	M		
18	Fabrication & Erection of PipngSys 80nb	100	M		
19	Dismantling of Piping system 250nb	500	M		
20	Dismantling of Piping system 200nb	500	M		
21	Dismantling of Piping system 80nb	100	M		
22	Boiler Licence recertification.	2	No		
23	Boiler Tube Leak Repair including liasoning -Scope upto 10joints	6	No		
24	Additional Tube Joints	100	No		
Total Amount for 1st Year					

Total Amount for 1st Year in figures: _____

Total Amount for 1st Year in Words: _____

b) Annual Overhauling of Mechanical Equipments (Mills, Feeders, Fans and misc. works) of 210MW Unit

ITEM NO	DESCRIPTION OF JOB	UOM	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(A)	MILLS & FEEDERS:				
1	FABRICATION, REMOVAL & WELDING OF DAMAGED SCREW CONVEYOR RIBBONS, CHAIN LINKS, STIFFNER PLATES OF MILL DURING REPAIR /OVERHAUL	MILL	3		
2	REPLACEMENT OF ENTIRE SCREW ASSEMBLY (ONE SIDE MILL)	NO	3		
3	REPAIR OF SPARE SCREW CONVEYOR OUTSIDE MILL	NO	1		
4	OPENING OF MAN HOLE DOOR				
4.1	SHELL MAN HOLE DOOR	NO	6		
4.2	SIDE MAN HOLE DOORS IN HOT AIR BOX & DUCT	NO	45		
5	REPLACEMENT OF CERAMIC PACKING ROPE FOR PC OUTLET PIPE BEFORE CLASSIFIER FEED ASSY. & REFUSAL DUCT CLASSIFIER EXPANSION JOINT				
5.1	FEED PIPE FEEDER O/L EXPANSION JOINT	NO	6		
6	INSPECTION & TIGHTENING OF LINER/ANCHOR/SHELL/ TRUNION BOLTS ETC				
6.1	ENTIRE BOLTS IN MILL TIGHTENING	MILL	3		
7	SHELL LINER REPLACEMENT				

7.1	COMPLETE LINER REPLACEMENT (560 NOS.)	MILL	1		
7.2	PER LINER	NO	100		
8	BALL CHARGING AFTER SEGREGATION				
8.1	PER MILL	NO	3		
9	INSPECTION & SERVICING OF MAIN REDUCER TO DRIVING SHAFT COUPLING	NO	3		
10	INSPECTION & SERVICING OF OTHER DRIVE COUPLINGS				
10.1	AUX. REDUCER TO MAIN MOTOR	NO	3		
10.2	MAIN MOTOR TO MAIN REDUCER	NO	3		
10.3	AUX. MOTOR TO AUX. REDUCER (FLUID COUPLING)	NO	3		
10.4	AUX. MOTOR TO AUX. REDUCER (PIN BUSH COUPLING)	NO	3		
10.5	OIL REPLACEMENT OF FREE WHEEL OUT SIDE GEAR BOX	NO	3		
11	SERVICING OF AUX. REDUCER	NO	3		
12	SERVICING OF MAIN REDUCER	NO	3		
13	SERVICING OF MAIN REDUCER LUB OIL PUMPS / REPLACEMENT OF COUPLING	NO	3		
14	CLEANING/REPLACEMENT OF OIL	NO	3		
15	SERVICING OF GIRTH GEAR & DRIVE PINION	NO	3		
16	SERVICING OF THE GIRTH GEAR GREASE PUMP	NO	3		
17	CLEANING OF MAIN LUBE OIL COOLER (PLATE HEAT EXCHANGER)	NO	6		
18	FABRICATION, REMOVAL & WELDING OF DAMAGED CONVEYOR BODY LINERS	KG	60		
19	BALL FEEDING GATE SERVICING	NO	6		
20	ALIGNMENT OF AUX. REDUCER TO MAIN MOTOR	NO	3		
21	ALIGNMENT MAIN MOTOR TO MAIN REDUCER	NO	3		
22	ALIGNMENT OF MAIN REDUCER TO PINION SHAFT	NO	3		
23	MILL SHELL LEVEL INSPECTION	MILL	3		
24	SEAL AIR FAN				
24.1	SEAL AIR FAN COUPLING REPLACEMENT /ALIGNMENT	NO	2		
24.2	DECOUPLING& ALIGNMENT OF SEAL AIR FAN	NO	6		
24.3	REPLACEMENT OF SEAL AIR FAN BEARING	NO	4		
24.4	SERVICING OF SEAL AIR FAN AUTO DAMPER	NO	3		
24.5	SERVICING OF THE SEAL AIR FAN FILTER	NO	3		
24.6	REPLACEMENT OF SEAL AIR GASKETS	NO	4		
24.7	SEAL AIR FAN SUCTION DAMPER SERVICING	NO	6		
25	SERVICING OF GIRTH GEAR SEAL AIR FAN FILTER	NO	3		
26	GG SEAL AIR FAN DECOUPLING & MOTOR REASSEMBLY	NO	3		
27	SUPPORT BEARING				
27.1	REPLACEMENT OF OIL HOSES IN SUPPORT BEARING	NO	12		
27.2	MAIN LUB OIL UNIT TANK SERVICING	NO	3		

27.3	MAIN BEARING LUBE OIL PUMP SERVICING (HP, B & S, LP)	NO	15		
27.4	SERVICING OF MAIN LUBE OIL UNIT RECIRCULATION /HP LINE SUCTION VALVE	NO	3		
27.5	SUPPORT BEARING OIL NOZZLE CLEANING / REPAIR	MILL	6		
28	MILL SHELL				
28.1	TRUNNION SEAL REPLACEMENT	NO	4		
28.2	SEAL BOX INSPECTION AND CLEANING	NO	6		
28.3	GIRTH GEAR HOUSING SEAL REPLACEMENT	NO	6		
28.4	TRUNION LINER AND DP TUBE REPLACEMENT (ONE SIDE OF MILL)	NO	2		
29	DRIVE BARS REPLACEMENT	NO	24		
30	UNDER SIZE (<20MM) BALL SEGREGATION FROM MILL SHELL	MT	45		
31	RAW COAL FEEDERS				
31.1	DRIVING PULLEY/ TAKE-UP PULLEY/ CENTRE PULLEY BEARINGS AND SEAL REPLACEMENT	FEEDER	6		
31.2	INLET SPAN ROLLERS/ TENSION ROLL/ WEIGH ROLL BEARINGS AND SEAL REPLACEMENT	NO	54		
31.3	FEEDER DOOR OPENING & CLOSING	NO	24		
31.4	ENDLESS BELT REPLACEMENT	NO	6		
31.5	LOAD CELL REPLACEMENT	NO	4		
31.6	SERVICING OF CLEANOUT CONVEYOR	NO	6		
31.7	SHEAR PIN REPLACEMENT	NO	6		
31.8	MAIN DRIVE UNIT SERVICING	NO	6		
31.9	INLET SIDE SKIRT & END PLATES, COAL ON BELT PADDLE SWITCH, DISCHARGE PLUG	FEEDER	6		
31.10	FEEDER BELT TRACKING	FEEDER	6		
31.11	SERVICING OF FEEDER CHAIN GATE	NO	6		
31.12	COAL REMOVAL IN CASE OF FEEDER CHOKING	FEEDER	4		
32	FEEDER OUTLET GATE (R.C GATE)				
32.1	SERVICING OF R.C GATE	FEEDER	4		
32.2	REPLACEMENT OF THE R.C GATE	FEEDER	1		
33	CLASSIFIER OUTLET GATE				
33.1	SERVICING/SPINDLE REPLACEMENT OUTLET GATE	NO	24		
33.2	REPLACEMENT OF P.C. GATES	NO	4		
34	CLASSIFIER				
34.1	CLASSIFIER CLEANING	NO	6		
34.2	CLASSIFIER & MILL TO CLASSIFIER CHUTE REPAIR	RM	100		
34.3	SERVICING OF CLASSIFIER VANES AND ADJUSTMENT	CLASSIFIER	6		
34.4	CLACK BOX SERVICING	NO	6		
34.5	CLASSIFIER CONE REPLACEMENT	NO	4		
35	CHOKING REMOVAL IN DELTA-P LINE	NO	12		
36	SCREW CONVEYOR BEARING SERVICING/ REPLACEMENT	NO	6		
37	REPLACEMENT OF MAIN REDUCER BEARING/GEAR	NO	6		

	(INPUT/ INTERMEDIATE / OUTPUT SHAFT)				
38	REMOVAL REFIXING OF COUPLING AND ALIGNMENT				
38.1	AUX REDUCER TO MAIN MOTOR	NO	3		
38.2	MAIN MOTOR TO MAIN REDUCER	NO	3		
38.3	MAIN REDUCER TO PINION SHAFT	NO	3		
39	REPLACEMENT OF PINION SHAFT/ BEARINGS	MILL	1		
40	GREASE PANEL SERVICING	NO	3		
41	GREASE BARREL CHANGING	NO	3		
42	SERVICING OF DAMPERS				
42.1	BAD/CAD/MIXBOX DAMPER (Size: 860mmx860mm) SERVICING/REPLACEMENT	NO	18		
42.2	HAD/PAD(Size:1727mmx1829mm,870mmx2310mm) SERVICING/REPLACEMENT	NO	9		
(B)	FD FANS				
1	CLEANING OF SILIENCER AND FAN INTERNALS	FAN	2		
2	FD FAN LUBE OIL SYSTEM				
2.1	SERVICING OF LUBE OIL UNIT & CHANGING OF LUBE OIL:-	NO	2		
2.2	SERVICING OF OIL COOLER (WITH HYDRO TEST)	NO	4		
2.3	ALIGNMENT OF LUBE OIL PUMP	NO	4		
3	SERVICING OF THE SHAFT SEAL, PROTECTION COVER ASSY.& DIFFUSER STATIC BLADES	NO	2		
4	REMOVAL & REPLACEMENT OF THE RUBBER EXPANSION BELLOW / JOINT SUCTION SIDE.	NO	2		
5	REMOVAL & REPLACEMENT OF THE RUBBER EXPANSION BELLOW / JOINT DISCHARGE SIDE.	NO	2		
6	DISMANTLING/REASSEMBLY WORKS FOR SERVICING OF FAN BEARING / BLADE BRG. / SERVOMOTOR	NO	2		
6.1	OVERHAULING OF MAIN BEARING ASSY.	FAN	1		
6.2	SERVO MOTOR ASSY. SERVICING	FAN	2		
6.3	BLADE BEARING ASSY. SERVICING	FAN	1		
7	INSPECTION /REPLACEMENT OF RIGIFLEX COUPLING BOLTS	FAN	2		
8	REPLACEMENT OF RIGIFLEX COUPLING	NO	2		
9	REPLACEMENT OF BEARING & OIL SEAL OF LUB OIL PUMPS	NO	4		
10	SERVICING OF LINK ROD MECHANISM OF SERVO MOTOR	NO	4		
11	CHECKING & REPLACEMENT OF OIL HOSE	NOS	10		
12	STROKE LENGTH ADJUSTMENT OF SERVOMOTOR	FAN	2		
13	ALIGNMENT OF FAN WITH MOTOR	NO	2		
C	ID FAN				
1	CLEANING OF FAN INTERNALS	FAN	2		
2	SERVICING OF THE LABYRINTH SEAL ASSY(DE & NDE)	FAN	2		
3	SERVICING OF BEARING (DE & NDE)	FAN	2		
4	BEARING INSPECTION (DE &NDE)	FAN			
5	REPAIR OF FAN LINERS (WEIR PLATES)	KG	6		

6	REPAIR OF CASING LINER	RM	10		
7	SERVICING / CLEANING OF THE PHE	No	4		
8	SERVICING OF HYDRAULIC COUPLING	NO	2		
9	CHECKING OF WELDING & BOLT TIGHTNESS FROM SHAFT TO IMPELLER	FAN	2		
10	REPAIR & REPLACEMENT OF STATIC SEALS (DE & NDE).	FAN	2		
11	ALIGNMENT OF HYDRAULIC COUPLING & MOTOR.	NO	2		
12	ALIGNMENT OF FAN WITH HYDRAULIC COUPLING:-	NO	2		
13	SERVICING/ REPLACEMENT OF GEAR COUPLING	NO	4		
D	PA FAN				
1	SERVICING OF LUBE OIL UNITS & CHANGING OF LUBE OIL.	NO	3		
2	ALIGNMENT OF LUBE OIL PUMP	NO	6		
3	SERVICING OF THE LABYRINTH SEAL ASSY (DE & NDE)	FAN	3		
4	SERVICING / REPLACEMENT OF BEARING (DE & NDE)	FAN	3		
5	REPLACEMENT OF IMPELLER LINERS (WEAR PLATES)	FAN	3		
6	HARD FACING OF FAN CASING / IMPELLER	KGS	250		
7	CUTTING AND WELDING OF CASING PLATE / IMPELLER.				
7.1	CUTTING	RM	200		
7.2	WELDING	RM	200		
8	SERVICING OF OIL COOLER (WITH HYDRO TEST)	NO	6		
9	REPAIR & REPLACEMENT OF STATIC SEAL (DE & NDE)	FAN	3		
10	ALIGNMENT OF FAN WITH MOTOR	NO	3		
11	SERVICING OF INLET GUIDE VANES	FAN	3		
12	REPLACEMENT OF COMPLETE IGV	FAN	1		
13	REMOVAL & REASSEMBLY OF THE TOP CASING.	FAN	3		
14	ASSEMBLY OF ROTOR	NO	2		
15	REPLACEMENT OF ROTOR ASSY.	FAN	2		
16	EQUIPMENT CONDITION (ASSISTANCE)	FAN	3		
17.1	REPLACEMENT OF TOP CASING OF PA FAN	FAN	1		
17.2	REPLACEMENT OF BOTTOM CASING OF PA FAN	FAN	1		
17.3	REPLACEMENT OF INTERMEDIATE CASING OF PA FAN	FAN	2		
E	MISCELLANEOUS JOBS				
1	FABRICATION & ERECTION OF PIPING SYSTEM(200NB SIZE)	RM	150		
2	DISMANTLING OF PIPING SYSTEM	RM	100		
3	CUTTING -CARBON STEEL	RM	150		
4	WELDING (NON IBR)- CARBON STEEL	RM	100		
5	APPLICATION OF PAINTING (WITH COST OF PAINTS)	SQMTR	100		
6	REPLACEMENT WITH BALL VALVES	NO	40		
7	SERVICING/ REPLACEMENT OF COOLING WATER LINE VALVES UP TO 4 INCH SIZE	NO	20		

8	PATCH WELDING AT DIFF. LOCATION O/L GATE, RETURN CHUTE, CENTRAL FEED PIPE ETC.	NO	100		
9	ERECTION OF SCAFFOLDING FOR PA FAN DUCT, BELLOW WORK	CUM	300		
10	REPAIRING OF PA FAN DISCHARGE DUCT	RM	100		
11	REPLACEMENT OF PA FAN DISCHARGE BELLOW	No	12		
12	APPLICATION OF PAINTING (WITH OUT PAINT)	SQ MTR	200		
Total Amount for AOH					

Total Amount for AOH in figures: _____

Total Amount for AOH in Words: _____

Net Total Amount (AMC + AOH) in figures: _____

Net Total Amount (AMC + AOH) in Words:

Note:

1) Price shall be quoted for 1st Year AMC and AOH for one unit only. The price for next year and AOH of subsequent unit shall be derived considering an escalation @ 8% of immediate preceding year price.

2) Bidder has to use this Price Bid Format failing the bid will be liable for rejection.

Date:

(Signature of Bidder)

Place:

(Seal)