OPEN TENDER NOTICE

KIOCL Limited, Bangalore invites sealed tenders from experienced firms / agencies / contractors for carrying out the Operation & Maintenance of KIOCL’s Blast Furnace Unit at Panambur, Mangalore, Karnataka State.

A pre-bid meeting is scheduled on 24.01.2017 @ 11.00 AM for providing any clarifications related to this tender. Bidders are requested to make site visit i.e., KIOCL’s Blast Furnace Unit, Panambur, Mangalore - 575010 to get acquainted with site conditions and the nature of work involved before submission of their offers.

The last date for submission of the offer is 09.02.2017 at 5.30 PM.

For more details and downloading the tender documents please visit the websites: www.kioclltd.in, www.eprocure.gov.in & http://tenders.gov.in

Corrigendum, if any, shall be uploaded in KIOCL website only.

Noor Ahmed
Dy. General Manager (CP&TS)
Mob No.8105133993
INVITATION TO BID

KIOCL LIMITED
(A Govt. of India Enterprise)
Registered Office:
II Block, Koramangala
Bangalore – 560 034
Telephone No.: 080 – 25531461 -70
E-mail: bgmcpts@kioclltd.com
www: kioclltd.in

Tender No. TS/BU/O&M/F-288/153 Date: 09.01.2017

Dear Sir(s)

Sub: Tender for carrying out the Operation and Maintenance of KIOCL’s
Blast Furnace Unit at Panambur, Mangalore. Karnataka State.

KIOCL LIMITED (formerly Kudremukh Iron Ore Company Limited) is a
leading public sector undertaking under ministry of steel, Govt. of India. It is 100%
export oriented unit with Mini-Ratna Category-I status.

Company is ISO-9001: 2008 certified for Product Quality, ISO-14001: 2004
certified for Environmental Management and OHSAS: 18001:2007 certified for
Occupational Health and Safety Management System. Company’s registered
office is located at 2nd Block, Koramangala, Bangalore.

KIOCL’s Blast Furnace Unit has a blast furnace of 350 cum capacity for
producing 227500 MT of Hot Metal per annum. The end product of the Blast
Furnace Complex is foundry grade Pig Iron.

The principle involved in Blast Furnace iron making is the thermo-chemical
reduction of iron oxide ore by Coke into liquid iron at around 1500 degree C. The
unwanted materials are removed in the form of liquid slag by addition of suitable
fluxes. Raw materials are charged from blast furnace top and hot air is blown from
the bottom resulting in these thermo-chemical reactions.

The major raw materials used in the Blast Furnace operation are Iron Ore, Coke,
Manganese Ore, Lime Stone, Quartzite and Dolomite, the last three being
fluxes. The raw materials are received and stacked material wise in the stockyard.
The materials required for the day’s usage are then transferred into day bunkers
by use of Front End Loader and conveyor system. The materials from the day
bunkers are screened and weighed to the required size and quantity in batches.
The undersize materials in the screening process are transferred to the fines
bunkers for storage and further disposal. The weighed batches are discharged into
blast furnace feeding conveyor in a pre-determined sequence and are transported
to the blast furnace top for charging into the blast furnace.
The Blast Furnace top charging system is equipped with a double bell system to maintain the blast furnace top pressure. The raw materials are evenly distributed by using a rotary chute. The charging is carried out in batches as per a pre-determined sequence. The stock level indicator measures the level of raw materials inside the furnace and gives feedback for charging inputs. The entire charging system from screening to charging is fully automated (PLC operated).

The hot air required for the chemical reactions are blown into the furnace at an average rate of 43000 Nm³/hr by 2 HT motor driven blowers. The air before entering into the blast furnace is heated up to 1100 degree C using 3 stoves. The stove refractory checkers, which store heat, are heated by combustion of air and blast furnace gas inside stoves at optimum proportions. Blast Furnace gas is a by-product of the chemical reaction in the furnace and carries around 20% CO. The heat thus stored in the stack of refractory bricks is passed onto the cold air blown by the blowers rising its temperature to around 950 - 1100 Degree C making it suitable for use in the blast furnace.

The counter current movement of blast air and raw materials facilitates the reduction reaction of iron ore. The liquid iron (Hot Metal) produced collects at the bottom of the furnace above which liquid slag, which is higher, is collected. Both slag and hot metal are drained out through a top hole at regular intervals by drilling, by a drilling machine and the tap hole is closed by a hydraulic mud gun in Cast House. The hot metal is collected in 35 T capacity ladles where as the slag is granulated into powder form in a Slag Granulation Plant.

The Blast Furnace gas generated inside the furnace is cleaned of dust at Dust Catcher and Gas Cleaning Plant (GCP). Gas is washed of dust in GCP by water spray and the stoves and captive power plant use the cleaned gas as a cheap source of fuel. Any excess gas is bled off to the atmosphere after flaring through a flare stack.

Dedicated water pumping arrangements provides cooling water for the different cooling members inside the furnace. Cooling is essential in view of the refractory and shell life of the furnace. Another pumping system caters to the water requirements of the GCP.

The ladles carrying hot metal are transferred to Pig Casting Machines (PCM) using a 50 Ton EOT crane. In the PCM, the hot metal is cast into 'Pig Iron' of 5 to 6 Kg weight. There are 3 pig casting strands in the plant (Two are with common pouring stand & crane assisted tilting system and placed closer to each other whereas the other machine has hydraulic ladle tilting system) The strands are driven by an electric drive. Air-cooling and water-cooling is provided for the casting chain. The pig iron produced at the PCM is collected by 20 MT tippers or Tractor Trailers and transported to the weigh bridge and then to pig storage yard and stacked grade wise for dispatch to customers.

The Pig Iron thus produced is sold to various customers all over India as per their requirements. Loading of Pig Iron to the customer's trucks or containers is being done under the supervision of the plant operating department.
The Captive Power Plant (CPP) with two nos. of 3.5 MW (each) Steam Turbine Generators (TG) caters major portion of power requirement of Blast Furnace complex. CPP uses Blast Furnace gas as the major fuel resulting in cost effective power generation.

KIOCL invites sealed tenders (two bid systems) from the experienced contractors / agencies /firms for carrying out the Operation and Maintenance (O&M) contract for KIOCL’s Blast Furnace Unit located at Panambur, Mangalore.

1. Bid documents for the above job are enclosed herewith.

2. A pre-bid meeting is scheduled on 24.01.2017 @ 11.00 AM for providing any clarifications related to this tender at the office of

The Joint General Manager, I/c (BFU)
Blast Furnace Unit,
Panambur
Mangalore – 575 010

**NOTE:** Bidders are requested to make site visit to get acquainted with site conditions and the nature of work involved before submission of their offers.

Any clarifications required regarding this tender may be forwarded in advance and clarifications issued during the pre-bid meeting, amendments to NIT terms, if any, shall be uploaded in the form of Bulletins on the KIOCL’s website & Govt. portals. Bids shall be submitted in accordance with the tender terms and conditions and the amendments issued, if any. Any changes will be notified through the KIOCL’s website & Govt. portals only and the same will not be published in the news papers. Bidders are requested to check KIOCL website from time to time before submitting their bids.

The sealed bid will be received up to 5.30 PM on 09.02.2017 at the office of

The Dy. General Manager (CP&TS)
Technical Services Department,
KIOCL Limited,
Bangalore – 560 034.

3. Bids received late are liable for rejection. The Technical bids received shall be opened at 11.00 AM on 10.02.2017. The price bids of technocommercially accepted offers will be opened on a specified date which will be communicated to the bidders for participation to witness the same.

4. Bidders shall abide by all the details of “Instruction to Tenderers” enclosed with the tender documents.
5. **Tender documents**: Consists of

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<td><strong>(i) Technical Bid:</strong></td>
<td></td>
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<td>Instruction to Tenderers</td>
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<td>Pre-Qualification Criteria of Bidders</td>
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<td>Annexure: C-1</td>
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<td>Annexure: C-2</td>
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<td></td>
<td>Bank Guarantee as per KIOCL format</td>
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<td>IV</td>
<td>Business rule and terms &amp; conditions of online price bidding cum e-reverse auction</td>
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6. Sealed bids shall be submitted in the manner as mentioned below:

   a) First sealed Envelope superscribed as: **Un priced** – Operation and Maintenance contract for KIOCL’s Blast Furnace Unit, Panambur, Mangalore.” shall contain one set of all the above tender documents at para 5 above including all Annexure duly filled-in and other relevant documents in support of your bid with official seal & signature on all pages but without any mention of rates & prices.

     First envelope shall also contain “EARNEST MONEY” and “COST OF TENDER DOCUMENT” in the form of Demand draft as para 7.0 below.

   b) Second sealed Envelope superscribed as: **Priced** - Operation and Maintenance contract for KIOCL’s Blast Furnace Unit, Panambur, Mangalore.” shall contain prices filled in strictly as per format i.e
PRICE BID - ANNEXURE-G with official seal & signature and no other additional papers to be enclosed there in.

c) Both the above envelopes should be kept in another cover and sealed and superscribed as: \textbf{Bid - Operation and Maintenance contract for KIOCL's Blast Furnace Unit, Panambur, Mangalore.} shall be addressed to Dy. General Manager (CP&TS), Technical Services Dept., KIOCL Limited, 2nd Block, Koramangala, Bangalore – 560 034.

7. The bid shall be accompanied by an Earnest Money Deposit of \textbf{Rs. 5,00,000/-} (Rupees Five lakhs only) and cost of the Tender document \textbf{Rs. 5,000/-} (Rupees Five thousand only) in the form of;

   i. Demand draft from any Nationalized Bank, Scheduled Bank or any other Bank acceptable by company in favour of “KIOCL LIMITED” payable at Bangalore.

   ii. Pay Order in favour of “KIOCL LIMITED” payable at Bangalore

   iii. Through RTGS

   \begin{itemize}
   \item \textbf{UNION BANK OF INDIA}
   \item \textbf{PBS (KORAMANGALA) BANGALORE -560 034}
   \item \textbf{ACCOUNT NO. 515401010022015}
   \item \textbf{IFSC CODE: UBIN0551546}
   \end{itemize}

   iv. Through Bank Guarantee (BG) as per prescribed BG format of KIOCL Limited drawn from any nationalized bank / Schedule Bank / any bank acceptable by KIOCL Limited. BG from Co-operative bank will not be acceptable. The original BG shall be directly received from Bank. The copy of the BG shall be enclosed with the offer/bid (The BG format is enclosed along with this tender).

   No other form of EMD and cost towards tender document will be accepted. However cost of tender document may be submitted through cash receipt in addition to above instruments, if the tender document is obtained from the office of Deputy General Manager (CP & TS).

8. FORFEITURE OF EMD

   ➢ EMD shall be forfeited if the tenderer withdraws or alter /modify the tender terms in any respect within the period of validity specified in the tender document after the due date of submission of bids.

   ➢ Non acceptance of the work order by the successful bidder the EMD shall be forfeited

   ➢ After accepting the work order by the successful bidder and not performing the contract as per the terms and conditions of the work order than the EMD shall be forfeited.
9.0 REFUND OF EMD

EMD shall be returned without interest after submission of the Security Deposit in the case of successful bidder. However, the same shall be returned without interest to the unsuccessful bidders immediately after the award of work to the successful bidder.

Bids not accompanied with EMD are liable for rejection.

10.0 The Techno-Commercial bid submitted with EMD would be opened at 11.00 AM on 10.02.2017. The opening of tenders can be witnessed by the bidder's authorized representatives at the place, date and time of opening and the letter of authorization shall have to be furnished at the time of opening the tenders.

11.0 All technically and commercially acceptable bidders those who have accepted business rules provided by our service provider would be required to participate in the online bidding cum e-auction, on a date and time to be intimated by service provider. After the online bidding cum reverse auction, KIOCL will collect final price bid comparative statement from service provider.

12.0 After the receipt of the price comparative statement from the service provider, the price-bids of the bidder(s) who meets the techno-commercial terms and other evaluation criteria would be opened separately and the eligible bidders would be intimated about place, date and time of opening of the price bids. The opening of the price bids also can be witnessed by the bidder or his authorized representatives at the place, time and date of opening of the price-bid.

13.0 Acceptance of the bid will be intimated to successful bidder through a work order.

14.0 The period work under this contract shall be ONE YEAR. The effective date of contract would be specified in Letter of Intent (LOI)/Work Order.

15.0 Renewal of the Contract: On satisfactory performance of the work by the contractor, KIOCL reserves the right to extend this contract on mutual agreement for further period of ONE YEAR on the existing rate, terms and conditions of the work order.

16.0 Bidder / Contractors obligations:

- Bidders are requested to make site visit i.e, Blast Furnace Unit, Panambur, Mangalore to get acquainted with site conditions and the nature of work involved before submission of their offers.
• The contractor shall ensure National holidays for the manpower deployed by him, if incase the workman worked on national holidays which is not falling on their weekly off double wages shall be paid by contractor with no cost to KIOCL.

• Contractor has to ensure payment of minimum wages not only as existing at the time of award of contract but also should ensure payment of minimum wages as notified by the Govt. of India from time to time during the period of Contract. In this regard, KIOCL will also intimate to the contractor as & when notified by Govt. of India. No reimbursement will be made by KIOCL Limited on account of variation in minimum wages during the tenure of the contract.

17.0 The Company reserves the right to reject any or all the tenders without assigning any reason.

Thanking you,

Yours faithfully,

for KIOCL LIMITED

Sd/-

(Noor Ahmed)

Dy. General Manager (CP & TS)
INSTRUCTION TO TENDERERS:

1.1 The Technical Bid should accompany EMD of Rs. 5,00,000/- (Rupees Five lakhs only) in the form of Demand Draft or any other equivalent instrument as mentioned in clause no. 7.0 of Invitation to Bid above and drawn in favour of KIOCL Limited, Bangalore.

1.2 Tender will be received up to 5.30 PM on 09.02.2017.

1.3 Tenderers have to acquaint themselves with the conditions prevailing at site, before submitting the tenders.

1.4 Tenderers shall furnish their quotation in the 'Price-Bid' enclosed at Annexure-G to the documents. Quotations should be written in both words and figures.

1.5 KIOCL reserves the right to reject any or all tenders without assigning any reason.

1.6 Tenders received late are liable for rejection.

1.7 Tenders submitted without EMD and tender document fee will not be considered for further processing.

1.8 The tenderer shall make no alterations in the tender documents.

1.9 Tenders shall remain open for acceptance for a period of three (03) months from the date of receipt of the Bid.

1.10 Security Deposit: Contractor shall deposit 10% of the contract value towards Security deposit, within 15 days from the date of issue of work order/Letter of Intent whichever is earlier.

The successful bidder shall submit the security deposit in any one of the following form:

   a) By Demand Draft
   b) By Bank Guarantee
   c) By Pay Order and
   d) By RTGS/NEFT

1.11 The Bidder shall not be entitled for any additional payments during the tenure of this contract due to escalation in any direct/indirect cost e.g., cost of the materials, cost of transport etc., on the Service charges quoted.

1.12 The bidder shall be solely responsible for payment of ESI and EPF admissible as per the statutory rules.
1.13 Any breach of the condition of this contract by the contractor or by any one employed by him or acting on his behalf, KIOCL has the right at any time to terminate this contract by giving one month notice in writing to the contractor by a registered mail. The KIOCL shall have no further liability to make any payment in terms of the agreement and in such an event the Security Deposit will be forfeited.

1.14 EVALUATION AND COMPARISON OF BIDS:

Evaluation of the bids will be based on the rates quoted in the tender price form at Annexure - G- Quotation.

L-1 BIDDER IS THE ONE WHO HAS QUOTED LOWEST AMOUNT TOWARDS COST PER TONNE OF PIG IRON PLUS COST OF LOADING OF PIG IRON INTO TRUCKS/ CONTAINERS.

The detailed process for BID Evaluation is as follows:

a) First Stage: Techno-Commercial Bid Evaluation:

The techno-commercial offers received from the bidders will evaluated as per the tender terms and conditions of the NIT. The Tender Committee may call the bidders/bidders representatives for detailed techno-commercial discussions, clarifications, presentation if required. The names of techno-commercially qualified vendors will be intimated for participation in the online price bidding cum reverse action and for opening of the Price bids (i.e., sealed price bid received along with the bid).

b) Second Stage: Online Price bidding cum Reverse Auction and Collection of online final price bid history from service provider:

As per prevailing guidelines, KIOCL shall be conducting Online Price bidding cum Reverse Auction prior to opening of price bids. All techno-commercially acceptable bidders those who have accepted business rules provided by our service provider are eligible to participate in the online price bidding cum reverse auction. After the online price bidding cum reverse auction, KIOCL will collect the final price comparative statement from service provider.

c) Third Stage: Composite price comparative statement

After the receipt of final online price bid cum reverse auction comparative statement from the service provider, the sealed price bids of all the Techno-commercially acceptable tenderers, irrespective of whether they have participated in the Online price bidding cum Reverse Auction or not, shall be opened within a short duration i.e., within 2 to 4 working days.

Based on the prices so received, through Online price bidding cum Reverse Auction and the Sealed price bids received along with the
techno-commercial offer, a composite price comparative statement shall be made considering the lower of the prices (i.e., sealed price bid prices & final online prices) of all the tenderers. Placement of the order shall be considered on the L1 price so arrived.

**ALL PRICE BIDS WOULD BE EVALUATED WITHOUT CONSIDERING SERVICE TAX & CESS.**

**Note:**

a) During the online price bidding cum reverse auction, if no bid is received within the specified time, then KIOCL, at its discretion may scrap the online price bidding cum reverse auction process and open only sealed price bids of those bidders who are techno-commercial qualified for opening of Price bids.

b) In case of offers which contain price details / partial price details of the prices in the Techno-Commercial bid, such offers shall not be considered for evaluation.

c) In case two or more firms quote exactly same rates in e-reverse auction; In such cases, the firm who has quoted the lowest price in the hard copy of the price bid shall be considered as L1.

d) If no participation for online price bidding:

i) In case if, no bidders participate in the online price bidding cum reverse auction within the specified time & duration, only 'Sealed Price Bid' received along with techno-commercial bid will be opened and Price bids will be evaluated.

ii) In case of Reverse auction is conducted, where there is a response from bidders, composite price comparative statement shall be made.

iii) Except in exceptional cases, there will be no negotiation & order will be placed on the L-1 offer. Hence, bidders are requested to quote competitive rates against schedule of works.

**DEFINITIONS:**

As used in the Contract including all documents contained in or referenced by the Invitation to Bid, the following terms shall have the meaning ascribed herein unless the context within which they are used clearly precludes such meaning. Terms and Expressions not herein defined shall have the same meaning as one assigned to them in the Indian Contract Act (Act 18 of 1872) and failing that in the General Clauses Act (1897) and subsequent amendments thereof.

1. **ACTUAL CONTRACT VALUE** means the Final cost of the Work including the cost of Extra Work(s) or adjustments due to changes in works.
2. APPROVAL of OWNER/ENGINEER shall mean the written approval by OWNER/ENGINEER of a document or drawing or other particulars or matters in relation to the Contract.

3. “BID” shall mean the offer tendered by BIDDER to the OWNER to do and perform all work and other things necessary to complete the work required for the Project / Portion of the Project as described in the Bid document.

4. “BIDDER/TENDERER” shall mean the party submitting a bid for the work.

5. “BID DOCUMENTS” shall mean a document prepared and issued to the Bidder by OWNER which will contain, among other things a description of the Work to be performed, schedule of quantities and the time schedule for completion of work.

6. “CLEAR DAYS” shall mean consecutive days without interruption for week ends or holidays and shall include the day on which the notice/request is received.

7. “CONSTRUCTION EQUIPMENT” shall mean all machinery, plant, apparatus, parts, appliances, instruments, articles and things required for erection, construction and completion of the work required for the Project or any Portion thereof and the operation thereof, including supply of maintenance items, spare parts and consumables etc. required therefore.

8. “CONTRACT” shall mean and include the Invitation to Bid, Instruction to Tenderers, Offer / bid (initial/modified), the General Conditions, the Specifications, Drawings, Special Conditions and Bulletins, if any, and the Letter of Intent /Work Order/ Supply Order/the Agreement entered into by the parties including mutually agreed subsequent amendments/ changes, if any.

9. “CONTRACTOR” shall mean the Bidder whose Bid has been accepted and shall include his/ her/its/their heirs, executors, administrators, legal representatives, successors and assigns.

10. “CONTRACT DRAWINGS” shall mean and include the designs, blue prints or other documents of a similar nature which show or illustrate the character and nature of the work to be performed which are supplied by Owner enclosed with the Bid Document or available with the Owner for inspection by the Bidder or Drawings issued by the Owner during the execution of Contract.

11. “CONTRACT VALUE” shall mean the amounts as stipulated in the Letter of Intent/Work Order / Supply Order/Agreement which amount represent the estimated total cost of the work to be performed by CONTRACTOR under the CONTRACT.
12. “EFFECTIVE DATE OF THIS CONTRACT” shall mean the date of issue of Letter of Intent/ Supply Order/Work Order unless otherwise specified.

13. “ENGINEER” shall mean person/persons nominated by or authorized by OWNER among other things to administer the Contract and / or supervise the work under the Contract.

14. “IN PLACE” shall mean the work or any items of Work being fully completed / installed and completely incorporated as determined by ENGINEER/OWNER whose decision in this regard shall be final, binding and conclusive on the Parties.

15. “LETTER OF INTENT” shall mean the acceptance by the OWNER of the Bid tendered by CONTRACTOR and the award there under of the work to be performed in accordance with the terms and conditions of CONTRACT.

16. “MONTH” when used for the purpose of calculating a period of time, shall mean the period from the day of one month to the corresponding day of the next calendar month if such day exists, or, if not, to the last day of the next calendar month.

17. “OWNER” shall mean KIOCL Limited having its Registered Office at Second Block, Koramangala, Bangalore - 560 034, Karnataka, India and include its Lawful successors and assigns.

18. PERIOD OF MAINTENANCE shall mean a period of Twelve continuous months or any other period, if specifically stipulated in the Special Conditions calculated from the date the whole work, is “IN PLACE” as certified by ENGINEER/OWNER.

19. “PORTION” shall mean that part or parts of the work as identified in the Contract and shall include all aspects of such part or parts as are included in the Contract.

20. “RUPEES” or “Rs” shall mean Rupees, the currency of India.

21. “SITE” shall mean the actual place or places where the work is to be done by the Contractor and/or services are to be performed under the Contract as notified / indicated by OWNER/ENGINEER.

22. “SPECIFICATIONS” shall mean and include the descriptions/type, quality, standard of materials and work, general arrangements, statements of technical data, performance and/or documents of a similar nature which are included in the Contract and /or issued or supplied by OWNER relating to the Work.

23. “SUPERVISION” shall mean the direction and control in relation to the execution of work and instructions given by OWNER/ENGINEER or their
authorized representative in relation thereto under the terms of the Contract.

24. "WORK" shall mean and include all works operations / activities to be performed by CONTRACTOR as set out and/or required in the CONTRACT in accordance with the Bills of Quantities, Specifications and Drawings or to be implied there from or incidental thereto or as may be specified during the execution of work or required in such explanatory/additional instructions and drawings as shall, from time to time, during the progress of the work hereby contracted for, be issued by OWNER/ENGINEER.

25. "WRITING" shall mean any information, request, notice, data contained or given in any manuscript, typewritten or printed statement or other document under seal or hand and includes telegrams, telexes, taxes and cables and words “In Writing” shall mean any document duly signed by any person authorized to represent CONTRACTOR and OWNER/ENGINEER.
## Pre Qualifying Evaluation of Bidders

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<th>Description</th>
<th>Minimum Required</th>
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<tr>
<td>1</td>
<td>Average annual financial turnover during the last three (03) years, ending 31st March 2016.</td>
<td>Should be at least Rs. 2.88 Crores (Rupees Two Crores eighty eight lakhs only)</td>
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<tr>
<td>2</td>
<td>Highest value of similar nature of work executed in any single year during last 7 years.</td>
<td>i) Three (3) similar completed works costing not less than Rs. 3.84 Cr (Rupees Three Crores eighty four lakhs only).&lt;br&gt;OR&lt;br&gt;ii) Two (2) similar completed works costing not less than Rs. 4.80 Cr (Rupees Four Crores eighty lakhs only).&lt;br&gt;OR&lt;br&gt;iii) One (1) similar completed work costing not less than Rs. 7.68 Cr (Rupees Seven Crores sixty eight lakhs only).</td>
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**Note:** Copies of the work orders & work completion certificates from the client shall be furnished to meet the PQ criteria.

Non-Submission of similar nature of job work orders and work completion certificates the bids (tender documents) will not be considered for further processing.
INFORMATION ABOUT THE TENDERER / BIDDER / CONTRACTOR:

The agencies who are sending their letter of expression must furnish the following details along with documentary evidence of their claims.

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<tr>
<th>Name of the Agency</th>
<th>Postal Address</th>
<th>Communication Address</th>
<th>Contact Person</th>
<th>Mobile / Landline Nos.</th>
<th>E-Mail ID</th>
</tr>
</thead>
</table>

1. Name of the Firm/Tenderer/Contractor : ...........................

2. Father’s Name (in case of individual) : ...........................

3. Details about registered address of the Firm/Tenderer
   a. Full postal address : ...........................
   b. Telephone Number along with code : ...........................

4. Nearest Police Station : ...........................

5. Whether it is Sole Proprietary Firm or Partnership Firm or Private Limited Company : ...........................

6. Name(s) of the Sole Proprietor/Partners/Directors : ...........................

7. Permanent Income Tax No. (PAN Card) : ...........................

8. Service Tax Registration No : ...........................

9. ESI No. : ...........................

10. PF No. : ...........................

11. Bank A/c. details & Address of the Bank : ...........................
    a) Name of the Bank: 
    b) Bank Address: 
    c) Account No: 
    d) Type of account: 
    e) IFSC / RTGS No.: 
    f) MICR no.

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Seal & Signature of the Bidder
12. Details of other branches of the Firm/Contractor with address, if any : ..................

13. Registration certificate of Establishment issued by Government of Karnataka-Department of manpower & Details of the license from ALC (Central) : ......................

14. After accepting the LOI/work order from KIOCL it is mandatory to obtain License from Govt. of India Ministry of Manpower & Employment- office of the Dy. Chief Manpower Commissioner (Central), Bangalore : ......................
SCOPE OF WORKS

1.0 General:

The successful bidder has to Operate and Maintain the Blast Furnace and its auxiliary equipments during the period of the contract for the production of Pig Iron.

i. Bidder shall ensure and put all efforts:

   a. To maximize plant capacity utilization,
   b. To reduce plant down time,
   c. To optimize the specific raw material, lubricants, water and other consumption,
   d. To optimize the useful life of the equipment /components/ spares of the Plant.
   e. To keep the conversion cost to the minimum.

ii. The Bidder has to carry out Schedule / Non-schedule and such other Maintenance necessary for the Plant as well as authorized by KIOCL’s Engineer-in-charge.

iii. Bidder shall operate and maintain the plant efficiently and carry out the following activities:

   a. Bidder shall furnish the requirements of spares, consumables, chemicals, raw material, lubricants etc to KIOCL’s Engineer in charge well in advance. Upon issue of authorized Stores Issue Voucher (SIV) by KIOCL’s concerned officials, the Bidder shall draw the materials from the Stores. The materials / items drawn shall be duly accounted by the bidder under intimation to the concerned KIOCL’s Engineer in charge.

   b. Bidder shall ensure Safe custody of the spares and consumables inside the plant.

   c. Bidder shall take such other actions as are necessary to enable Bidder to perform his obligations and carryout the O&M operations effectively.

   d. Bidder shall ensure all the efforts to comply with set targets defined in Annexure-H.

   e. Bidder shall deploy qualified and experienced Engineers round the clock at the Plant to supervise and to meet any emergency.

   f. The Bidder shall deploy skilled and unskilled manpower for carrying the operation and maintenance for Blast Furnace.
g. All the essential personnel of the contractors team shall be available in the nearest locality to the extent possible, so that they may be available during silent hours as well as on weekly off days to cater any emergency.

h. The Bidder shall maintain up-to-date operating and maintenance logs, records and reports etc regarding the operation and maintenance of the Plant.

i. The Bidder shall provide support and co-operate KIOCL’s Quality initiatives & Continual Improvement Plans.

j. Prepare and submit hourly / daily / weekly / monthly Operations & Maintenance Report. Also submit a detailed reports as required by KIOCL to the concerned KIOCL’s engineer in charge on a regular basis.

k. Ensure the operation of the plant equipments as per set standard procedure.

l. The contractor has to deploy sufficient manpower required to carry out repairs in the event of Major Machine Breakdown to minimize the break down period.

m. Bidder shall keep all the assets of KIOCL intact (in good condition) and workable condition throughout the mandate period.

n. Bidder shall put all efforts to maximize performance and productivity.

o. To optimize the useful life of equipments / components / spares of the system using standard Engineering practices.

p. To take appropriate safety and fire preventive measures inside the plant premises. Bidder shall operate fire hydrant system as and when necessary.

q. Bidder should take care for segregation of scrap, waste oil etc., generated during the course of the contract period, and arrange to shift the same to the designated scrap yard.

r. All Standard Operating Procedures and also revised procedures should be followed strictly by bidder’s manpower.

s. The responsibilities except those not enumerated in the KIOCL’s responsibilities as below, shall be in the scope of bidder.
k) The required PPEs (including special safety PPE'S) for safety of bidder’s personnel shall be issued by the bidder with his own cost, safety of bidder' personnel will be sole responsibility of bidder only

iv. KIOCL’s Responsibilities: KIOCL shall be responsible for the following activities, each to be at KIOCL's expense unless otherwise expressly provided.

a) Make payments to Bidder in accordance with commercial Terms of this mandate.

b) Provide drawings, specifications, diagrams and other information as available, regarding the Plant that are required for the operation and maintenance.

c) Obtain and maintain in effect all government licenses, permits and approval necessary to operate and maintain the Plant other than those permits required to be held by bidder to permit it to perform its obligations and comply with all such statutory compliances as may be required for bidder to carry out the operation and maintenance of the Plant. The Bidder shall provide all technical help / information needed to obtain the above said statutory compliance.

d) KIOCL will provide special purpose tools and tackle that are available. The same shall be returned by the bidder in usable condition at the end of the term of the Mandate, considering normal wear and tear accepted. In case of loss of tools and tackles by the bidder, the present cost of the same shall be recovered from him/replace with new one.

e) Pay all taxes related to the Plant including, without limitation, national and regional, sales, use, stamp, gross receipt, fuel, raw material and value added taxes, as well as import and customs duties, if any, except for any taxes imposed on bidder’s net income and pay taxes imposed on bidder’s personnel.

f) Designate KIOCL’s Representative/s.

g) Review in a timely fashion and not unreasonably, withhold its approval of items submitted by Bidder to KIOCL for its approval.

h) Provide and maintain insurance policy for fire, natural perils and machine break down of the plant equipments and assets.

i) Procure and timely provide consumables supplies, raw material and spares from standard reputed suppliers.

j) KIOCL will provide first aid facility as available in the premises.
2.0 **THE DETAILED SCOPE OF WORK:**

To carry out the operation and Maintenance of Blast Furnace and its auxiliary unit at BF unit, Mangalore in close coordination and under guidance of KIOCL Ltd., for 24 hrs a day, 7 days a week, 365 days a year as under:

**Operation and Maintenance of:**

i. **Stock House**:
   - Stock House Bunker feeding from the stock yard through Front End Loader and Conveyor system and Bunker level maintaining.
   - Checking of screens and cleaning the same.
   - Cleaning of spilled materials in the platforms, Junction houses and housekeeping of the area.
   - Shifting of iron ore fines and coke fines generated at screening station to designated yard after weighment in KIOCL’s weigh bridge with proper documentation as per KIOCL’s procedure.

ii. **Furnace proper** including Furnace top system:
   - Plugging of Tuyeres during shut down.
   - Removal and fixing of Tuyeres.
   - Lancing through tuyeres during abnormality.
   - Monitoring of Furnace shell cooling system and checking of Tuyere, tuyere cooler, breast cooler and Tap hole cooler temperatures.
   - Grouting of furnace shell whenever required.

iii. **Cast house** system:
   - Operating the drilling machine. Replacement of drill rod.
   - Lancing and poking of Tap hole.
   - Maintaining of slag and hot metal dams, ensuring slag not passing to ladles, and hot metal not passing to Slag Granulation Plant.
   - Tap hole cleaning, properly butt the mud gun nozzle, to avoid leakage of mud gun mass. Operating the Mud Gun for closing of tap hole.
   - Cleaning of Main runners, sub runners, slag runners and dressing the same.
   - Removal of debris from Cast house and shifting them to the designated location after every tapping.
• Preparation of Main trough, Sub runners and slag runners periodically and heating the same, for maintaining the runners in good condition.

• Monitoring of ladles during tapping.

• Mud gun cleaning after every tapping and making ready for the next tapping.

• Drawing of hot metal and slag samples during every tapping and taking the samples to laboratory for testing.

• Shifting of consumables, as and when required, to the required designation for effective operation.

iv. Slag Granulation plant (SGP):

• Checking of blow box regularly and maintaining the same, for free flow of water jet.

• Controlling of water flows and meshes to avoid overflow from the tanks.

• Operation of Slag Granulation Pit EOT Crane. Removal of granulated slag from the tank frequently and keeping it ready for the next tapping.

• Shifting of slag to designated place and loading of slag when ever slag is sold. Deployment of Tippers with operators for this purpose.

• In the event of non operation of SGP dry pit slag to be removed from the dry pit and to be shifting to designated place.

v. Hot Blast stove system:

• Checking of cooling water temperatures of Hot blast valves and FIV.

• Grouting of Stoves shell whenever required. Grouting arrangement shall be done by the contractor (Grouting material will be issued by KIOCL on free of cost basis)

• Manual heating of Stoves using LDO, during any crisis. (LDO will be provided by KIOCL on free of cost basis)

• Inspection of Gas lines and burner, and Cleaning of the same during shut down.

• Draining of Gas lines frequently to avoid water entrapping inside the stoves.
vi. Dust catcher system:

- Removal of dust periodically from dust catcher and shifting (through tippers) the same to the designated place.

vii. Stock house De dusting System:

- Working system shall be checked periodically.

viii. Gas Main line and Flare stack system:

- Draining of venturies periodically.
- Dosing of necessary chemicals for Effluent treatment and maintaining as per standards.
- Draining of Gas seal pots periodically to maintain moisture free gas to Stoves and CPP.
- Ensuring Flare stack always in the ignited position during furnace running and avoiding letting of un-burnt BFG/CO to atmosphere.

ix. Pig Casting Machine and Ladle Repair Shop bay:

- Ensuring proper lime coating to moulds.
- Proper handling of hot metal during pouring with minimum losses.
- Preparation of lime solution.
- Maintaining of runners after pouring.
- Removal of pigs sticking to the moulds.
- Controlling of water spray for cooling of pigs.
- Hammering of pigs at discharge end to remove pigs sticking to the moulds, while pouring.
- Maintaining the lime box with no foreign materials.
- Housekeeping at tail end of PCM, return line of strands, walkways and lime spray units.
- Dumping of ladles and cleaning of ladles.
- Shifting of hot pig iron (including small pigs and pig iron chips) after pouring from pig casting machine to weigh bridge and stacking at designated location in the pig iron storage yard.
- Periodic disposal of skull and auxiliaries and slag to the designated location. The separation of skull and auxiliary materials as per the direction of engineer in charge of KIOCL.
- Inspection and maintaining of ladles frequently for proper refractory and maintaining of ladle spouts. Ensuring continues availability of ladles with proper refractory jobs. Heating of ladles to be ensured, prior to taking in to circulation.

x. Cooling water pump house, make up water pump house and other pump houses
xi. Field activities during shut down and start-up of Blast Furnace.

xii. Field activities during emergency operations of Blast furnace.

xiii. Erection, Fabrication, Overhauling and welding activities as and when required basis.

xiv. Housekeeping of Blast furnace area and all equipment cleaning jobs.

xv. Monitoring of air compressor system, check and maintain the desired air pressure.

xvi. Monitoring of cooling water pump system and checking of water level.

xvii. All cranes in Blast Furnace premises.

xviii. Any other jobs connected to operation of the plant as per the instructions of shift in charge.

xix. Operation and maintenance of captive power plant, electrical sub stations and electrical power distribution system as per the work instructions and standard operating procedures mentioned in Annexure-I as per the direction of engineer-in-charge/area in-charge.

xx. Machineries required (Loaders, Backhoe, Tippers, Tractor Trailer etc.) for Raw material feeding, Shifting of Dry/Granulated slag, consumables, Pig Iron and Auxiliaries, Effluent waste to the respective designated locations shall be in the scope of Bidder.

xxi. Loading (mostly manually) of pig iron, slag to trucks and containers during dispatch activities. Ensure loading the required grade and avoid mixing of fines/small pigs along with the normal pigs.

xxii. Analysis of Pig Iron, Slag, Raw materials, water & air analysis to be carried out in Process Control (PC) Laboratory. Any other job connected with PC lab as per the instructions of KIOCL’s PC lab In-charge.

xxiii. Apart from the above scope of works, the detailed scope of work of I&C and mechanical maintenance is as mentioned below:

(Ä) I&C department scope of work

1. Scheduled preventive maintenance activity of all types of pneumatic, electrical actuators, once in 6 months duration. Preventive maintenance activity includes cleaning, greasing of the actuator, checking the actuator for its healthiness & if not healthy repair the same with required spares.
2. Scheduled preventive maintenance activity of all types of transmitters, switches, sensors etc once in 6 months duration. Preventive maintenance activity includes cleaning of the transducer, checking the transmitter and transducer for its healthiness & if not healthy repairs to be done with required spares.

3. Weigh bridge calibration once in 7/14 days duration and maintenance once in 3 months duration.

4. Weigh hopper calibration is to be done once in 15 days and maintenance once in 3 months.

5. UPS & Battery bank at all places checking to be done once in a month and proper maintenance to be done.

6. Belt weighs scale and MPD to be checked once in 15 days for zero error, to be cleaned. Calibration is to be done once in 6 months.

7. DCS system maintenance once in 6 months. Preventive maintenance includes dedusting the panels, servers, checking the connections etc.

8. Checking and maintenance of solenoid valves, external limit switches to be done once in 6 months and to be maintained healthy.

9. Checking the thermocouples, RTDs, Switches, gauges, valves etc and cleaning them once in a month.

10. Checking the cable glands of all the instruments once in 6 months and if cable glanding is not proper, regland the same.

11. Maintaining all types of communication cables like FO cables, LAN cables, telephone cables etc. If cable is cut or damaged, the cable to be jointed using proper tools or to be replaced if the damage is beyond repair.

12. Breakdown maintenance of any of the instrument is to be done as and when it is reported.

13. Maintaining all types of communication equipments like wireless sets, telephone Instruments, telephone exchange .Lab maintenance etc.

14. Software modification. Trouble shooting logic. Taking backup at regular intervals or whenever any modification done on system.
15. Weigh bridge maintenance with OEM if required and rodent treatment of plant has to be done regularly.

16. Scheduled calibration of instruments as a part of ISO .IMS certification has to be complied.

17. **SOP & SMP**

   The detailed standard operating and maintenance procedures of respective departments are as enclosed in Annexure –C2. The same shall be followed by the bidder.

2.1 **SOP & SMP**

   The detailed standard operating and maintenance procedures of respective departments are as enclosed in Annexure –C2. The same shall be followed by the bidder.

3.0 **General instructions to the Bidder**

i. The Bidder should provide qualified, trained and experienced personnel to carry out the assignment effectively and efficiently. The bidder shall ensure sufficient supply of manpower for execution of work given from time to time. The bidder in addition to the above shall arrange to deploy the requisite number of skilled manpower in each shift as may be required to complete the breakdown jobs in time and for discharging of other responsibilities, without causing any delays.

ii. The bidder shall provide personnel as per Annexure-I. The quantity mentioned is indicative. It is responsibility of the bidder to deploy sufficient manpower for efficient operation and maintenance of Blast Furnace unit.

iii. The Bidder shall also provide necessary material handling equipments for raw materials, Pig Iron, Auxiliary and provisions to dispatch Pig Iron & auxiliaries as per Annexure-II. The machinery mentioned is indicative any additional equipment / machinery required to be on bidder scope.

iv. KIOCL does not assurance any specific quantity of regular flow of work and the work involved either partially/fully stopped/ decreased or increased and the bidder agrees to maintain the labour force accordingly without causing any interruption/ stoppage of the work so assigned.

v. The bidder shall fulfill following obligations during the Mandate period:
a) The bidder shall disburse the payment to the personnel deployed in KIOCL on or before 7th day of the following month. After making the payment the bidder shall submit Payment Register as a proof thereof to the authorized representative of KIOCL. The bidder agrees to make payment of wages to his workmen as well as all statutory compliances on or before the said due date irrespective of the fact it has received money from the company or not or even whether it has any dispute with the company or not.

b) The Bidder shall maintain Register indicating duty hours of each Personnel round the clock and every Personnel must register the attendance. The Register should remain available for checking as and when required. Entry / Exit of the material shall be through gate pass and entry/exit of the bidder personnel as per prevailing system in practice at Company's Plant. The entry/exit system of the Bidders personnel and its material shall be through stipulated gate only. Daily Attendance Report and important information related to area of deployment of personnel of bidder should be sent daily to the authorised officer in-charge of KIOCL. If any matter requires immediate reporting it should be reported to HOD and HR Head simultaneously by the Bidder. The personnel of bidder agree that they will report at place of work at beginning of the shift and leave the workplace only after end of shift / reporting of reliever wherever applicable.

c) The Bidder is required to provide complete postal address, past service records and past history along with photographs of all personnel engaged by him prior to the commencement of work under this mandate. Further, in case of replacement of any personnel the particulars as above in respect of new personnel to be deployed must be furnished at least three days in advance before reporting for duty. For departing Personnel advance information should be given. Prior to engagement and joining of personnel, the bidder shall provide the relevant data detailing candidature to Company’s HR department. If the Bidder suppresses any material information regarding his personnel i.e. Identity, insurance policy details etc., then all Liabilities arising of the same shall be discharged by the Bidder.

d) KIOCL- BFU is comes under Factory Act, as such, the bidder shall obtain all necessary clearance / permission / License from the concerned authorities as required from time to time and submit a copy of the same to Authorised Officer of the company.

e) The bidder shall not sublet or assign in full or part, the work agreed to be performed by him without prior written permission from KIOCL.

f) The bidder shall comply with all provisions of all labour laws as applicable to the Mandate work viz. The Minimum Wages Act, The
Factories Act, The Payment of Wages Act, Contract Labour (Regulation & Abolition) Act, 1970, The Employees Provident Funds and Miscellaneous Provisions Act, 1952 and The Payment of Bonus Act, 1965, ESI / Employees Compensation Act and all other applicable Labour Laws reported to HOD and HR Head simultaneously by the bidder. The personnel of bidder agree that they will report at place of work at beginning of the shift and leave the workplace only after end of shift / reporting of reliever wherever applicable.

The bidder is responsible to carry out verification of character and antecedents of his personnel deployed by him at KIOCL.

The bidder is required to get all his Personnel insured under the Insurance Scheme through a reputed Insurance Company to meet the full liability arising out of Employees' Compensation Act 1923, in case required and shall get the insurance policies renewed from time to time. KIOCL shall not be liable for any compensation due to any injury / accident / death caused to Personnel or any claim under Employees Compensation Act. The Bidder shall submit a copy of Insurance policy for record of KIOCL.

The bidder shall be responsible for Appointment, control, over all supervision, Termination, etc., of all Personnel deployed by him. The Bidder shall be responsible to sort out disputes, if any, arising with their Personnel and shall keep the authorities of KIOCL suitably informed of the same. For any undesirable behaviour or criminal offence by any of its personnel the responsibility shall be fully that of the bidder. KIOCL will have every right to stop entry into KIOCL premises of such persons/personnel.

Any pilferage, financial loss, damages to KIOCL's property directly or indirectly due to negligence or carelessness of the personnel deputed by the Bidder or bidder will be recovered from the bidder. The decision of the Management of KIOCL will be final.

The bidder shall be responsible to maintain continuity of its services by providing sufficient manpower and machineries under all circumstances.

The bidder shall identify the process variable need to be adjusted on day to day basis for optimizing plant operation or assigned work.

vi. The Bidder shall arrange accommodation, food, and transportation for his personnel with no cost to KIOCL.

vii. The bidder and its personnel deployed shall not disclose and shall keep in confidence all information or data whether in writing or oral, concerning or related to the business activities of KIOCL,
its products, general business operations including manufacture, sale of products and by-products or any other information effecting the business interests of KIOCL. All the confidential information or the data supplied by KIOCL to the service provider in connection with the service being provided by the bidder shall remain the property of KIOCL. If the confidential information is disclosed by the bidder to an unauthorized third party, the bidder shall be liable for damages and further agrees to indemnify KIOCL from and against the same. In addition KIOCL may take suitable penal action including termination of contract as deemed fit.

viii. In case of any significant observation found deviated from the normal operating condition of BFU, the same shall be reported to KIOCL's Authorised person.

4.0 GENERAL TERMS:

While carrying out operations under the Mandate, the Bidder shall strictly adhere to the security and safety norms, and be fully responsible for the same, including its compliance under various laws. Other terms and conditions are enclosed at Annexure-C.

5.0 COMMERCIAL TERMS:

As per Annexure – H enclosed.

6.0 PAYMENT TERMS:

The Bidder shall submit the invoice for payment by 3rd day of every subsequent billing month in respect of the O&M works carried out during the preceding month supported by all relevant documents. The bidder shall get the invoice duly certified by head of the concerned departments about satisfactory completion of the work. Payment will be made within 15 days from the date of submission of duly completed bill/invoice to KIOCL Limited.

I. The rates shall remain firm during the contract period and shall not be subject to any escalation whatsoever.

II. The payment shall be made based on production of the actual tonnage of pig iron (including small pigs and chips) produced for the billing month plus total tonnage of pig iron loaded in to trucks/container for the billing month. Total payment will be made as per annexure H.

III. The bidder shall ensure production of minimum of 16,500 tonnes of pig iron (including small pigs and chips) per month.

IV. The Bidder shall not be entitled for any claim other than the above.
V. The O & M charges shall be deemed to be inclusive of all salaries, expenses of the bidder's employees, charges towards machinery and equipments deployed and consumables listed at Annexure: C-1 for the entire period of O & M. The rate shall also deemed to be inclusive of liabilities of every description and all risk associated in Operation & Maintenance including insurances to be taken by the bidder in his scope and to protect his own interest.

VI. All tax, charges and levies whether under central or state government, present or future, shall be charged to the bidder. Service Provider shall be fully and exclusively liable for all the sales tax, duties, octroi and any other statutory taxes, levies etc., now in force and hereafter increased, imposed or modified in respect of works and materials by central and state government authorities.

7.0 **TAXES & DUTIES:**

i. The O&M charges are exclusive of “Service Tax” & applicable cess (presently levied at 15%).

ii. Service Tax & applicable cess shall be as per prevailing rules which shall be reimbursed to bidder on production of documentary evidence. The invoice for the service portion shall separately indicate Service Tax or cess claimed by the bidder along with their relevant service tax registration number.

8.0 **SECURITY DEPOSIT:**

The successful bidder shall submit the security deposit 10% of the total contract value in any one of the following form:

   e) By Demand Draft
   f) By Bank Guarantee – As per KIOCL format attached at Annexure: C-3
   g) By Pay Order
   h) By RTGS/NEFT

9.0 **CONTRACT PERIOD:**

The Contract shall be valid for a period of 1 (One) year effective from the date of commencement of the O & M operations with a provision to extend the contract for a further period of one year at the same terms and conditions & rate on mutual consent based on the satisfactory performance of the bidder.

10.0 **SUSPENSION:**

KIOCL reserves the right to suspend and restart any part of the work without invalidating the provisions of the contract. Orders for suspension or restart of the work will be issued by KIOCL to the bidder by serving 15 days notice in writing. The contract period will be extended for a suitable period corresponding to the duration of the suspension.
KIOCL shall not be responsible for any liabilities what so ever in the event of such suspension.

11.0 **TERMINATION:**

I. KIOCL may terminate the contract by giving 30 days notice in writing to the bidder without assigning any reason.

II. Over riding Clause (i) above KIOCL shall be at, liberty to terminate the contract forthwith without any notice to the bidder, if on account of any Statute or order or Rule or Regulations, award, or judgment materially affects this contract: Without prejudice to what is mentioned in indemnity clause or in Clause (i) above KIOCL shall, at its sole and absolute discretion be entitled to terminate this mandate forthwith by written notice and paying an amount equivalent to one month's service charges paid in previous month, if

a. In KIOCL’s opinion (which shall not be called in question by the bidder and shall be binding on bidder): the bidder failed to perform to the satisfaction of KIOCL or performance is unsatisfactory.

b. The Bidder commits a breach of any of the terms and conditions of this mandate.

c. The Bidder is adjudged insolvent.

d. For any reason. Whatever the bidder becomes dis-entitled in law to perform its obligation under this mandate.

e. There is any variation in bidder’s constitution or its business without the prior approval in writing by KIOCL to such variation.

12.0 **LIQUIDATED- DAMAGES / PENALTY FOR NON- PERFORMANCE:**

If the performance of the bidder is not satisfactory then KIOCL will impose penalty on the bidder as per the details given below:

I. If the bidder fails to maintain the replacement of instruments / equipment provided by KIOCL due to fault of his personnel, or rework due to faulty workmanship a penalty as deemed fit by KIOCL subject to minimum of 110% of the cost of instrument/ equipment will be deducted.

The bidder will ensure housekeeping / cleanliness of their respective work areas. If the service provider fails to maintain housekeeping cleanliness of his work area to the satisfaction of the KIOCL, an amount as deemed fit by KIOCL subject to minimum of 110% of the
expenditure that would be incurred on account of the aforesaid work, shall be withheld from the invoice. It shall be released only after service provider completes the pending jobs and gives an undertaking for non-recurrence of the same in future to KIOCL In charge.

II. In case any personnel found absconding from the duty spot, found sleeping while on duty, penalty may be imposed on the bidder, Rs.500/- (Rupees Five hundred only) per person per day at the sole discretion of KIOCL, which shall be deducted from monthly bills in addition to wages for the day.

III. KIOCL's decision for estimation of such penalty shall be final and binding on the bidder.
OTHER TERMS AND CONDITIONS

1. **General requirements of Bidder’s scope:**

   The bidder shall personally and exclusively supervise the work of all his personnel so as to ensure that the safety and services rendered under this contract are carried out to KIOCL’s satisfaction.

   Proper logging of the jobs carried out, day to day log sheet, maintenance activities, spares consumption record, compliance and repairs record, personnel daily attendance sheets are required to be maintained regularly wherever applicable. All stationary items for book-keeping etc., are within the scope of the Bidder.

1) Engage experienced Operation manpower and Maintenance Staff as per Annexure – I

2) Maintain the Plant in accordance with the annual maintenance plan duly approved by KIOCL Limited.

3) The Bidder shall make the necessary arrangement for his staff offices, with the entire required infrastructure (to include biometric attendance facility with access to KIOCL, workshop tools & tackles, other communication facilities at site and other things required for the job). The land required to construct such offices shall be provided by KIOCL for the contract period. The Maintenance Bidder has to indicate the space required & type of construction envisaged.

4) The Bidders staff accommodation, food & transportation has to be arranged by the Bidder. Considering the continuous running Plant requirement & emergencies the essential Bidder Staff need to be housed within a 10 Kms radius from the Plant.

5) Emergency medical services limited to the first aid in nature will be provided by KIOCL within the company premises.

6) The Bidder shall provide ID card, safety goggles, safety shoes & safety helmets etc while working in the plant.

7) All his office equipments such as computers & accessories, office furniture, AC’s, all stationery etc. shall be in the scope of Bidder.

8) KIOCL will provide security arrangement in line with the prevailing practices at the plant periphery, entry & exit gates only.

9) The Bidder shall abide by the plant safety norms in compliance with the applicable standards, plant safety guidelines which are in line with OSHAS 18001:2007

10) All essential documentation, records, drawings etc pertaining to plant operation, maintenance, breakdowns, overhauls, documentation pertaining to statutory regulations and correspondence with government authorities has to be maintained in such a manner that it is easily accessible to KIOCL. It is the
Bidder’s responsibility to furnish all such document on the request of the KIOCL. Bidder has to maintain records & documentation as per KIOCL requirements.

11) KIOCL shall be free to conduct internal audits at regular interval with prior intimation to the Bidder. The Bidder is required to comply with the audit findings within the stipulated time.

12) Condition monitoring of all equipments and machinery is in the scope of bidder. The records pertaining to condition monitoring shall be made available to KIOCL as and when requested.

13) Bidder shall devise a structured training plan to improve the competency and skills of staff and workmen engaged for the contract. Each workman & staff shall undergo minimum 8 hours & 16 hours of safety training respectively in a year. Additionally, Technical & process training shall be provided to workmen & staff to improve competency & skill required for the job responsibility. There shall be a coordinator for training on safety, technical and process related areas. Each and every employee shall undergo safety training and cover all areas once in a year. The bidder shall work towards OHSAS 18001 and Factory act and comply with required training.

14) The bidder shall submit the list of personnel for the respective duty positions as mentioned in Annexure-I & II with qualification & experience to KIOCL within 10 days of LOI/Contract for approval by KIOCL. This shall be a precedent to certification of daily manpower power by KIOCL.

15) Medical examination & fitness of employee

   i. Workers employed shall be medically examined by a qualified medical practitioner, in the following manner:-

   a) Once before employment, to ascertain physical fitness of the person to do the particular job.

   b) Once in six months, to ascertain the health status of all the workers.

   c) The detail’s of pre-employment and periodical medical examinations carried out as aforesaid shall be recorded in the Health Register.

   ii. No person shall be employed by bidder without a certificate of fitness.

The above general requirements sl. no. 1 to 15 of Bidder are not necessarily exhaustive and Bidders will be required to include all items as may be necessary to complete the work unless otherwise excluded specifically. Therefore, except as specifically provided, all other works are deemed to be included for complete operation and maintenance of BF.

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Seal & Signature of the Bidder
CONSUMABLES PROVIDED BY KIOCL LIMITED

MECHANICAL/CPP/ELECTRICAL/I&C

1. Welding accessories:

   MS welding electrodes (6013 & 7018) and any special welding electrodes (dissimilar steels), hardfacing electrodes, gas cylinders (DA, Oxygen)

2. Tapes

   Insulation tapes, fiberglass tapes and any other types of insulation tapes required for the relevant job.

3. Tools & Tackles

   All sizes of wire rope slings, D Shackles, rope clamps.

   Multimeter, Megger, Hand held meter, Soldering iron, electrical power tools required for the performance of the Service.

4. Sealants and glues

   Thread sealant, gasket sealant, O-ring sealant and jointing compounds, Locktite, Ana bond, holdtite etc.

5. Hardware

   All sizes of MS hex head bolts/nuts/washers, CSK bolts, allen headed bolts, asbestos rope & gaskets, graphite ropes, rubber gaskets, hose clamps, rope clamps, shims, belt fasteners, split pins, binding wires, Teflon tapes etc.

6. Electrical/I&C consumables

   Dry cell batteries (AA, AAA), cable ties up to 10”, portable hand lamps (24V), plugs, halogens fittings for temporary illumination, power supply extension boards, emery paper, diesel, hand gloves, Etc.

7. Miscellaneous

   Cutting wheels, Grinding wheels, buffing wheels, Hacksaw blades, paints & brushes, emery sheet, pendant holder, petroleum Jelly etc, shall be in scope of KIOCL

MATERIALS TO BE PROVIDED BY THE BIDDER

The Bidder shall supply tools and tackles for carrying out the O&M of BF. The following items are indicative only and the Bidder shall provide all material which is specifically not excluded from its scope in the Contract and would be customarily required:
MECHANICAL

1. Workshop tools
   All-cutting and grinding tools, buffing tools, blades, drills and tool bits, power tools with its consumables.

2. Tools & Tackles
   a) For Electrician/I&C Technicians: Tester, torch, Cutting pliers, screw drivers of standard size, adjustable spanners, Set of DE, Ring spanners of standard size, Ratchet driver, Allen key, chisel, files, hammer, Hacksaw frame, crimping tool for cables upto 400 mm².
   b) Mechanical / CPP: 4 sets of spanners(6-32mm), 2 sets 32-50mm including open, ring & Slogging, Allen key sets( 2 each - Metric & Inches), Hacksaw frames, screw spanners, screw drivers, cutting pliers, nose pliers, hammers, pipe wrenches, files, measurement & alignment tools, chain blocks (capacity-2, 3, 5T- 4, 2, 2 Nos. each, lift-3, 5, 10m ), kito lever hoists, pullers & hydraulic jacks, chisels, centre punches, pneumatic wrenches, Gas cutting sets(Hoses, torches, nozzles, regulators)-5 Nos, DC Welding machines- min. 5nos, Welding cables, Welding holders & shield, Vibration meter, Temp Gun.

3. Cleaning agents
   Cotton rags, rust remover, soap solution, detergents, disinfectants, thinner and solvent, acetone (oxygen application).

4. Stationery
   All stationery, computer stationery, tapes, CD, printed stationery (Checklist/Log books/planning books/equipment record books etc.) required for day to day activity by the bidder.

5. The bidder shall make his own arrangements for commuting within Plant limits.

6. Fire and Safety
   Safety equipment and consumables like safety appliances such as Safety helmet of Fibre reinforced plastic (FRP) as per IS: 2925, leather safety shoes of good quality as per IS 10348: 1982/IS 5852, Safety step ladder of ht 4 m, full harness safety belt for workers working at height more than 2m, jean jacket, cotton pant and cotton shirt in hot zone area, safety goggles, dust mask, ear plugs/ear muffs of superior quality, gum boots for the activities involving waterlogged areas, all types of hand gloves including for electrical works HT/LT, face shields, gum boots, special aprons and first aid kit etc will be in the scope of contractor. Hand gloves for cryogenic application.
**ANNEXURE-I**

**MANPOWER REQUIREMENT ON DAILY BASIS**(on all days including Sundays and holidays with no extra cost to kiocl. Relivers to provided with no extra cost to kiocl ltd.) FOR O & M FOR BLAST FURNACE & ITS AUXILLIARY UNITS SHALL BE PROVIDED BY THE BIDDER – DURING OPERATION PERIOD

(A) OPERATION:

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<th>B</th>
<th>C</th>
<th>TOTAL</th>
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<td>Fitter</td>
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### (C) ELECTRICAL:

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All manpower should have experience in Steel Sector / Continuous process plant

(D) CAPTIVE POWER PLANT:

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<td>26</td>
<td>Control room and Boiler field operation and maintenance Operators</td>
<td>SSLC, ITI with 1st Class Boiler Attendant Certificate</td>
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<td>BSc / Diploma - Chemistry</td>
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<td>Entire premises</td>
<td>Skilled</td>
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<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>43</td>
<td>Entire premises</td>
<td>Unskilled-Male</td>
<td>Not Applicable</td>
<td>NA</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>44</td>
<td>Entire premises</td>
<td>Unskilled-Female</td>
<td>Not Applicable</td>
<td>NA</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>45</td>
<td>Helpers</td>
<td>Helpers</td>
<td>Unskilled</td>
<td>NA</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>46</td>
<td>Sub total</td>
<td></td>
<td></td>
<td></td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>47</td>
<td>Grand Total</td>
<td></td>
<td>(109 + 51 + 15+ 16 + 13 + 14 + 27) =</td>
<td></td>
<td>245</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


## SCHEDULE OF QUANTITIES FOR SUPPLY OF EQUIPMENTS - DURING OPERATION PERIOD

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description of work</th>
<th>Unit</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply of one mobile crane (8/10MT) for 24 hours basis with operators with valid license and Model 2010 onwards for collection of splash guard/runner jams, shifting of flash guard jams from flash guard to designated yards, assistance to removal of flash guard jams and runner jams, shifting of runner jams to designated locations, Loading of jams, scraps and other materials to tractors, tippers etc., shifting of pumps, motors and other equipments/pipes and tools and tackles to locations as directed by shift in charges, Shifting of boxes in and around PCM and LRS area, shifting of materials to cast house and PCM platforms if required and other jobs as per the instruction of shift in charges.</td>
<td>Hour</td>
<td>8760.00</td>
</tr>
<tr>
<td>2</td>
<td>Supply of one backhoe loader (JCB) along with operator with valid driving license daily on 16 hours basis, in A&amp;B shifts, for collection of auxiliary materials from PCM and LRS, Clearing of scrap and runner jams from in between ladle positioning area in LRS. Loading of the same into tipper/tractors, Assistance to removal of flash guard jams and runner jams, if required, Assistance in shifting of runner jams and flash guard jams to designated locations, Clearing of ladle dumping area jams on a daily basis and loading of the removed materials into tipper/tractor, Housekeeping in LRS area, Shifting of materials to cast house and PCM platforms if required, Clearing of return pigs in PCM, Loading of return pigs to wagon or trucks, Collection and clearing of accumulated scraps and other debris materials from PCM and LRS, Clearing of PCM pouring end area as and when required, Clearing of slag and debris accumulated in SGP and other areas. Digging jobs, if any in KIOCL BF Unit premises and other jobs as directed by Shift-In-Charges in the company premises.</td>
<td>Hour</td>
<td>5840.00</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Description of work</td>
<td>Unit</td>
<td>Qty.</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td>--------------</td>
</tr>
<tr>
<td>3</td>
<td>Supply of two tractors with body having hydraulic lift arrangement, along with operators having valid driving license, daily on 16 hour basis in A&amp; B shift, for shifting of auxiliary materials to designated locations. Shifting of runner jams, flash guard jams to designated locations, Shifting of ladle dumping area jams and other debris material from PCM and LRS to designated locations. Shifting of consumables/tools &amp; tackles, slag, pig and dust. Weighing of all the above materials shall be taken up at KIOCL BF Unit weigh bridges, if required, before dumping in yards, and other jobs as directed by Shift -In -Charges in the company premises.</td>
<td>Hour</td>
<td>11680.00</td>
</tr>
<tr>
<td>4</td>
<td>Supplying 02 nos 10 MT capacity Tipper, in good working condition, (Model 2012 onwards) on for full day (24 hours continuously) with heavy vehicle driving licensed drivers and cleaners for transportation of Pig Iron (including small pigs and pig iron chips), Iron ore Pellet, Iron ore lumps, Limestone, Dolomite, Manganese Ore, Quartzite, Coke, Iron ore fines, coke fines, Dust, Dry pit slag, Granulated slag and any other material from one place to another area inside KIOCL Limited BFU area and also to KIOCL Limited during the validity of contract. The shifting of materials shall be done as per the requirement of the Plant and as per the instructions of Engineer-in-charge.</td>
<td>Month</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Supplying 02 Nos. Tipper of 20 MT capacity in good working condition (Model 2012 onwards) for full day (24 hours continuously) with heavy vehicle driving licensed drivers and cleaners, for Transportation of Pig Iron (including small pigs and pig iron chips), Iron ore pellet, Iron ore lump, Limestone, Dolomite, Manganese ore, Quartzite, coke, iron ore fines, coke fines, Dust, Dry pit slag, Granulated slag and other material form one place to another area inside KIOCL Limited BFU area and also to KIOCL Limited during the validity of contract. The shifting of material shall be done as per the requirement of the Plant and as per the instructions of Engineer-in-charge.</td>
<td>Month</td>
<td>12</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Description of work</td>
<td>Unit</td>
<td>Qty.</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td>6</td>
<td>Supply of 02 nos of Front End Loaders (1.7m3 Bucket Capacity) on hourly basis for full day (24 hours continuously) with operators and helpers, for shifting of Coke, Iron ore, Iron Ore Pellet, Limestone, Dolomite, Manganese ore, Quartzite from raw material yard to the ground hoppers. The work also includes shifting, heaping and loading of Pig Iron, Iron ore pellet, Iron ore lump, Limestone, Dolomite, Manganese ore, Quartzite, coke, Iron ore fines, Coke fines, Dust, Dry pit slag, granulated slag and any other material from one place to another area, inside KIOCL BFU Project area and also to KIOCL PF/ PP Unit. Shifting of operational consumable items like, mud gun mass, runner mass, salt, husk, mortar, refractory, cylinders (oxygen and LPG) lime etc. The shifting of materials shall be done as per the requirement of the plant and as per the instructions of Engineer-in-charge. Also they have to shift or load any other materials and they have to carry out any other job including removal of hot slag from BF dry pit, granulated slag and miscellaneous jobs as directed by Engineer-in-charge.</td>
<td>Hour</td>
<td>17520.00</td>
</tr>
<tr>
<td>7</td>
<td>Manual loading of single pieces of pig iron into trucks (to be broken by bidder with no extra cost to KIOCL BF Unit)</td>
<td>MT</td>
<td>126000.00</td>
</tr>
<tr>
<td>8</td>
<td>Manual loading of single pieces of pig iron into containers / any other type of vehicle as arranged by the customer (to be broken by bidder with no extra cost to KIOCL BF Unit)</td>
<td>MT</td>
<td>54000.00</td>
</tr>
</tbody>
</table>

**Note:** The quantity in Item No - 7 & 8 are interchangeable.
BIDDER MANPOWER REQUIREMENT DURING BFU SHUTDOWN PERIOD

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>DESCRIPTION</th>
<th>MANPOWER PER DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OPERATION</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>6</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>15</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>9</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>MECHANICAL</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>8</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>8</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>ELECTRICAL</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>1</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>8</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>CPP</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>2</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>4</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>2</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>I&amp;C &amp; SYSTEMS</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>2</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>5</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>PROCESS CONTROL</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>1</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>3</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>CIVIL</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>0</td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL MANPOWER</strong></td>
<td><strong>119</strong></td>
</tr>
</tbody>
</table>
# Schedule of Quantities for Supply of Equipments During Shut Down

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Equipment / Contracts</th>
<th>Unit</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loader (1*8HRS, 15DAYS)</td>
<td>HOURS</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>Tipper 10MT (2*8HRS, 5DAYS)</td>
<td>HOURS</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>Tipper 20MT (2*8HRS, 3DAYS)</td>
<td>HOURS</td>
<td>48</td>
</tr>
<tr>
<td>4</td>
<td>JCB (1*8HRS, 3DAYS)</td>
<td>HOURS</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>Tractor (2*8HRS, 3DAYS)</td>
<td>HOURS</td>
<td>48</td>
</tr>
<tr>
<td>6</td>
<td>Hydra (1*8HRS, 7DAYS)</td>
<td>HOURS</td>
<td>56</td>
</tr>
</tbody>
</table>
## O&M Responsibility Matrix

Below mentioned are the responsibilities matrix of KIOCL Limited and Service Provider

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Function</th>
<th>Job Responsibility</th>
<th>Financial Responsibility</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bidder</td>
<td>KIOCL</td>
<td>Bidder</td>
</tr>
<tr>
<td>1</td>
<td>General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Continuous improved planning and actions (Plant Availability) based &amp; continuous improvement in Plant Availability</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Continuous improved planning and actions based</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Operation &amp; Maintenance and Safety : Training for site personnel</td>
<td>Y</td>
<td>Y</td>
<td>KIOCL will provide the training rooms.</td>
</tr>
<tr>
<td>1.4</td>
<td>All necessary statutory clearances from the concerned authorities in connection to O&amp;M of BFU</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>1.5</td>
<td>Maintenance related consumables &amp; other materials as per enclosed Annexure :C-1</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td>Repair of Electrical &amp; Mechanical items related to third party service.</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mechanical Maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Preventive maintenance programs, Plan, Schedule, Execution and Reporting for all equipments listed</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Condition monitoring measurement and analysis</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Routine Repairs (Corrective maintenance/ Breakdown maintenance) of all equipments</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>---------------------</td>
<td>--------------------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bidder</td>
<td>KIOCL</td>
<td>Bidder</td>
</tr>
<tr>
<td>2.4</td>
<td>All structural work new / replacement like platforms, column, beam, staircase repair, dismantling and new fabrication and installation, sheet replacement and hook changing, new sheet fixing</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.5</td>
<td>All piping work, fabrication, dismantling, laying, installation, commissioning of pipe work including flange, Tee welding, valve fixing, pressure gauge &amp; other instrument fixing.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.6</td>
<td>Any improvements and modifications jobs in connected to plant (excluding major Projects)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.7</td>
<td>Calibration of tools and instruments/Measuring tools</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.8</td>
<td>Repair of Vehicles, crane/ hydra and truck mounted crane used by maintenance bidder.</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>2.9</td>
<td>Maintenance of Conveyors, belts, laying , hot &amp; cold vulcanizing, clamping, roller maintenance, drum lagging, scrapper maintenance, guarding repair , new fixing and maintenance, screen repair, replacement, screen cloth changing, skirting maintenance, hood cover maintenance, feeders, screens, weigh feeders.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.10</td>
<td>Belt vulcanizing and lagging of drums as and when required</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>--------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bidder</td>
<td>KIOCL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bidder</td>
<td>KIOCL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KIOCL's scope is limited to providing spares</td>
</tr>
<tr>
<td>2.11</td>
<td>Operation &amp; maintenance of compressor, maintenance of Pneumatic systems</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>and pipeline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12</td>
<td>Maintenance of Hydraulic systems, power pack, pipeline, cylinders,</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>hydraulic drives, etc with all tools and tackles.</td>
<td></td>
<td></td>
<td>KIOCL's scope is limited to providing spares</td>
</tr>
<tr>
<td>2.13</td>
<td>Greasing and lubrication</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KIOCL's scope is limited to providing lubricants &amp; greases for plant/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>and KIOCL's equipment.</td>
</tr>
<tr>
<td>2.14</td>
<td>Machining, cutting, boring, drilling, key making, tapping, shaping, etc.</td>
<td>Y</td>
<td>Y</td>
<td>Jobs carried outside the plant will be reimbursed by KIOCL</td>
</tr>
<tr>
<td>2.15</td>
<td>Welding – electric arc, gas, TIG welding</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.16</td>
<td>Maintenance of Hydraulic equipment, cylinder, drives overhauling and</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>testing</td>
<td></td>
<td></td>
<td>KIOCL's scope is limited to providing spares</td>
</tr>
<tr>
<td>2.17</td>
<td>Maintenance of Gear box, pump, valve, technological equipment, HBS,</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>GCP, Bells, overhauling and testing / no load running</td>
<td></td>
<td></td>
<td>KIOCL's scope is limited to providing spares</td>
</tr>
<tr>
<td>2.18</td>
<td>Pressure testing &amp; no load trial on receipt of equipment</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.19</td>
<td>Inspection of spares on receipt</td>
<td>Y</td>
<td></td>
<td>Joint responsibility of Bidder and KIOCL</td>
</tr>
<tr>
<td>2.20</td>
<td>Loading, unloading, Transportation of material from stores</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.21</td>
<td>Return of scrap to stores at designated place within plant premises</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.22</td>
<td>Proper handling of hazardous material and return to designated places</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.23</td>
<td>Piping work and valve overhauling, replacement, leakage attending</td>
<td>Y</td>
<td></td>
<td>KIOCL's scope is limited to providing spares</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
<td>Remarks</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sl. No</td>
<td>Function</td>
<td>Remarks</td>
</tr>
<tr>
<td>2.24</td>
<td>Engine &amp; Pump operation, overhauling, dismantling, changing, erection, frame fixing, alignment, coupling changing, etc</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.25</td>
<td>PCM mould changing in between cast</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.26</td>
<td>PCM link, roller, bracket, lime pump, spray nozzles, piping, chute repair, gate repair, hammer repair/replace &amp; overhauling, cleaning rollers, lubrication of link and rollers</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.27</td>
<td>PCM sprocket repair, replacement, grab repair, overhauling, reconditioning, wire rope maintenance &amp; changing</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.28</td>
<td>Slag granulation screen repair, changing, fabrication, pump maintenance, alignment, erection, pipe line , valve replacement, structural work, grab crane maintenance, rope changing, rail alignment &amp; maintenance, lubrication, gear box repair, coupling changing, etc</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.29</td>
<td>All crane , hoist maintenance, rope changing, gear box drum maintenance , replacement, rail checking alignment, reconditioning of grabs, shaft, drum, structure etc</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.30</td>
<td>All valve maintenance, lubrication, setting, dismantling, overhauling, erection</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>2.31</td>
<td>Top charging equipment maintenance, lubrication, valve overhauling, setting, dust, uptake, down comer welding, repair, chute changing, valve changing, stock rod maintenance, etc</td>
<td>KIOCL</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing spares</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
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<td>Bidder</td>
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<td>2.32</td>
<td>Blower operation and maintenance such as bearing and impeller changing, shaft alignment, base frame, motor alignment, coupling &amp; decoupling, all valve maintenance, filter cleaning, job in blower etc.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.33</td>
<td>Housekeeping of plant and equipments</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2.34</td>
<td>Preparation of drawing for minor modifications and corrective actions / preventive actions / improvements in consultation with KIOCL Engineer Incharge.</td>
<td>Y</td>
<td>Y</td>
<td>Limited to hand sketches. However, major modification drawings shall be issued by KIOCL</td>
</tr>
<tr>
<td>2.35</td>
<td>Roller overhauling</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.36</td>
<td>Gas line maintenance including flare stack, goggle valve, flare stack igniters</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.37</td>
<td>Hard facing of chutes, hammers, liners</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.41</td>
<td>Maintenance of documentation and updating of records</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Sl. No</td>
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<td>Bidder</td>
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<tr>
<td>2.42</td>
<td>Maintenance of fire hydrant system at BF complex including replacement of damaged parts &amp; healthiness checking of fire hydrants</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3.0</td>
<td><strong>Captive Power Plant</strong></td>
<td></td>
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<tr>
<td>3.1</td>
<td><strong>Boiler</strong></td>
<td></td>
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<tr>
<td>A</td>
<td>Boiler operation and maintenance as per the specified procedure and to ensure the safety</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>B</td>
<td>Shut down and start-up of Boilers as per the specified procedure</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>Preventive and break-down maintenance</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>D</td>
<td>Any other jobs as per the instruction of engineer-in-charge</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3.2</td>
<td><strong>Turbine</strong></td>
<td></td>
<td></td>
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<tr>
<td>A</td>
<td>Turbine operation and maintenance as per the specified procedure and to ensure the safety</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>B</td>
<td>Shut down and start-up of Turbines as per the specified procedure</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>Preventive and break-down maintenance</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>D</td>
<td>Any other jobs as per the instruction of engineer-in-charge</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>3.3</td>
<td><strong>DM Plant</strong></td>
<td></td>
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<tr>
<td>A</td>
<td>DM plant operation and maintenance as per the specified procedure and to ensure the safety</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>B</td>
<td>Shut down and start-up of DM Plant as per the specified procedure</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>Preventive and break-down maintenance</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>D</td>
<td>Any other jobs as per the instruction of engineer-in-charge</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>3.4</td>
<td><strong>Cooling Tower</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>A</td>
<td>Cooling Tower operation and</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
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<td>Bidder</td>
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<td></td>
<td>maintenance as per the specified procedure and to ensure the safety</td>
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<tr>
<td>B</td>
<td>Shut down and start-up of Cooling Tower as per the specified procedure</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>Preventive and break-down maintenance</td>
<td>Y</td>
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<td>Y</td>
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<tr>
<td>D</td>
<td>Any other jobs as per the instruction of engineer-in-charge</td>
<td>Y</td>
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<td>Y</td>
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<td>4</td>
<td><strong>Instrumentation &amp; Automation Maintenance</strong></td>
<td></td>
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<tr>
<td>4.1</td>
<td>Preventive maintenance programs, planning and execution</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>4.2</td>
<td>Condition monitoring measurements and analysis</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>4.3</td>
<td>Repairs of lab and field instruments (Preventive &amp; Corrective maintenance)</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>4.4</td>
<td>Small improvements (excluding projects)</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>4.5</td>
<td>Calibration of tools and instruments/measuring tools</td>
<td>Y</td>
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<td>Y</td>
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<tr>
<td>4.6</td>
<td>Maintenance, calibration and setting of on line instruments (e.g. actuators, indicators switches, pressures, levels, temperatures, current, voltage, etc)</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>4.8</td>
<td>PLC and DCS Hardware replacement and maintenance</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>4.9</td>
<td>Updating of preventive &amp; breakdown maintenance documents for periodical maintenance of equipments</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
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<td>Bidder</td>
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<td>4.10</td>
<td>The refurbishment/repair jobs as per field requirements</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>5</td>
<td>Building and Areas</td>
<td></td>
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<tr>
<td>5.1</td>
<td>Maintenance of Buildings</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>5.2</td>
<td>Maintenance of outside areas, (roads, railroads, chip yard area)</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>5.3</td>
<td>Compressed air systems maintenance</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>5.4</td>
<td>Gardening and yard clean-up</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>5.5</td>
<td>Maintenance of Lighting (process + workshop areas + offices + general premises) maintenance</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>5.6</td>
<td>Entire Water Circuit maintenance</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>5.7</td>
<td>Sewage</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>5.8</td>
<td>Telephone network and equipment maintenance (Includes EPABX system)</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>5.9</td>
<td>IT network and equipment maintenance including LAN I/O port checking</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>5.10</td>
<td>Fire water pumps, jockey and electrical pump maintenance piping and hydrants including fire box , extinguisher etc</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>5.11</td>
<td>UPS</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>6</td>
<td>Maintenance Related Spare Parts, Materials Management</td>
<td></td>
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<tr>
<td>6.1</td>
<td>Management of Maintenance spare parts inventory</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
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<tr>
<td>6.2</td>
<td>Maintenance Material Ordering</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6.3</td>
<td>Maintenance Consumables as per Annexure: C-1</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>Checkups and reporting of inventory, reporting of warehouse transactions, stock counts.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6.5</td>
<td>Material transportation from Stores to site and vice a versa</td>
<td>Y</td>
<td>Y</td>
<td></td>
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<tr>
<td>7</td>
<td>24 Hour Service, On Call</td>
<td></td>
<td></td>
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<tr>
<td>7.1</td>
<td>Maintenance Shifts</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>On call system – for regular equipment failure (Maintenance manpower)</td>
<td>Y</td>
<td>Y</td>
<td></td>
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<tr>
<td>8</td>
<td>Maintenance Tools and Consumables</td>
<td></td>
<td></td>
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<tr>
<td>8.1</td>
<td>Crane for maintenance work</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.2</td>
<td>Trucks and mobile cranes etc for maintenance works</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.3</td>
<td>Chains, jacks, winches</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.4</td>
<td>Personal Tools, shift tools</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td>Welding machines</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.6</td>
<td>Welding machine consumables for maintenance related jobs</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>8.7</td>
<td>Scaffolding</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>8.8</td>
<td>Tool repairs</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.9</td>
<td>Equipment specific tools</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>8.10</td>
<td>Office supplies for Maintenance Bidder</td>
<td>Y</td>
<td>Y</td>
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<td>Sl. No</td>
<td>Function</td>
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<td>Bidder</td>
<td>KIOCL</td>
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<tr>
<td>8.11</td>
<td>Maintenance of walkie talkie</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>8.13</td>
<td>Detergents</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>8.14</td>
<td>Supply of Steel, pipes, sheets and paints</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>9</td>
<td>Insurance</td>
<td></td>
<td></td>
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<tr>
<td>9.1</td>
<td>Insurance against fire - Bidder equipments and his assets</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>9.2</td>
<td>Workmen Compensation</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>9.3</td>
<td>Any other insurance bidder is liable to undertake as per statute</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<tr>
<td>10</td>
<td>Safety and Security Services</td>
<td></td>
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<tr>
<td>10.1</td>
<td>Personal safety equipment for Bidder employees.</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>10.2</td>
<td>Maintenance of Safety Equipment</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>10.3</td>
<td>Maintenance of Fire extinguishers within battery limits</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>10.4</td>
<td>First Aid kits at designated locations.</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>10.5</td>
<td>Obtain the work permit from KIOCL before start up any work. The bidder shall ensure that the work area is safe during the job execution.</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>11</td>
<td>Cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.1</td>
<td>Workshop cleaning</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>11.2</td>
<td>Clean up of maintenance tools and equipment</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>11.3</td>
<td>Clean up of maintenance area after work</td>
<td>Y</td>
<td></td>
<td>Y</td>
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<td>Sl. No</td>
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<td>Bidder</td>
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<tr>
<td>11.4</td>
<td>Transport of maintenance waste to disposal site</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>11.5</td>
<td>Clean up of process wastes and spills</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>11.6</td>
<td>Disposal of maintenance waste for any items brought in by bidder to outside agency.</td>
<td>Y</td>
<td>Y</td>
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</tr>
<tr>
<td>12</td>
<td><strong>Compliances under applicable Law</strong></td>
<td></td>
<td></td>
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<tr>
<td>12.1</td>
<td>Load testing for tools, tackles, hydra, cranes, hoist, jacks, slings, D-shackles, gas cutting set, accumulators, pressure lines of the KIOCL as well as of bidder</td>
<td>Y</td>
<td>Y</td>
<td></td>
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<tr>
<td>12.2</td>
<td>Calibration &amp; stamping of weights/ weigh bridge / weigh scales</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>12.3</td>
<td>Structural inspection for structures, roofing for corrosion, stability and safety once in a year &amp; every three years through third party expert.</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>12.4</td>
<td>Earth pit maintenance, relay testing from the competent person once in a year</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>12.5</td>
<td>Co-ordination, assistance for periodic inspection of electrical installations from state electrical inspectorate &amp; Re-certification of HT/LT electrical installations from Regional electrical inspector</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>12.6</td>
<td>Area wise lux level measurement twice in a year.</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>12.7</td>
<td>Power transformer oil</td>
<td>Y</td>
<td>Y</td>
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<td></td>
<td>Bidder</td>
<td>KIOCL</td>
<td>Bidder</td>
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<tr>
<td>filtration</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>12.8</td>
<td>BDV, DGA analysis of Transformer oil</td>
<td>Y</td>
<td>Y</td>
<td>Shall be done through authorized external agency by bidder.</td>
</tr>
<tr>
<td>12.9</td>
<td>Lightning arrester testing &amp; maintenance</td>
<td>Y</td>
<td>Y</td>
<td>shall be done through authorized external agency by bidder.</td>
</tr>
<tr>
<td>12.10</td>
<td>HT/LT breaker relay testing and relay co-ordination</td>
<td>Y</td>
<td>Y</td>
<td>Shall be done through authorized external agency by bidder.</td>
</tr>
<tr>
<td>12.11</td>
<td>Calibration of water flow meters</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>12.12</td>
<td>Calibration of dust monitoring system</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>PROCUREMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.1</td>
<td>Procurement of spares, steel, chemicals, coolants &amp; lubricants except for consumables mentioned in Annexure :C-1</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>UTILITIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.1</td>
<td>Water supply</td>
<td>Y</td>
<td>Y</td>
<td>Water shall be provided free of cost. The necessary pipeline connections required for water to be done by the service provider only, at his own cost.</td>
</tr>
<tr>
<td>14.2</td>
<td>Electricity</td>
<td>Y</td>
<td>Y</td>
<td>Power supply required for service provider office to be taken from nearby available electrical panel. Electricity shall be charged as per the MESCOM rates. Necessary wirings to be done by the service provider at his own cost.</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Function</td>
<td>Job Responsibility</td>
<td>Financial Responsibility</td>
<td>Remarks</td>
</tr>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14.3</td>
<td>Communication</td>
<td></td>
<td></td>
<td>Land line telephone connections to service provider office will be provided from nearest point available in bfu. KIOCL. Necessary wiring and cable connections, from that point, to be done by the service provider at his own cost. Payment to the connections to be at service provider cost</td>
</tr>
<tr>
<td>15</td>
<td><strong>Electrical maintenance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.1</td>
<td>Preventive maintenance programs, planning, execution</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>15.2</td>
<td>Routine Maintenance of electrical equipment (HT/LT motors, Transformers, CTs, PTs, LA, circuit breakers, (SF6, VCB, ACB) cables, HT/LT panels, battery maintenance, AC/DC converters, electrical equipments of labs, utilities (drinking water pumps, canteen, first aid equipments, fire fighting pumps) DG/Motovator, CPP Generator, electrical distribution network, lighting etc)</td>
<td>Y</td>
<td>Y</td>
<td>Spares supply by KIOCL</td>
</tr>
<tr>
<td>15.3</td>
<td>Maintenance of Air conditioners (PAC, Split/window)</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.4</td>
<td>Maintenance of Lift</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.5</td>
<td>Maintenance of all crane/hoist motors, cables, brakes, panels, resistance box, master controllers, bus bars, current collectors, breakers, etc</td>
<td>Y</td>
<td>Y</td>
<td>Spares supply by KIOCL</td>
</tr>
<tr>
<td>15.6</td>
<td>Plant &amp; equipment lighting- Periodic cleaning &amp; maintenance</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>15.7</td>
<td>Maintenance of Lighting (process + workshop areas + offices + general premises)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>15.8</td>
<td>Repair of Electrical &amp; Mechanical items related to third party service.</td>
<td>Y</td>
<td>Y</td>
<td>Equipment required for calibration will be provided by KIOCL. Master calibrators /test weights shall be calibrated through authorized external agency by bidder.</td>
</tr>
<tr>
<td>15.9</td>
<td>Calibration of instruments, meters/Measuring tools and relay test kit</td>
<td>Y</td>
<td>Y</td>
<td>Equipment required for calibration will be provided by KIOCL. Master calibrators /test weights shall be calibrated through authorized external agency by bidder.</td>
</tr>
<tr>
<td>15.10</td>
<td>Updating of preventive &amp; breakdown maintenance documents for periodical maintenance of equipments</td>
<td>Y</td>
<td>Y</td>
<td>KIOCL’s scope is limited to providing documents (manuals &amp; drawings whichever are available), testing commissioning reports, as built drawings, wherever available. Subsequent maintenance documents of working drawings shall be maintained by Bidder.</td>
</tr>
<tr>
<td>15.11</td>
<td>Condition monitoring measurements on HT equipments including Transformers, Motors, Generators</td>
<td>Y</td>
<td>Y</td>
<td>Shall be carried out through authorized external agency by bidder.</td>
</tr>
<tr>
<td>15.12</td>
<td>LT Motor rewinding</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
Apart from the above responsibility matrix, the additional responsibility of shift incharge in mechanical maintenance department is as follow:

The bidder is responsible for execution and coordination of maintenance jobs in the Blast Furnace area, Stock House, RMHS, Pump houses Blowers, Air compressors & other utility areas. Needs to attend any breakdowns immediately in consultation with Operation in charge so that the production does not hamper. Also responsible for planning and execution of shutdown jobs and manpower scheduling. The nature of responsibility may be summarized as follows,

a. Gather information from the shift reliever.

b. Go through the logbook and glance through preceding shift maintenance jobs carried out.

c. To carry out the inspection of critical equipments like cranes, winches, Mud gun, drilling machine and operating the centralized lubrication system etc. along with the shift mechanic on regular basis.

d. Carrying out preventive maintenance of equipments and rectifying the breakdowns that occur during the shift.

e. Identifying the impending jobs on priority basis and later arranging the manpower and material to carry out the jobs. For any spares required, coordinating with the planning section.

f. Coordinating with shift in charges of other department to know about the day-to-day progress and thereby to have smooth running of all equipments.

g. Planning shutdown jobs, manpower requirement and allotment.
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>List of approvals</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Approval from Electrical Inspector for bidder maintenance crews</td>
<td>License renewal - Bidder's scope</td>
</tr>
<tr>
<td>2</td>
<td>License from labour commissioner for labours required to be employed under perview of the contract</td>
<td>Bidder's scope</td>
</tr>
<tr>
<td>3</td>
<td>Testing of all lifting tools and tackles of bidder</td>
<td>Bidder's scope</td>
</tr>
<tr>
<td>4</td>
<td>EPF &amp; ESI regulations for bidder personnel</td>
<td>Bidder's scope</td>
</tr>
<tr>
<td>5</td>
<td>Steam line repair - IBR approvals</td>
<td>As &amp; when required Bidder's scope. Statutory Fees will be borne by KIOCL.</td>
</tr>
<tr>
<td>6</td>
<td>Relevant Boiler operator certificate from statutory body 1st class Boiler operator certificate for workers and BOE certificate for Engineers</td>
<td>Bidder's scope</td>
</tr>
</tbody>
</table>

**Condition monitoring of equipments**

Condition monitoring of all rotary equipments as per standard engineering practices, viz., latest vibration monitoring & analysis procedures are in the scope of the Bidder:

(a) All rotating equipments and analysis through spectrum analysis

(b) Hydraulic oil for NAS value and Ferro-graphy

(c) Thermo-graphy for electrical panel, substation, hot metal ladle, furnace, hot blast stoves, hot blast & flue gas line.

(d) Ultrasonic testing of ladle pins and hooks of cranes/hoist hooks, gear box shaft etc for flaw detection

(e) Leakage test of compressed air through audio meters

(f) Ferro-graphy of gear box oil

(g) Wear and thickness measurement in steel wire rope, conveyer belts

(h) Transformer oil DGA analysis, HT equipments like transformers, power cable TAN delta tests, oil filtration, earth pit maintenance, health check up of HT/LT critical motors winding

(i) Any other condition monitoring techniques

The records of the condition monitoring of all equipments and machinery shall be provided to the KIOCL as and when requested.
REPORTS & INFORMATION:

The Bidder shall provide to KIOCL the following reports:

1. The Bidder shall provide to KIOCL daily in the morning a copy of report for the previous day, including details of:
   
   1.1 Availability of the plant & machineries.
   1.2 Efficiency report on critical equipments
   1.3 Spares requirement plan.
   1.4 Shutdowns, equipments under maintenance or break down of critical and non-critical equipments
   1.5 Non available equipments list, list of parameters which are in variance with rated parameters, manpower report category wise.
   1.6 Near miss and safety record.
   1.7 Accident and failure reporting
   1.8 Any other relevant information for the job.

2. The Bidder shall prepare Monthly report for the previous Month which shall include the following details:

   a. Plant availability
   b. Reasons for down time if any
   c. Plant utilization
   d. Quality of the product
   e. Energy consumption
   f. Raw material, Spares and consumables
   g. Safety and accident record
   h. Man-power attendance record

3. Within five (5) days of the end of the Month to which it relates (the “Relevant Month”), the Bidder shall provide to the KIOCL a Monthly report (the “Monthly Report”) which shall include but not be limited to the following:

   3.1 A review of maintenance for the Relevant Month (including reliability, load factor, actual output, efficiency and outages);
   3.2 To the extent reasonably available, identification of and reasons for any deviation from the Annual Maintenance Plan for such period or any other plans or forecasts in respect of the Relevant Month and any such deviations anticipated for the following two Months;
   3.3 Identification of all major repairs or alterations made during the Relevant Month;
3.4 All the daily reports to be consolidated so that a comprehensive report can be prepared;

3.5 Information relating to safety and the incidence of accidents at the Plant;

3.6 Training of staffs.

3.7 Such information as the KIOCL may reasonably request to assess the level of Bidder Penalty and which relate to the performance of the Bidder’s obligations since the first day of the Contract Year in which the Relevant Month falls

3.8 Such information as the KIOCL may reasonably request in connection with compliance with all applicable statutory requirements to the extent under Bidder’s scope; and

3.9 Accident and incident reporting

4. As soon as practicable (but in any event not later than 24 hours) after the occurrence the Bidder shall provide to the KIOCL, a report of:

4.1 Any major breakdown;

4.2 Any incidence of death or injury to any person on the Site or near miss incident.

4.3 The breach of any relevant statute; and

4.5 Any Emergency Event.

Under the above mentioned eventualities it is the sole responsibility of the Bidder to take immediate necessary action whatsoever including notifying the insurance company.

5. Maintenance Records and Reports

The Bidder shall prepare and maintain the records pertaining to operation, maintenance, accounting and reports of the Plant as required by the KIOCL.

In addition, the Bidder shall prepare and maintain such logs, records and reports as required supporting and documenting the information submitted to the KIOCL in any Monthly Report or Annual Report and such logs, records and reports as may reasonably be requested by the KIOCL.

Such logs, records and reports shall utilize the [International System of Units (SI)]. Accounting data and records shall be in a level of detail reasonably acceptable to the KIOCL.

The Bidder shall also prepare reports and data required by any Directive (including any renewal or replacement of any Permit), including such
reports and data related to the maintenance of Hazardous Materials at the Site, in a manner that complies with applicable Directives.

6. KIOCL will provide the required manuals for reference to the successful bidder.

7. **TAXES AND DUTIES:**
   
i.  TDS/ Income Tax at the prevailing rate, on gross amount billed, shall be deducted from the Bidder’s bills as per relevant provisions of Income Tax Act.
   
   ii. Work contract tax as applicable.
   
   iii. Any other deductions as per prevailing statutory regulations.

8. **MATERIAL/ EQUIPMENT:**
   
The bidder shall be responsible to keep in proper good working condition of all equipments, tools etc.,

9. **WORK TIMINGS:**
   
   In order to maintain proper co-ordination at the plant, the personnel deployed by the Bidder shall adhere to the work timings.

10. **SAFETY:**
   
   a) The personnel of the Bidder will not be permitted to enter factory premises without proper Personal Protective Equipments. The Bidder should ensure strict compliance of safety measures adopted by the company. In case of any violation of safety measures by the Bidder or his personnel will be taken seriously and in such situation, the company reserves its right to cancel the Man days and/ or penalize the Bidder.

   b) The Bidder shall immediately upon knowing of any accident, damage or losses, in which he or his personnel is involved on the site, inform the area in charge. The Bidder has no authority to negotiate and make any commitment for and on behalf of KIOCL, without obtaining specific approval from the authorized representative of KIOCL. But the Bidder is responsible for settling and repudiates the dispute if any.

   c) Ensuring safety and prevention of any accident/ incident of the personnel of the Bidder will be the sole responsibility of the Bidder.

   d) Any personnel without safety induction training will not be employed for carrying out any work.

   e) The Bidder shall take all safety precautions and provide adequate supervision by competent persons in order to do the job safely and
without damage to plant, personnel, equipment and the environment. The instructions and guidance extended by Safety Department of KIOCL to Bidder & the instructions of KIOCL site staff as well as that provided under the law are to be followed while undertaking jobs.

f) SAFETY OF CONTRACTOR PERSONNEL IS SOLE RESPONSIBILITY OF CONTRACTOR.

11. HOUSE KEEPING:

The Bidder shall ensure that its personnel while on Company's premises or while carrying out their obligations under these man days, observe the standards of cleanliness, decorum and general discipline lay down by KIOCL. KIOCL shall be the sole judge as to whether or not the Bidder or its personnel have observed the same.

12. STATUTORY REQUIREMENT:

a) The Bidder shall comply in all respect with the provisions of all Statutes Rules and Regulations of labour legislation applicable to the Bidder, and/or to the Bidder's personnel. The Bidder is further representing that there is no inquiry/ investigation pending by the Police against the Bidder or its personnel. As per the labour Welfare legislation, the Bidder should have separate code number under the scheme of Provident Fund & ESI. No. If applicable such numbers should be furnished to KIOCL at the time of commencement of the Mandate. The bidder shall discharge his legal liability with regard to PF & ESI as applicable, for his workmen and documents in support of the same shall be submitted to HR & Admn. Dept of KIOCL. The Bidder should comply with Contract Labour Act and eligible to get license from the authority. He will also produce the records so maintained before the authorized representative of KIOCL as and when required in demand. He should not work without a valid license.

b) The bidder shall not employ any child labour under the age of 18 Years.

c) The bidder shall submit a copy of PAN number and Service tax registration number.

13. OTHERS:

a) The mandate is temporary and non-perennial in nature. The Bidder will be an independent Bidder and neither a personnel nor an associate of KIOCL. Similarly persons employed by the bidder to carry out work assigned to the Bidder will be the employees of the Bidder and will not have any employee/ employer relations with KIOCL.
b) The bidder will devote his undivided attention and time to the work entrusted to him by the Company and work diligently to the full satisfaction of the KIOCL. The services shall be of good quality and in accordance with good working practices.

c) The Bidder will arrange necessary equipment and Supervisors to carry out his obligation under the Mandate.

d) The Bidder will ensure that his representative / supervisor will be always available in the KIOCL premises to administer and ensure proper functioning of the workforce deployed by him as required by KIOCL.

e) The Bidder shall be responsible and liable for payment of salaries, wages and other legal dues of the employees employed by the Bidder for purpose of rendering the services required by KIOCL under this mandate. The Bidder shall maintain proper books, accounts, records and documents and comply with all statutory rules and regulations, which are applicable to the bidder for the fulfillment of the terms of this mandate.

f) The bidder shall provide at his own expenses, facilities like, transport, boarding and lodging, medical, washing, conveyance, safety equipment, shoes etc., to all his personnel working under his Man days. All general medical care, hospital treatment and expenditure in case of any injury to the Man day workmen arising during the course of employment would be borne by the Bidder. The bidder will be solely responsible for any misconduct or undesirable behaviour or indiscipline of any kind or drunkenness of the persons provided by him. The Bidder will forth with remove the person against whom KIOCL has information to believe that deploying such person is against the interest of KIOCL.

g) The bidder’s personnel shall always be under bidder’s direct control or supervision and the bidder shall be free to transfer or terminate its personnel in accordance within its need provided that the bidder ensures the fulfillment of its obligations under this mandate. The bidder shall, as the employer, have the exclusive right to terminate the services of any of its personnel employed to fulfill the Service Providers obligations under this mandate and to substitute a person instead.

h) The bidder shall ensure that none of the workforce is deployed in KIOCL who has ever been employed by the KIOCL and has been charge sheeted, suspended, dismissed or discharged by company or who has been convicted by any courts for any offence, to carry out assigned job within the premises of the KIOCL.
i) The bidder shall not use the name of the company in any manner either for credit arrangement or otherwise. It is agreed that the company shall not in any way be responsible for the debts, liabilities or obligations of the bidder and/or its personnel.

j) The Bidder or its work force shall not do inside or outside the premises anything, which in the opinion of the company may be or becomes a nuisance or annoyance or danger or which may adversely affect the property, reputation or interest of the company.

k) The bidder or its work force shall not do any act in or about our premises anything whereby any policy of insurance taken out by the company against loss or damage by fire or otherwise may become void or avoidable.

l) The Security Staff of Company will have the right to refuse entry, question or check workmen of bidder who involve in any type of activity which would cause to damage to any property and materials of the company.

m) The bidder should implement the enclosed SOP, SMPS of various departments while implementing the O&M contract.

n) If any dispute arises in implementing the O&M contract the decision of KIOCL Ltd plant in charge decision is final.

14. INDEMNITY:

a) The bidder shall indemnify and keep the company indemnified, Company's Directors, Company's officers and Company's employees from and against all claims, demands, actions, suits and proceedings, whatsoever that may be brought or made against Company by any person or workmen or employee on behalf of any person, body authority whomsoever and whatsoever and all duties, penalties, levies, taxes, losses, damages, costs, charges and expenses and all other liabilities of whatsoever nature which the company may now or thereafter be liable to pay, incur or sustain by virtue of or as a result of the performance or non-performance or observance or non observance by the Bidder of any of the terms and conditions of this mandate. Without prejudice to the other rights, the company will also be entitled to deduct from any service charge or other dues payable to the Bidder, the amount payable by the company as a consequence of any claims, demands, costs charges, attorney fees and expenses. The company shall not be responsible for death, injury or accidents to the bidder’s personnel in relations to their duties on or about the company's property and premises and in the event that the company is made liable to pay any damages or compensation.
in respect of such personnel, the Bidder hereby agree to pay to Company such damage or compensation upon demand.

b) The company shall also not be responsible or liable for any theft, loss, damage or destruction of bidder’s property or belonging to personnel of bidder lying in Company's premises from any cause whatsoever.

15. DEMOBILISATION OF MANDAYS:

a) On expiry of this man days or any earlier termination thereof, the bidder shall forthwith remove any of the bidder personnel who are on the KIOCL premises or any thereof, irrespective of whether the bidder or its workmen have any dispute or not with the company. failing which, the Bidder, the Bidder's personnel, agents, servants etc, shall be deemed to remove them (if necessary by force) from the KIOCL's premises.

b) The benefits and obligations of this man days shall not be directly or indirectly assigned or dealt with by the Bidder. We shall not be liable for any third party liabilities and claims etc.,

16. NOTICE AND ADDRESS:

All notice under this man days shall be in writing and shall be served either by hand delivery or by sending the same by registered post/speed post addressed to either party at the last known place of business and in proving the service of such notice it shall be sufficient to show that the same has been received in person or properly addressed by registered post/speed post. The notice shall be sent at the address, mentioned in the "Definition" clause of this order unless and until the party has requested for change of address.

17. ARBITRATION:

In the event any disputes, differences or controversies should arise between the parties, hereto, in relation to this man days; the parties hereto shall thoroughly explore all possibilities for an amicable settlement.

18. FORCE MAJEURE:

In case bidder is prevented from the performance of its obligations in whole or in part for reasons of force majeure Viz., act of god, act of government, acts of public enemy, war hostility, civil commotion, sabotage, fire, floods, explosions, epidemics, then the period of such force majeure shall be excluded provided notice of happening of any such eventually is given by the bidder to the Company. No compensation will be payable for the period of Force Majeure.
19. **PARALLEL MANDAYS:**

If in the opinion of the company, the bidder is not in a position to fulfill his obligations under the Mandays' (which opinion cannot be challenged by the bidder), KIOCL reserves the right to appoint one or more bidder or make some other suitable arrangement to complete the work.

The expenditure so incurred by the company will be deducted from the charges payable to the Bidder by KIOCL.

20. Integrity Pact (IP) is a part of this contract document. The Integrity Pact Agreement format is enclosed as an annexure- E. The name and address of the IEM is as under. Format of Integrity pact agreement is also available in our website: [www.kioclltd.in](http://www.kioclltd.in)

Shri. Kumar Jitendra Singh,
1, MOIL VATIKA,
Chicholi Road,
IFetri Kajol Road,
Nagpur: 441 501.

21. **PAYING AUTHORITY:** Dy. General Manager (F), KIOCL Limited, Mangalore shall be the Paying Authority for this contract.

22. **EXECUTING AUTHORITY:** Joint General Manager, BFU or his authorized representative will execute this job.

23. **JURISDICTION OF COURT:**

Only the courts in Bangalore shall have jurisdiction regarding the matters relating to this contract.

24. **Fraud Prevention Policy of KIOCL:** “Fraud Prevention Policy” is being followed at KIOCL, which provides a system for prevention/detection/reporting of any fraud. It is also forbids provides everyone from involvement in any fraudulent activity and that where any fraudulent activity is suspected by any one, the matter must be reported to the ‘Nodal Officer’(Chief Vigilance Officer) as soon as he/she comes to know of any fraud or suspected fraud.
STANDARD OPERATING PROCEDURES

BLOWER OPERATION

1. Safety Instructions

   a) All persons working in blower area shall wear necessary safety equipments, as the area is a high noise area.
   b) Blower discharge pipelines carry hot air. Hence adequate safety precautions to be taken before handling the same.

BLOWER START UP:

   a) Start water-cooling pumps. When one blower is to be kept running, keep only one pump ON, whereas two pumps are made ON when both the blowers are running. Water pressure is to be maintained between 2 – 3 Kg/cm².
   b) Start oil mist fan. Keep the oil tank pressure to ~100mmWC by adjusting the throttle valve.
   c) Start AOP. Observe for a steady pressure between 1.8 – 1.9 Kg/cm². Observe filter DP. Above a DP value of 1 Kg/cm², change over to the fresh filter. Ensure proper venting before the change over.
   d) The Noise hood fans & Lights are switched ON.
   e) Ensure for sufficient Instrument air pressure & all instrument lines are kept open. Also, check for the Dew point of the Instrument Air.
   f) Keep the motor selector switch in ‘0’ position.
   g) Reset the alarms & ensure that no alarms are remaining in the panel.
   h) Observe for ‘Compressor (Blower) ready to start’ indication & ask the clearance from MSDS.
   i) When air is to be sent through the Snort valve, ask clearance from the BF control room.
   j) Ensure the ‘EOP panel switch’ is ON. Check for proper voltage and check for the alarms in the charger panel. Inform MSDS for troublesome alarms.
   k) Open the Discharge valve. When only one blower is made to run, the other blower’s discharge valve may be kept in closed condition.
   l) Ensure that all the set points in the controller are ‘minimum’. In case the blower is to be started in Common pressure mode, ensure that the proper minimum set point is selected. Check for IGV positions in IGV controller – 15% opening for any of the IGV’s could be indicative of controller malfunctioning. FIC 745/845 shall be in LOCAL mode during start up.
   m) Keep recording ON for all the recorders. All recorders are to be kept OFF when the blower is not running.
   n) Keep the motor selector switch in ‘1’ position & ensure that ‘Ready to start’ indication is still persisting. Give start command after informing MSDS, CPP & BF control.

   ✓ The flow indicator controller/ Pressure indicator controller (FIC/ PIC) output value should become 9% once Blower is started with minimum
set point. Second blower is to be started on Individual pressure mode and changed over to common mode after equalizing discharge pressure of both blowers.

- Both blowers can be run together in individual Flow mode or Common pressure mode and not in individual pressure mode.
- When both blowers are run on individual flow mode, flow set points on both FIC are to be equal.

o) Switch off Auxiliary Oil Pump (AOP) in manual mode, once all vibration level reaches normal value (indicated by steady green lights in Bentley Nevada Panel). Also ensure MOP is working properly (Indicated by Lub Oil Pressure value above 1.9 Kg/cm$^2$)

p) After switching off AOP, keep selector switch in AUTO so as to enable auto take over of AOP in case Lub oil pressure drops.

q) Blower discharge pressure/flow can be raised or lowered in AUTO/MANUAL mode.
    - When FIC/PIC is in AUTO mode, corresponding parameters are automatically maintained at set levels by the controller.
    - Any increase/decrease in pressure/flow is to be done slowly, keeping an eye on IGV deviation value.

r) Changing of modes (pressure to flow) can be done while blowers are running.
    - Mode changing should be done preferably at low pressure/flow values
    - Mode changing is to be done only after equalizing controller flow/pressure set point with measured value at the time of change over. However change over can also be done by equalizing controller output values (Only while changing over from Individual pressure mode to flow mode)

s) Operator’s authority to control the operation is restricted to usage of the following buttons in PIC/FIC/Common PIC only
    - Increase/Decrease Buttons
    - AUTO/MANUAL Button
    - LOCAL/REMOTE Button in FIC 745/845
    - SEL Button

Operator is not authorized to do any operations in following Controllers
    - Anti Surge Controller
    - IGV Deviation Controller

2.1 CRITICAL STEPS

- Step a
- Step c
- Step i
- Step l
- Step o

BLOWER SHUT DOWN:

- Before stopping blowers inform CPP/MSDS
- Ensure that AOP is in AUTO mode
c) Bring down the pressure/flow to minimum value before stopping
   ❖ Give Stop command and observe for AOP take over.

   ❖ When two Blowers are to be started in Common pressure mode, first
     blower is to be started in Individual pressure/flow mode and then to be
     changed over to Common Pressure mode. Once first blower is
     stabilized, AOP should automatically change over once Lub oil
     pressure is below 1.4 Kg/cm$^2$

   ❖ In case of any problem with AOP, EOP to be started immediately from
     panel

d) Ensure presence of sufficient lubricating oil pressure

e) AOP/EOP should run till all bearing temperatures are normal (40°C)

3.1 CRITICAL STEPS

➢ Step b
➢ Step d

REMOTE FLOW CONTROL FROM BF CONTROL

a. After starting the blower slowly increase the set point in the LOCAL mode
   up to the desired value in Blower control panel.

b. Switch the controller from AUTO to MANUAL and LOCAL to REMOTE mode.

c. Select set point in FIC 745/845 controller and vary set point from BF Control
   to match the flow reading on the flow totalizer.

d. At BF Control, Proc 19 has to be selected and PID loop of Blower I or Blower
   2 can be selected and required flow set point has to be fed.

e. Switch over controller from MANUAL to AUTO mode. The controller is now
   in REMOTE & AUTO loop and set point can be varied from the control room.

f. If the controller is to be again taken back to LOCAL operation change over
   to MANUAL mode is not required. Directly switch over to LOCAL from
   REMOTE mode and vary the set point at blower house itself. Now the
   controller is in its regular mode of operation – LOCAL & AUTO.

4.1 CRITICAL STEPS

➢ Step c

COMPRESSOR OPERATION

COMPRESSOR START UP:

a) Check the lube oil level of all the compressors.
b) Check for sufficient cooling water supply to oil circuit. (2.5 to 3.5 kg/cm$^2$)
c) Check for the set point of pressure and temperature of the oil. (7 kg/cm$^2$ and
   50°C)
d) Keep the air drier switch in ‘ON’ position.
c) Keep the water inlet, outlet and compressor air discharge valves in open position.
f) Ensure the compressor to be in the ‘unloaded’ condition before start up.
g) Also ensure that the Annunciators are switched ‘ON’ and check for any alarms.
h) Before starting, take clearance from MSDS/ CPP.
i) Start the compressor. After starting the compressor for 2 – 3 minutes, load it.
j) Drain the moisture traps of drier and all the compressors every two hours.

1.1 CRITICAL STEPS

- Step a, c & f

STOPPING PROCEDURE:

a) Keep the ‘load/ unload’ switch in ‘UNLOAD’ condition.
b) Information is to be given to MSDS/ CPP before stopping.
c) Stop the compressors after receiving the clearance.

2.1 CRITICAL STEPS

- Step a

BLAST FURNACE & STOVES COOLING SYSTEM

CWPH – Operation of pumping system

a) Blast Furnace is provided with 4 nos each of supply and return pumps for catering to the water requirements of the blast furnace and stoves. An emergency overhead tank of 500 cum capacity also is available to cater to emergency requirement of water. A 3 cell cooling tower is provided in the return circuit to bring the temperature down.
b) Operator shall ensure at all the time that the BF(S) pumps are running continuously delivering water at pressure 5-6 Kg/cm².
c) Ideally 2 pumps shall be working and other 2 in stand by mode for both supply and return pumps. However the no. of working pumps shall be decided based on the water requirement.
d) Whenever the cooling water system is started after a shutdown or total stoppage, proper venting of the line shall be ensured.
e) Before starting the pump ensures that the levels are comfortable and high level switch is picked up. The pumps can be run in local and remote mode by selecting the choice required in the selector switch. Confirm that the pump selected for starting is clear from mechanical/electrical shutdown.
f) Start the pump by keeping the delivery line valve in closed condition. Keep the vent valve at +24 mtrs open. Once the pump is running slightly open the vent line in the pump and bleed any air trapped inside. Similarly remove the air in the discharge line by venting through the pressure gauge line valve.
g) Once the air is removed in discharge line, open discharge valve slowly and raise the line pressure to around 3.5-4.0 Kg/cm². Wait till all the air is vented through the vent line at +24 mtr level.

h) Start one no of BF® pump and bleed out the air as described in pint no. f. Slowly open the discharge valve and maintain the sump levels. Ensure that the valves in cooling tower are open and start the fan. In remote mode BF® pump will be started only after the cooling tower fans are started.

i) The manifold supply valves/spray line valves may be kept open during venting, if required. EOHT supply and return line valves are to be kept closed during this period.

j) Once all the air is removed water can be let to cooling members.

k) EOHT has to be kept filled to cater to the emergency water requirement at all times. In order to fill the EOHT the manual valves on the supply line to EOHT (2 nos) has to be opened. Maintain line pressure above 5 Kg/cm². Open the motorized gate valve and ensure water is going to EOHT. During filling ensure that the line pressure is above 4.5 Kg/cm². Watch the sump levels and add sufficient make up water to maintain the level.

l) Once filling is completed, which is shown by the presence of water in over flow line, close the motorized valve. Manual gate valves may be kept open.

m) Open the geared gate valves (3 nos) in the return line of the EOHT. These valves should remain open all the time.

n) Whenever the pump trips water from EOHT will be fed to furnace and stoves by gravity.

o) Water to the furnace and stoves are filtered in Duplex Filter, which has got 2 filter bags – one working and other stand by for each line.

p) Duplex filter shall be changed over every day in A shift.

q) BF(S) & ® pumps shall be selected in such a way that if 2 pumps are running one shall be in CPP supply and one in MESCOM supply, if the above is permissible. Otherwise the pumps shall be in CPP supply.

r) Pumps shall be changed over regularly after intimating CPP.

1.1 CRITICAL STEPS

➢ Step f,k

DURING FURNACE SHUT DOWN CONDITION:

a) Scrap the scaling formed in the furnace shell and clean all the gutters.
b) Clean all box coolers, baffle plates, collection troughs.
c) Do the pressure grouting for all the grouting points.
d) Clean the water-collecting tank at the zero meter level by opening the drain valve.
e) Arrest the leaking pipelines.
f) Clean all water sumps one by one (if time permits).
g) Any abnormality in functioning of pumps, motors, valves, etc..found during furnace running condition and could not be solved is to be rectified.

5.1 CRITICAL STEPS

➢ Step b
FURNACE & STOVE WATER SYSTEM DESCRIPTION

a) Blast furnace is provided with cooling members for all 12 tuyere assly. These include tuyere, tuyere coolers & breast coolers. All these are provided with individual supply connections from the manifolds in tuyere platform level. (Total 36 connections)
b) The individual return lines from these are routed to the trough in tuyere platform.
c) Tap hole is provided with 4 nos of double row cooling plates around it fixed to the shell. Each row of cooling plates are provided with separate inlet and outlet from tuyere platform manifolds.
d) Main supply line from CWPH is connected to a ring main at +17 mtrs which supply water to all spray headers.
e) Spray headers are provided at +6.8, +11,+18,*24 mtr levels for external cooling of the furnace. Whenever furnace is running these spray lines have to be opened and water spray around the periphery shall be ensured. The spray water is collected by collection troughs provided at each level and diverted to return line to the hot sump of the CWPH system.
f) 4 no of manifolds supply water to tuyere and tap hole coolers. Each supply line is provided with plug valves at the starting. Manifolds are provided with connection from FW line with isolation valves for emergency water supply.
g) During running the valve position of the entire plug valves shall be full open and maximum water flow shall be ensured in the return line.
h) Each HBV of the stoves are provided cooling water connection for body (2 nos) and disc. The supply originates from the manifold provided near the HBV of individual stoves. Return lines are routed to the collection trough and the common stove return line. Similar cooling arrangement is provided for FIV also.
i) Stove hydraulic power pack also receives water for cooling from the manifold for Stove-2.
j) Stove line as well as supply mains to blast furnace (2 nos) are provided with flow meter and pressure transmitters.

ACTIVITIES DURING NORMAL RUNNING CONDITION:

a) Check all the tuyeres, tuyere coolers & Breast coolers for any abnormalities, every hour and inform the shift i/c /Manager(O) for any abnormalities.
b) Monitor the external cooling of the furnace, for any choke in the spray system, box coolers, baffle plates & collectors. If so, the same is to be rectified immediately.
c) Check inlet & outlet water temperatures of all tuyeres every two hours and the same is to be recorded.
d) If any steaming is observed in external cooling system, increase the cooling water flow or else provide extra water-cooling immediately in that area.
e) Monitor stave-cooling system in the taphole area of the furnace. If any abnormalities found, like less flow, any choking of staves, etc., the same is to be flushed with high-pressure water, so that the required flow is obtained.
f) If it is suspected that water is leaking inside the furnace from any stave cooler, the same cooling member is to be disconnected from the system and extra external cooling to be provided in that area. The same is to be pressure grouted with refractory material during shut down.
g) Change over of pumps should be done with the prior permission from MSDS/ CPP.
h) The emergency water supply valve is always kept open from the Emergency Over Head Tank (EOHT).
i) Avoid accumulation of foreign particles in the water-collecting troughs at all levels.
j) If any abnormalities in the functioning of valves, pumps, motors, etc. are found, the same is to be informed to the respective departments for further action.

4.1 CRITICAL STEPS

➢ Step b, c & h

ACTIVITIES DURING POWER FAILURE / PUMPS TRIP:

1. Ensure from electrical dept. either power failed or pump tripped.
2. Provide cooling water to Blast furnace & Stove valves from E.O.H.T whenever power fails.
3. Minimize water to hot blast valves & furnace external cooling as far as possible.
4. Minimize water flow to the stave coolers by observing the out lets.
5. Provide maximum water flow for the tuyeres, tuyere coolers & breast coolers.
6. Monitor the tuyere cooling members continuously for any abnormalities.
7. Ensure the power resumption time from the electrical dept., if it is getting delayed more, then start the diesel pump. Open the modified valves for the tuyere cooling members and hot blast valves so that cooling water is provided continuously.
8. After the power is resumed the cooling system for the furnace & stoves are to be normalized by starting the pump and by opening the throttled valves, closing the modified valves from diesel pump. Then stop the diesel pump.
9. Refill the E.O.H.T by maintaining the sump levels.

6.1 CRITICAL STEPS

➢ Step b, c & g

MAKE UP WATER PUMP HOUSE

MW System Description

a) MWPH caters to the Make up water and firewater requirement of the plant.
b) MW network of the pump house comprises of 2 nos DMF Feed pump, 2 nos of ground storage pump, 3 nos of MW feed pumps, 2 nos of DMF filter and 2 nos of ACF filter.
c) Raw Water from KIOCL can either diverted to the pond for storage or directly taken in the MW and FW sump. Normally water is taken directly to sump and in case sump is full water is diverted to the pond.
d) Whenever water is taken directly from pond suitable treatment shall be administered by process control dept. to control pH and to restrict presence of scaling promoters.
e) Raw water after treatment is pumped through the DMF and ACF filters using DMF feed pumps and stored in ground storage sump. However if the quality of raw water is good, DMF can be by passed using ground storage pumps.
f) MW collected in the ground storage sump is pumped into various locations using the MW feed pumps. These may be run as and when user depts. requests for MW water. Major MW consumers are CWPH & CPP.
g) Alternatively raw water from KIOCL can be directly taken to the plant MW line through DMF/ACF filters by opening the isolation valve near the DMF. However the pressure of the raw water system shall be kept above 1 kg/cm² by keeping other valves in the raw water line partially closed. The DMF feed line valve to the ground storage sump also needs to be kept closed during such time.
h) However when KIOCL raw water line is connected to the MW line, CPP shall be supplied MW from BF(S) line by opening the valve provided near GCP. The CPP MW branch line isolation valve shall be kept closed.
i) Change over of pumps shall be regularly done.

1.1 CRITICAL STEPS

➢ Step d & g

FW System Description

a) FW network consists of one no Electric main pump, 1 no diesel main pump and 2 nos of small jockey pumps.
b) FW sump is provided with water sourcing connection from the Pond as well as KIOCL raw water line.
c) Ideally KIOCL raw water shall be used and in case pond water is used suitable treatment shall be initiated.
d) FW system is provided with a automatic system, where in the main pump which is run in normal conditions trips when the line pressure is 10Kg/cm². This is indicates that there are no consumers for FW system and it is running idle.
e) Once the pressure gradually drops to 6.5 Kg/cm² jockey pump takes over and still if pressure is dropping Main pump takes over at 4Kg/cm² and jockey pump is stopped.
f) If electric main pump is not starting due to no supply, diesel pump takes over. Operator shall ensure that the diesel level and water level in radiator are enough.
g) In case the auto system is difficult to be maintained due to leakages in the system, local operation may be resorted to.
h) Operator shall make entry with regarding to consumption of diesel and Diesel pump run hours in the log book provided.
i) FW Diesel pump is provided with 2 suction lines. One suction is from the FW sump and other one from ground storage MW sump. In case FW is used for tuyere applications water shall be drawn from MW sump, which is chemically treated for BF water applications.
2.1 CRITICAL STEPS

- Step g & j

DMF & ACF Operations

a) DMF shall be used when the TSS and turbidity of the raw water is above agreeable limits. ACF shall be used when the source water contains traces of oil and grease above agreeable limits.
b) Raw water from KIOCL shall be chemically treated and filtered in DMF in normal conditions. Both DMF shall be used and the inlet and outlet valves shall be kept open. DMF by pass valves shall be kept closed.
c) Operator shall check the DP across filter regularly and take remedial steps like backwashing.
d) For backwashing the filter the backwash pumps and compressor shall be used.
e) Before backwashing the filter bed is loosened by compressed air supply. After starting the compressor open air inlet/outlet valves keeping DMF inlet/outlet valves and backwash inlet/outlet valves closed. Flush the system for 10-15 mts.
f) Stop compressor and close air inlet/outlet valves. Start backwash pump and keep the backwash inlet/outlet open. Keep the pump running till clear water is observed at the outlet (20 mts appx.). Backwash sump shall be filled using the MW.
g) After backwashing the dirty water collected in backwash return sump shall be pumped out using backwash return pumps.

3.1 CRITICAL STEPS

- Step c & f

CHEMICAL ADDITION AND WATER TREATMENT

Chemical addition and water treatment at Make up water pumphouse, CWPH, ETP, CPP and DM plant comes under KIOCL SCOPE.

CHECKING FOR DAMAGED TUYERES

a) Check outlet water volume to find fluctuation.
b) Check outlet-cooling water for gas and bubbles.
c) Check for moisture or sweating near the contact point of blowpipe with the tuyere.
d) Check the nature of water flow from tuyeres outlet, for any irregular coughing flow.
e) Check for high hydrogen content in top gas compared to normal level.
f) Check for the drastic drop in Silicon percentage and hot metal temperature.
g) Check for FeO in slag going high.
h) Dull slag during the tapping.
i) Sulphur level going high in the metal.
j) Whenever the wind volume is reduced for taking the furnace to off blast, check the tuyeres from the peephole for any abnormalities like steaming or blackening.

**CRITICAL STEPS**

- Step c, f, i & j

**REMOVAL OF DUST FROM DUSTCATCHER**

a) Ensure that the previously dumped material is disposed off and no person is below the dumping spot or nearby.

b) Inform to Electrical Department so that the feeder of Dust Extraction valve is made ON.

c) Carry the CO monitor to the work spot.

d) Open the valve provided for water spray to avoid spreading of dust.

e) Release the push button in the Local Control Board (LCB) for Dust Extraction valve.

f) Open the Dust Extraction valve from LCB in inching. Dust from the Dust Catcher starts falling.

g) If the dust falling from Dust Catcher is not visible, close the Dust Extraction valve from the LCB. Seeing the slackness in the counter weight rope can ensure the closing of Dust Extraction valve.

h) Repeat this process of opening & closing of Dust Extraction valve, till sufficient amount of dust is discharged.

i) By the alarm of CO monitor & visibility of gas coming out from Dust Catcher, it can be very well known that sufficient amount of dust is discharged.

j) Lock the push button in LCB and handover the key to BF control room.

k) Close the valve provided for water spray.

l) Inform the Electrical Department to switch off the feeder.

m) The process is to be carried daily. The frequency of operation will be decided by the BF in charge from time to time.

**CRITICAL STEPS**

- Step g & l

**GAS CLEANING PLANT AND GAS LINE**

1.0 GCP system Description

a) Gas cleaning plant is provided with 2 ventury scrubbers for effective cleaning of BF gas
b) BF gas from dust catcher undergo cleaning at I stage ventury (VS1) and the semi cleaned gas is sent to II stage ventury (VS2) for further cleaning. One no. tapping is provided between VS1 & VS2 for equalizing line from furnace inter bell.

c) Each ventury scrubber is provided with ventury dampers, which are electrically operated. Water spray connections are provided at each ventury.

d) BF Gas is washed off dust at the ventury scrubbers by the impinging spray of water and the dusts containing water is diverted to the thickener through a seal pot and launder system.

e) Each ventury is provided with individual seal pots, which contain an inner and outer pipe. The function of the seal pot is to separate the gas & water system. Inner pipe originates from the ventury scrubber base surrounded by the outer pipe and carries the dust containing water. Water comes out through the outlet of the outer pipe. The outlet is at a height above the bottom of the inner pipe suitable enough to prevent the escape of gas through the slurry water. Seal pot outlet is connected to a launder, which carries the water to thickener. Seal pot is provided with a drain valve for periodical draining of slurry collected at bottom portion to prevent it from settling.

f) Gas from second stage passes through a moisture separator provided with a vane for removal of excess water.

g) GCP is provided with instrument connections for pressure, temperature, DP at different stages.

h) Control dampers in ventury scrubbers are powered by electrical actuators and can be opened and closed maintain sufficient differential pressure across the scrubbers for better cleaning. DP is maintained in AUTO mode through PID controllers in PLC. Here the required set point is fed and the dampers are given operating instruction from the PID loop.

i) In normal conditions appx 500mmWC differential pressure is maintained across VS1 and 2500 mmWC across GCP through VS2 damper. However at lower blast volumes a proportionate lower setting may be employed for proper gas cleaning. Dedicated pumps in CWPH meet the water requirement for ventury scrubbers independently. The over flow clarified water from thickener is directed to the GCP hot sump. Water from hot sump is sent to cold sump through a cooling tower by 4 nos of GCP® pumps (Drive no 318 to 321). But modification is carried in Thickner 2 circuit, where the overflow of Thickner goes directly to Cold Sump through Cooling tower. The cooled water in GCP cold sump is pumped into VS1 & VS2 scrubbers. Pumps with drive No 316/317 & 351 supply water to VS1 and 314, 315 supply water to VS2. In normal conditions 2 pumps each are run for VS1 & Vs2 supply. However drive 151 is a higher capacity pump and if 151 is run only one pump needs to be run. Other wise 316 & 317 may be run together. The moisture-ridden gas then passes through a septum valve, which controls the top pressure. It is system of 3 butterfly valves with 1 control & two on/off. Out of the two on/off, one is provided with a direct spool piece. In order to control the top pressure, septum control valve will operate from 40-80% in remote mode. When a set point for top pressure is set at the corresponding PID loop in VDU, and if the actual top pressure is less than the set value, the control valve will close slowly to 40% in each step checking the resultant top pressure. If still the set top pressure is not achieved command will be given to the on off valve to close fully. If top pressure has gone above the set point after closing the on off valve, the control valve will open to 80% checking at each stage about the resultant top pressure. If top pressure reaches the set point at any stage control valve stops operation. Same logic shall be used when the set value is more than the actual top pressure.
j) The gas line network from VS1 to moisture separator is considered as GCP system and the gas line from septum valve to user points are considered as Gas Line system.

k) Immediately after the septum valve one no. of electric-hydraulic operated goggle valve for isolation of the system during breakdown/shutdowns.

l) Stove branch gas lines are taken from the gas main after goggle valve. Each stove is provided with separate branch lines and electro-hydraulic operated goggle valves for isolating the same.

m) Gas line after the stoves bifurcates to CPP gas line, which supply gas to CPP and flare stack line. Flare stack line is equipped with an isolation valve, control valve and a water seal. BF gas is flared using an LPG igniter at flare stack.

n) Main gas line and flare stack gas line are provided with flow meter and pressure transmitters to give flow/pressure readings.

2.0 Safety Instructions

a) All persons working in GCP/gas line areas shall carry CO monitor

b) Proper purging shall be done before undertaking any work in GCP/Gas Line during shutdowns

c) Safety equipments like hand gloves, dust mask should be available for carrying out the work.

3.0 Operating Instructions

a) BF Control room operator shall cross check the set points given in various PID loops like Top pr., VS1/VS2 DP. Set points shall be with respect to the wind volume as specified in the technical manual to ensure maximum cleaning efficiency. GCP water flow also shall be maintained to achieve the above

b) During start up of the plant the entire GCP/Gas line shall be purged with steam, if any maintenance job is undertaken in the gas line. The sufficiency of steam purging shall be confirmed by the large amount of steam appearing at furnace/dust catcher bleeders.

c) Septum valve and PCV shall be kept opened before connecting the gas line.

d) Once the gas line has been connected after starting the plant, GCP water system shall be made on. Operator shall ensure sufficient water is going to the ventury by cross checking the flow meter reading and outlet temperature of gas.

e) Necessary set points may be given in the concerned PID loops.

f) GCP field operator should drain the VS1 &VS2 seal pots in every 2 hrs. While draining care should be taken to prevent seal breakage by excessive draining of seal pot. However, in the event of a seal breakage, extra pumps should be started and seal pot should be filled up. In case seal pot water level is not restored even after going through the above steps, decision may be taken by the shift in charges to reduce the wind volume by observing the furnace condition.

g) GCP field operator shall monitor the sump levels to prevent the tripping of the pump due to low level. Operator shall regularly changeover the working pumps.

h) The field operator shall drain all gas line seal pots twice in the shift. The water trap pots shall also be drained twice in the shift. Flare stack also shall be drained once in a day by the A shift field operator. All seal pots shall be filled up after draining.

i) BF Control operator shall monitor the gas line pressure in the main line by taking necessary steps to adjust consumption across various consumers.
3.1 CRITICAL STEPS

➢ Step d & f

EFFLUENT TREATMENT PLANT (ETP) OPERATIONS

1.0 Thickener Operation

a) Out of the two thickeners, one no. shall be running all the time to clarify the slurry water. Other one will act as stand by. Both the thickeners are fitted with drive assembly for rotation and lifting/lowering of rake. Lifting/lowering of rake shall be possible only when the rake is under rotation.
b) Thickener rotation shall be run continuously so as not to allow settling of slurry at the bottom.
c) Thickener rake shall be at the bottom most position. This will be ensured by the limit switch feedback.
d) Concentrated slurry at the bottom of the thickener shall be removed periodically (At least once in every 2 hrs) to the sludge tank. While transferring the slurry to the sludge tank, the concentration of slurry shall be observed to determine the end of pumping. Pumping shall be stopped when the slurry pumped becomes lean.
e) Whenever the slurry level in the thickener rises on account of excess dust generation and insufficient slurry removal, the torque experienced by the rotation drive increases. When the torque level reaches 70% set value, thickener-lifting command is generated by PLC in remote mode. Thickener rake will be lifted to relive the torque and necessary alarms will be generated by PLC.
f) On seeing the alarm, the operator shall ascertain the cause of the alarm and take suitable steps – viz. increase the frequency of slurry removal etc. Once the torque level is reduced, which can be checked by measuring the current of the rotation drive, the rake shall be brought down manually.
g) However in the event of torque level increasing even after lifting of the rake, torque switch at 100% torque will be actuated and rotation will come to stop. At this point emergency steps shall be taken to remove the slurry and reduce the torque level. In case the above steps are unsuccessful thickener may be changed over to the standby one.
h) During regular operation of the thickener care shall be taken to check the working of thickener rotation and that of under flow pumps. The rake position shall be observed and if it is not in bottom level it has to be brought down by observing the rake rotation current.
i) Chemical addition for fast settling of slurry is resorted to in the flash mixer area. Flash mixer shall be running when chemical addition is resorted to. The quantity and frequency of chemical addition shall be confirmed from the process control dept.
1.1 CRITICAL STEPS

➢ Step e & h

2.0 Slurry transfer from thickener to sludge tank

a) Each thickener is provided with 2 underflow pumps for transferring slurry to the tank. One pump shall be working and the other stand by. These pumps are provided with water flushing and gland cooling arrangements.
b) The pump discharge line is sent to sludge holding tanks. Alternatively pump discharge can also be given back to the thickener through the recycling line. Both the lines are provided with plug valves.
c) There are 2 nos of sludge tanks fitted with agitators. Both tanks will be used under normal conditions. The collected slurry can be pumped outside using the slurry transfer (truck loading pumps)
d) In order to pump the slurry to the sludge tank close the recycling line valve. Ensure that the discharge valve and the common discharge line valve are open. Open the valves for the individual sludge tanks. Start the pump and observe if slurry is coming to the tank.
e) Pump shall be stopped when the slurry turns lean or when the tank is full.
f) The agitators shall be running whenever slurry is stored in the tank. Switch off the agitator when slurry level is below it.

1.1 CRITICAL STEPS

➢ Step e & f

3.0 Slurry Transfer from sludge tank to tanker

a) Ensure that the tanker is placed near the outlet pipeline of sludge storage tank.
b) Inform the person near the tanker before starting the slurry transfer (truck loading) pump. (Drive no., 379 or 380, whichever in use)
c) Start the pump and the thick slurry is disposed to the tanker.
d) When the level of slurry in tank is low or the tanker is full stop the pump.
e) Stop the slurry transfer pump.
f) Take the tanker to the designated place for disposal.
g) The process is repeated 5 times in the shift at an equal distributed time interval. When the furnace is running with wind volume of more than 32,000 Nm$^3$/ hr, the process should be 5 times. Otherwise 3 times will be sufficient.

SHUT DOWN & RESTART OF FURNACE

Normal Shutdown of furnace

a) Inform all concerned.

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Seal & Signature of the Bidder
b) Before closing the tap hole, gradually reduce the wind volume to minimum (i.e., 14,000Nm$^3$/hr and 0.3 kg/cm$^2$ in the Blower house. Time required- 5 to 20 mts)

c) During the wind reduction, one person should always monitor the tuyeres from the peephole for any abnormalities. Stock length is kept minimum with low top temperature.

d) Isolate the stoves that are on GAS, while reducing the blast volume.

e) Close the tap hole. (Time required- 2- 5 mts)

f) Stop the charging system.

g) Open the snort valve gradually to atmosphere and maintain blast pressure about 0.2 kg/cm$^2$. (Time required - 2 mts)

h) Open the furnace bleeder valve by inching. Close GCP goggle valve. Isolate stove ON BLAST (Time required –6 to 12 mts )
i) Ensure CBMRV & CBMSV are closed (CBMRV & CBMSV will close automatically when the third stove is isolated)
j) Close FIV and then stop the Blower. Close Dust catcher cut-off valve if there is any job planned in GCP & Dust catcher. (Time required- 4 to 7 mts to stop blower/Dust catcher cut off valve- 15 to 25 mts)
k) Stop the GCP water system. Purge GCP/BF Top with steam if any work is planned in GCP/BF Top. Announce completion of purging and clearance for shutdown jobs by ensuring safe CO level at steam outlet (Time required 25 to 45 mts)
l) If back draught is required, open the back draught valve. (Time required 4 mts)
m) For back draft through stoves,
   ❖ FIV is not to be closed.
   ❖ Open hot blast valve of any one stove.
   ❖ Open Chimney valve with port, of the same stove.
   ❖ Furnace is on back draught through the stoves.

n) Check all tuyeres and clean the blow pipes. Immediately clay up the tuyeres.

CRITICAL STEPS

➢ Step c

Emergency Shutdown of furnace

2.1.1 Emergency shutdown after total power failure

Following procedure shall be followed in case there is a total power failure and normal shut down procedure can not be followed.

1. Check and arrange the availability of water for tuyere cooling members from EOHT or from Fire Water Diesel Pump.
2. Check the tuyeres for presence of slag/metal. In case of any suspicion, open the casting by lancing. In case the cast house is not ready for tapping and slag is there in the blow pipe open the peephole flange carefully and drain out the slag.
3. While opening the flange, choose the one which is farthest from vital equipments to minimize the damage due to flowing slag.
4. Open bleeder valves manually from winch house.
5. Take complete shutdown by isolating stoves, closing FIV, Dust Catcher cut off valve, BDV and GCP goggle valve as per requirement after power is resumed.

2.1.2 CRITICAL STEPS

➤ Step 1
➤ Step 3

2.2.1 Emergency shutdown due to other problems.

1. In case furnace has to be made shut down due to any serious breakdown/ mishaps the gravity of the problem needs to be ascertained first.
2. In case total shutdown can be delayed slightly, reduce the wind volume with a close watch of the tuyere conditions.
3. In case tapping is due and there is a chance of slag appearing at tuyeres immediately open the tapping.
4. Mean time wind can be reduced to the lowest possible. Once the tapping is opened and sufficient slag has come out wind can be made nil.
5. However if the situation warrants abrupt stoppage of plant, stop the blower and watch tuyere peepholes by taking adequate protection.
6. Open peephole flanges if slag appears in the blowpipe and allow it to drain out.
7. Take complete shutdown by following step 5 of section 2.1

2.2.2 CRITICAL STEPS

➤ Step 1
➤ Step 3

2.3.1 Restart of furnace after shutdown

1. Take the clearance for completion of shut down jobs from the respective departments.
2. Open the dust catcher cut off valve, if it is in the closed position. (Time required 10 mts to 25 mts)
3. Remove the furnace from back draught state, if it is so. (Time required 3 mts)
4. Open FIV & take one of the stoves in ‘ON BLAST’ state. (Time required 6 to 8 mts)
5. After taking clearance from MSDS/ CPP, start the Blower with minimum set point. (Time required 5-8 mts)
6. Close the snort valve gradually to atmosphere, so that 3,000 to 5,000 Nm$^3$/ hr of wind volume is sent to the Furnace. (Time required 2 mts)
7. Check the tuyeres for any blast leakages.
8. Connect the GCP by closing the furnace bleeders and opening of GCP goggle valve. Close other vents in Gas line towards CPP sequentially. Observe for any leakages from Furnace bleeders, Dust catcher cut off valve, etc.
9. After ensuring certain amount of gas bleeding from the vent that was kept open near the CPP, close the vent. Close the steam valves.
10. Start the GCP water systems.
11. Start the charging systems along with BFC – 1 conveyor.
12. After the above-mentioned points are satisfied, gradually increase the wind volume by closing the snort valve to atmosphere.
13. Finally, increase the wind volume from the Blower gradually, by observing the smooth burden movement.

2.3.2 CRITICAL STEPS

- Step 8 & 10

**SLAG HANDLING: (Dry pit cleaning and shifting of slag)**

1. Take clearance from shift-in-charge before moving the loader/excavator to the dry pit area.
2. Use personal protective equipments.
3. Ensure sufficient cooling spray water is sprayed over the hot slag in dry pit.
4. Ensure that slag in dry pit is cold. Work is to be started at least after half an hour of spraying water time.
5. Removed slag is kept separately in heap at designated place.
6. One layer of cold removed slag from previous tappings is to be spread over the cleaned dry pit.
7. Finally at the end of dry pit one dam is to be made. This is to ensure that hot slag shall not overflow outside the dry pit area.
8. Removed slag is to be shifted at slag yard using tippers.
9. Dry pit is ready for taking next hot slag.

**CRITICAL STEPS**

- Step 1 & 4

**1.0 SGP Operation**

1. Before taking slag to SGP ensure the following
   a) Slag launder and blowing box are cleared of jams, if any.
   b) Water pressure at blowing box is OK, otherwise check for the blockings
   c) Ensure that the tanks are empty and there is space to take the slag
   d) Ensure status of SGP crane
   e) Ensure sump level is OK
2. Once the slag is ready to be diverted to SGP, start the main pump (171 or 172) after taking clearance from CPP for any load fluctuation.
3. Guide the slag to SGP by blocking the dry pit side runner and watch for any launder jam or tank overflow.
4. Ensure 100% slag granulation. However in case the tank overflows or launder jam develops, divert the slag to dry pit by carefully removing the sand blockade.
5. Stop water after ensuring that slag flow towards SGP launder is completely stopped
6. Clear the runner debris and prepare for next tapping
7. Ask crane operator to remove the granulated slag after every tapping and ensure the same before tapping
CRITICAL STEPS

➢ Step 1 & 2

2.0 SGP Crane Operation

a) SGP crane has been provided with a 5T bucket to transfer the granulated slag outside the tank
b) After or during tapping, the crane operator shall use the crane to remove the slag and dump it outside. Crane has been fitted with lever controls for hoist/lower/bucket operation/LT & CT
c) Operator shall check for healthiness of equipments and in case of any problems shall inform shift in charge.
d) After the crane operation all controls shall be kept in off condition and crane bucket shall be rested on the floor.
e) Operator shall ensure the cleanliness of the screens, which are important for water draining. In case of any choking it shall be cleared by water/air spray. Any damage with screen shall be brought to the notice of shift in charge.
f) Operator shall ensure sufficient water in the sump by operating MW valves. Operator shall also inspect the pump house areas by periodic checking and ensure that drain pumps are in working condition. Any abnormality shall be brought to the notice of shift in charge.
g) Operator shall ensure shifting of removed slag to storage yard by arranging loaders.

CRITICAL STEPS

➢ Step e & f

PROCESS CONTROL

1. HOT METAL X-RAY ANALYSIS

   (a) Sample collection from B.F Cast House
   (b) Polishing in vertical rotary surface grinder
   (c) Feeding and analysing in X-ray machine for Silica, Sulphur, Phosphorus, Manganese

2. Hot Metal wet analysis.

Carbon cannot be analysed by X-Ray

   (a) Bringing sample in moulds from Blast Furnace area.
   (b) Drilling in drilling machine.
   (c) Analyse for carbon as per procedure.

MANGANESE, PHOSPHORUS, SILICA, SULPHUR, BY WET METHOD

   (a) Bringing sample in moulds from Blast Furnace area.
   (b) Analyse as per procedure for Manganese, Phosphorus, Silica, Sulphur
II. SLAG ANALYSIS

(a) Bringing sample in moulds from Blast Furnace area.
(b) Crush it manually and reduce by cone and quartering.
(c) Grind it to (-) 150 mesh in a pulveriser.
(d) Analyse for SiO$_2$, Al$_2$O$_3$, CaO, MgO by X-ray or by wet analysis if X-ray is not available. Analyse every samples of slag for FeO by wet method only.

III. RAW MATERIAL ANALYSIS

(a) Bringing materials from Stock yard.
(b) Size analysis as per instruction and requirement and moisture.
(c) Crushing to (-) 10 mm from 40 mm or 30 mm
(d) Reduce by cone and quartering
(e) Grind to (-) 100 mesh in pulveriser.
(f) Fe, SiO$_2$, Al$_2$O$_3$, Phosphorus, Manganese, Sulphur, LOI, moisture, size and tumble index in case of Iron Ore from rake or any supply through trucks,
(g) Fe, SiO$_2$, Al$_2$O$_3$, LOI, moisture and size in case of Iron Ore from bunker
(h) CaO, MgO, SiO$_2$, Al$_2$O$_3$, LOI, moisture and size for Lime stone and Dolomite.
(i) SiO$_2$, Al$_2$O$_3$, moisture and size for Quartzite.
(j) Mn, Fe, SiO$_2$, Al$_2$O$_3$, moisture and size for Manganese Ore.

IV. COKE : Moisture to be analysed every shift and in rainy season, twice in a shift. Ash, VM, Fixed carbon and size once in a day or once in shift as per our requirement.

Ash analysis : Every shipment

V. WATER ANALYSIS : PH, TDS, alkalinity P, alkalinity M, Acidity and Hardness every shift on 4 to 5 samples.

VI. IRON ORE SAMPLES FROM DIFFERENT SOURCES :

If one party is supplying Iron Ore from Two or more Mines, we have to analyse for all parameters by proportionately mixing from different sources. Some times, in case of doubt, we may have to analyse separately for different mines supplied by the same party and take weighted average analyses for reporting for every 1000 Tons.

I HOT METAL

COLLECT THE MOULDS AND BRING TO KIOCL LABORATORY

PREPARE THE SAMPLE IN BENCH DRILLING MACHINE AND ROTARY VERTICAL SURFACE GRINDER

CARRY OUT SULPHUR, SILICON, MANGANESE AND PHOSPHOROUS ANALYSIS
II. **SLAG SAMPLE**

COLLECT THE MOULDS AND BRING TO KIOCL LABORATORY

CRUSH TO 5 MM SIZE AFTER THOROUGHLY CLEARING THE SURFACE TO REMOVE ANY METAL

USE A HAND MAGNET TO REMOVE METAL, IF ANY

GRIND TO 100 # IN PULVERISER AND SIZE ANALYSIS, IF ANY

ANALYSE FOR CA0, MgO, SiO2 AND Al2O3

III. **RAW MATERIAL**

LIME STONE / DOLOMITE / MANGANESE ORE / QUARZITE / IRON ORE LUMPS / COKE, 10 KGS SAMPLE

CRUSH TO 10 MM SIZE

RIFFLE OR CONE QUARTER TO REMOVE TO 5 KGS.

CRUSH TO 3 MM SIZE

RIFFLE OR CONE ON QUARTER TO REDUCE TO 200 GMS

GRIND TO (-) 100 # SIZE IN PULVERISER

ANALYSES AS PER RADICALS GIVEN IN EACH RAW MATERIALS

IV. **LIME STONE**

DOLOMITE CaO, MgO, Silica, Alumina LOI, moisture & Size

COKE Ash, Volatile matter, Moisture & Fixed Carbon and Size

QUARZITE SiO2, Al2O3, moisture and Size

MANGANESE ORE Mn, Fe, SiO2, Al2O3, moisture and Size

IRON ORE LUMPS Fe, SiO2, Al2O3, P, S, Mn, LOI, moisture, Size & tumble index

V. **BOILER WATER EVERY SHIFT**

Hardness, total dissolved solids PH, Acidity and Alkalinity Phenolphthalein, Alkalinity methyl orange, total solids etc.
PROCESS CONTROL LAB EQUIPMENTS UNDER KIOCL SCOPE

1. X-Ray Spectrometer
2. Carbon apparatus
3. Tempo Hot plates of 3 KW capacity
4. Grinding machine
5. Bench drilling machine
6. Vertical rotary surface grinder
7. Muffle furnace – 1 No.
11. Drying Oven - 2 No.
12. Tables, working benches
13. Two PCs, one attached to X-ray and other one for all other works.
14. Gases like helium, Oxygen, LPG etc.
15. All Chemical and consumables and glassware
16. Combustion boats and combustion tubes and for carbon determination.
17. Grinding wheel for polishing machine.
18. Borax, Aluminum cups for X-ray analysis
19. Platinum crucible -3 nos

CONTRACTOR’s SCOPE

1. Screens 70 mm, 50 mm, 40mm, 30mm ,20 mm, 16mm, 10 mm, 8mm, 6 mm, 5mm, 3mm, 2mm,1mm, 100 mesh, 200 mesh and 325 mesh.

CONTRACT CONDITIONS FOR SAMPLING AND ANALYSIS

SCOPE OF WORK :

Scope of work under this contract shall include the following:

(a) Drawing of samples.
(b) Preparation of sample
(c) Carrying out chemical analysis
(d) Carrying out physical analysis

The above work schedule and time to time instruction by KIOCL Limited representative.
DRAWING SAMPLES:

(a) The sampling and assaying requirements will be intimated by KIOCL from time to time and also as per work schedule Representative samples shall be taken to conduct analysis.

(b) Contractor should be prepared to carry out joint sampling on all samples as per procedures.

PREPARATION OF SAMPLES:

(a) Representative samples shall be prepared by contractor on all samples as per procedures.

ANALYSIS OF SAMPLES:

(a) Chemical analysis shall be carried out as per requirements in the work schedule as well as time to time instruction by KIOCL Limited B F Unit representative. In case of X-ray spectrometer failure all analysis to be done by conventional wet chemical method without extra cost

CERTIFICATION AND FEED BACK:

(a) As soon as the analysis of Pig Iron, Hot Metal, Slag and Boiler Water is over, same has to be informed by phone. The analysis report has to be given in writing next day.

(b) Staff and service facilities to be prescribed by the Contractor.

CONTRACTOR shall employ adequately qualified and experienced staff for all work defined under “Scope of Work” and any other related work and furnish a list of persons, indicating their qualifications, proposed to be employed for the work.

The CONTRACTOR is expected to set up at his own cost, such facilities at Mangalore that may be necessary to comply with the requirements detailed under the scope of work and especially to ensure timely finishing of the Certificate of the analysis

STANDARD MAINTENANCE PROCEDURE

1). WATER PUMPS:

1.1) Perform the weekly/fortnightly preventive maintenance jobs as per the checklist provided.

1.2) For performing the maintenance jobs on stand by pump also, proper shut down of the pump shall be taken.
1.3) If shut down is required for any breakdown/planned jobs, take operational clearance for shutdown for a predetermined length of time.

1.4) Proper shutdown shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to prime mover and put a tag over panel.

1.5) Close suction and discharge valves tightly.

1.6) Pump casing shall be drained completely and ensure that there is no passing from suction and discharge valves.

1.7) Decouple the pump from prime mover if required.

1.8) Repair jobs shall be taken like replacement of impeller, wear rings, shaft sleeves, stuffing box glands etc.

1.9) Proper and correct tools and safety appliances as applicable shall be used.

1.10) After completing the jobs, check for free rotation of the pump and align the pump with the prime mover.

1.11) Couple the pump with prime mover and electrical clearance shall be taken for trial run after entering in the Electrical shut down register.

1.12) During trial run in front of operation personnel, observe bearing sound, vibration or any unusual sound.

1.13) If everything is within norms, clearance shall be given for operation.

1.14) Surrounding area shall be cleaned for any scrap generation like old gland ropes pieces, grease, cotton waste, metal pieces etc.

2) MUDGUN

2.1) Perform the weekly preventive maintenance jobs as per the checklist provided.

2.2) As Mud gun is not a continuously running machine, smaller jobs shall be taken up in between two castings.

2.3) If shut down is required for any break down/planned jobs, take operational clearance for shutdown for a predetermined length of time.

2.4) Proper shutdown shall be taken in consultation with electrical personnel after entering in the shut down register kept in the
respective LCSS. Switch off the feeder to power pack motors, put a tag over panel.

2.5) Release the accumulator pressure completely and isolate the main pressure lines.

2.6) Care shall be taken while opening any hydraulic line or sub assembly regarding draining of residual pressure.

2.7) Perform the planned maintenance jobs.

2.8) Electrical clearance shall be taken for trial running after switching on the power feeder of the hydraulic pump.

2.9) Close the accumulator release valves; open the pressure line isolation valves. Check the oil level in power pack reservoir and top up if required.

2.10) In front of operation personnel, trial run shall be taken after starting the hydraulic pump. (i.e, swing or ram operation)

2.11) Air lock in cylinders or pipefittings shall be released using the air release plug provided in the cylinders.

2.12) If operation of the mud gun is found okay, clearance shall be given to operation. Shut down written in the Electrical register shall be cleared.

2.13) Clear the area for any scrap generation like old oil, grease, burnt asbestos strip etc.

3) DRILLING MACHINE

3.1) Perform the weekly preventive maintenance jobs as per the checklist provided.

3.2) As Drilling machine is not a continuously running machine, smaller jobs shall be taken up in between two castings.

3.3) Any problem in the pneumatic drifter shall be attended after closing the compressed air isolation valve near control desk and disconnecting the air hoses from the drifter port.

3.4) If shut down is required for longer duration, take operational clearance for shutdown for a predetermined length of time.
3.5) Proper shutdown shall be taken in consultation with electrical personnel by entering in the shut down register kept in the respective LCSS. Switch off the feeder to power pack motors, put a tag over panel.

3.6) Release the accumulator pressure completely and isolate the main pressure lines by closing the valves.

3.7) Electrical clearance shall be taken for trial running after switching on the power feeder of the hydraulic pump.

3.8) Close the accumulator release valves; open the pressure line isolation valves. Check the oil level in power pack reservoir and top up if required.

3.9) In front of operation personnel, trial run shall be taken after starting the hydraulic pump. (i.e, swing, lift or drifter feed movements) Drifter operation shall be checked after opening the airline isolation valve.

3.10) Air lock in cylinders or pipefittings shall be released using the air release plug.

3.11) If operation of the Drilling machine is found okay, clearance shall be given to operation. Shut down written in the Electrical register shall be cleared.

3.12) Clear the area for any scrap generation like old oil, grease, burnt asbestos strip etc.

4) AIR BLOWERS

4.1) Perform the fortnightly preventive maintenance jobs as per the checklist provided.

4.2) Maintenance jobs on the stand by machine shall be done only by taking the shut down of the unit.

4.3) Jobs like oil filter cleaning/ replacement, heat exchanger cleaning etc, can be taken-up during running of Blower itself by changing over to stand by units after clearance from operation.

4.4) For all other jobs like problems in AOP/MOP/EOP, compressor gear box and coupling and air filter cleaning/replacement shut down of the unit is required.

4.5) If shut down is required for any break down/planned jobs, take operational clearance for shutdown for a predetermined length of time.
4.6) Proper shutdown shall be taken in consultation with electrical personnel by entering in the shut down register kept in the respective LCSS. Switch off the feeder to power pack motors and put a tag over panel.

4.7) Proper tools and safety appliances like ear plugs, goggles shall be used.

4.8) Perform the planned maintenance jobs.

4.9) Electrical clearance shall be taken for trial running after entering in the shut down register and switching on the power feeder to the Blower motor.

4.10) Trial running shall be carried out in front of the operation personnel.

Once the Blower is started and run for about 15min, all operating parameters shall be noted and inspected for any deviations.

4.11) If all parameters are within the limits, clearance shall be given for operation.

4.12) Clear the area for scrap generation like old filters, used oil, grease, cotton waste, sludge from heat exchanger, gasket and rubber pieces etc.

5) DUPLEX FILTERS FOR BF WATER SUPPLY

5.1) Filter cleaning shall be taken up once the differential pressure across the filter is 1 kg/cm² and backwash is not effective.

5.2) The actuator change over valve shall be lubricated and check for free operation once in every week.

5.3) Take operational clearance for shut down for a predetermined length of time for jobs like filter cleaning/replacement.

5.4) Proper shutdown shall be taken in consultation with electrical personnel. Switch off the feeder to actuator and put a tag over panel.

5.5) Isolate the filter by changing over to stand by filter, check through the vent whether filter is isolated or not.

5.6) Once the filter is isolated, maintenance job shall be carried out.

5.7) Use correct tools and tackles and safety appliances

5.8) Electrical clearance shall be taken for switching on the power feeder to the actuator.
5.9) Cleaned filter shall be taken on line by operating the actuator in presence of the operation personnel. Pressure difference across the filter shall be checked and noted. Shut down shall be cleared in the register.

5.10) The scrap generated like Old gasket, gland ropes, etc shall be cleared from the area.

6) **TUYERE STOCK ASSEMBLY**

6.1) Blowpipe cleaning shall be done during furnace is on blast itself, by removing the peephole flange and operating the peephole valve/poking by rods.

6.2) For replacement of tuyere, intermediate cooler, water hoses and cooling water pipes, etc. furnace shut down shall be taken.

6.3) Once the furnace is made off-blast for taking shut down, suitable capacity chain blocks shall be positioned at proper locations for removing blowpipe elbow assembly.

6.4) Operation clearance is a must after taking furnace in back draught, by checking the draught in all tuyeres.

6.5) Actual jobs shall be carried out once blow pipe elbow assembly is lowered like, replacement of tuyere, tuyere cooler, water hoses, blow pipe, elbow, gaskets, bridle assembly/springs, peep hole valves etc.

6.6) To fit back the blowpipe elbow assembly, chain block position shall be changed if required and proper fitment of blowpipe nose with tuyere face shall be made.

6.7) After completing the jobs, list the jobs, which could not be taken-up due to non-availability of spares, etc. and inform the same to the concerned.

6.8) Until the hot blast air is taken to furnace, chain blocks shall not be removed from the position.

6.9) Clearance shall be given to start the furnace once all the jobs completed are cross checked.

6.10) Check for any blast leakage from seatings when wind volume is around 6,000 Nm$^3$/hr. If minor leakage is observed, it shall be arrested by tightening the locks or hammering the wedges. For major leakages,
again furnace is made off-blast and leakage shall be arrested by removing the blowpipe and fitting again.

6.11) If no blast leakage is observed, clearance shall be given for operation to increase the windblast to furnace.

6.12) All tools tackles and scrap generated shall be cleared from the area.

7) CONVEYORS:

7.1) Perform the preventive maintenance jobs as per the checklist provided.

7.2) Conveyor shall be inspected during running. Jobs to be taken up shall be listed before taking shut down of the conveyor. Side travel adjustment shall be done during conveyor running only.

7.3) If shut down is required for any breakdown/planned jobs, take operational clearance for shut down for a pre-determined length of time.

7.4) Proper shut down shall be taken in consultation with Electrical personnel after entering in the shut down register. Put off the power supply feeder to motor and put a tag over the panel.

7.5) For jobs inside the discharge chute, dusty areas, they shall be cleaned with water or compressed air as required.

7.6) For rubber lagging of conveyor pulleys or jobs of bearing, plummer block, counter weight in take-up shall be lifted using manual winch, after locking the belt using clamps at suitable positions. Once counter weight is lifted to get the required belt loop, lock the winch arm to stationary member, so as the counter weight does not get lowered automatically. The pulley on which lagging shall be provided shall be made free by lifting the belt.

7.7) For making new belt joint (in case of damage to old joint) counter weight in take-up shall be lifted so as to get correct overlap for making new splice joint. Idler brackets shall be removed at the place of belt splicing on the stringer table. Suitable platform shall be provided for placement of vulcanizing machine.

7.8) Perform the planned jobs.

7.9) Idler brackets shall be fitted back along with idlers before removing the belt clamps one after the other starting at the right place.
7.10) Once all the belt clamps are removed, take-up counter weight shall be lowered slowly.

7.11) Ensure that 2-3m extra rope is unwound from the winch manually after all the counter weight load is transferred to belt.

7.12) Ensure that all tools/tackles/pulley blocks etc. are kept away from the conveyor and all workmen are evacuated away from the conveyor belt.

7.13) Electrical clearance shall be taken for trial running of the conveyor.

7.14) During trial run of the conveyor, inspection shall be done from head end to tail end for any abnormalities.

7.15) If all running parameters are found okay, operation clearance shall be given after clearing the shut down register.

7.16) All the tools tackles and the scrap generated like rubber pieces, cotton waste, grease, old rollers, shall be removed from the place.

8) EOT CRANES

8.1) Perform the weekly preventive maintenance jobs as per the check list provided.

8.2) If shut down is required, take operational clearance for a predetermined length of time.

8.3) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register. Put off the feeder to primer mover and put a tag over panel.

8.4) Perform the planned maintenance jobs.

8.5) After completing the jobs clear all the tools and tackles from near the equipments.

8.6) Clearance shall be given by entering in the Electrical shut down register and switching on the feeder.

8.7) Trial run shall be taken in front of operation personnel. Check for any abnormal sound or vibration.

8.8) If everything is within norms, clearance shall be given for operation.

8.9) Scrap generated like old wire rope, grease, oil, brake shoes, shall be remove from the area.

9) PIG CASTING MACHINE

9.1) Daily lubrication and inspection job shall be carried out. Perform the weekly preventive maintenance jobs as per the checklist provided.

9.2) If shut down is required for any breakdown/planned jobs, take operational clearance for a predetermined length of time.
9.3) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register. Put off the feeder to primer mover and put a tag over panel.

9.4) Perform the planned maintenance jobs.

9.5) After completing the jobs clear off all the tools and tackles from near the machine.

9.6) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

9.7) Trial run shall be taken in front of operation personnel. Check for any abnormal sound or vibration during trial run.

9.8) If everything is within norms, clearance shall be given for operation.

10) ELECTRICALLY OPERATED WINCHES

10.1) Perform the weekly preventive maintenance jobs as per the checklist provided.

10.2) If shut down is required for any breakdown/planned jobs, take operational clearance for shut down for a predetermined length of time.

10.3) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register. Put off the feeder to primer mover and put a tag over panel.

10.4) Perform the planned maintenance jobs.

10.5) After completing the jobs clear off all the tools and tackles from near the equipment.

10.6) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

10.7) Trial run shall be taken in front of operation personnel. Check for any abnormal sound or vibration during trial run.

10.8) If everything is within norms, clearance shall be given for operation.

11) AIR COMPRESSORS

11.1) Perform the fortnightly preventive maintenance jobs as per the checklist provided.

11.2) Maintenance jobs on stand by Compressor (which is not running) shall be done only after taking shut down.

11.3) If shut down is required for any breakdown jobs/ take operational clearance for shut down for a predetermined length of time.

11.4) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to primer mover and put a tag over panel.
11.5) Perform the planned maintenance jobs.
11.6) After completing the jobs clear off all the tools and tackles from near the equipment.
11.7) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.
11.8) Trial run shall be taken in front of operation personnel. Check for any abnormal sound or vibration during trial run.
11.9) If everything is within norms, clearance shall be given for operation.

12) STOVE VALVES

12.1) Perform the fortnightly preventive maintenance jobs as per the checklist provided for all the valves.
12.2) If shut down is required for any breakdown or planned jobs, take operational clearance for shut down for a predetermined length of time.
12.3) Ensure that stove is in isolation mode before taking up any major jobs.
12.4) For any jobs on gas line valves, ensure that individual stove goggle valve is closed completely and the gas line is purged with steam.
12.5) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to actuator and put a tag over panel.
12.6) Perform the planned maintenance jobs.
12.7) After completing the jobs clear off all the tools and tackles from near the valve.
12.8) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.
12.9) Trial run shall be taken in front of operation personnel and all the parameters shall be checked by operating 2-3 times. Check for any abnormal sound or vibration during trial run.
12.10) If everything is within norms, clearance shall be given for operation.

13) ----

14) HYDRAULIC POWER PACKS

14.1) Perform the weekly/fortnightly preventive maintenance jobs as per the checklist provided.
14.2) During normal running of the furnace, only stove hydraulic power pack shall be in continuous operation. Power pack of Mudgun/Drilling machine is available for maintenance in between casting. Dust catcher and GCP Goggle valve power packs shall be available for maintenance any time.

14.3) If shut down is required for any breakdown/planned jobs, take operational clearance for shut down for a predetermined length of time.

14.4) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to pump and put a tag over panel.

14.5) Before taking up the maintenance jobs, oil from the accumulators shall be drained completely.

14.6) Perform the breakdown/planned maintenance jobs.

14.7) After completing the jobs clear off all the tools and tackles from near the equipment.

14.8) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

14.9) Trial run shall be taken in front of operation personnel by checking all the operating parameters. Check for any abnormal sound or vibration from the pump during trial run.

14.10) If everything is within norms, clearance shall be given for operation.

15) TOP CHARGING EQUIPMENTS

15.1) Top charging equipments consist of big bell, small bell, bell lever, pulley block, stock level indicators, wire ropes, grease feed points of Centralized Lubrication System, furnace charging & rotating chute.

15.2) During normal running of the furnace only visual inspection shall be done for top charging equipments. As the BF top is prone to high concentration of BF gas, gas safety measures to be taken.

15.3) Perform the monthly preventive maintenance jobs during monthly planned shut down as per the checklist provided.

15.4) For any breakdown/planned jobs of top charging equipments furnace shut down shall be taken.

15.5) Proper shut down of the equipment shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to pump and put a tag over panel.
15.6) For replacement/inspection of stock rod counter weights furnace shall be taken on back draught before starting the job.

15.7) Perform the breakdown/planned maintenance jobs.

15.8) After completing the jobs clear off all the tools and tackles from near the equipment.

15.9) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

15.10) Trial run shall be taken in front of operation personnel by checking all the operating parameters. Check for any abnormalities during trial run.

15.11) If everything is within norms, clearance shall be given for operation.

16) CENTRALISED LUBRICATION SYSTEM

16.1) Perform the weekly preventive maintenance jobs as per the checklist provided for grease points in around winch house.

16.2) For grease points at BF top, inspection/maintenance shall be done only during planned shut down maintenance.

16.3) As maintenance personnel will operate the CLS once in every shift for about 10-15 min. any break down/planned jobs can be taken up without operational clearance.

16.4) If shut down of the pump is required, proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to pump motor and put a tag over panel.

16.5) Perform the planned maintenance jobs.

16.6) After completing the jobs clear off all the tools and tackles from near the equipment and clean the equipment/surroundings.

16.7) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

16.8) Trial run shall be taken and check all the operating parameters. Check for any abnormal sound or vibration during trial run of the pump. Ensure that all dose feeders are discharging correct quantity of grease.

If everything is within norms, the system is ready for operation.

17) ----

18) THICKENERS, SLUDGE AGITATORS AND FLASH MIXERS

18.1) Perform the fortnightly preventive maintenance jobs as per the checklist provided.
18.2) Maintenance jobs on stand by unit (which is not running) shall be done only after taking shut down from the operation personnel.

18.3) If shut down is required, take operational clearance for shut down for a predetermined length of time. Minimum shut down duration for the running drive unit shall be taken as delayed shutdown will lead to precipitation of slurry.

18.4) For longer shut down of the unit the tanks shall be drained off all the slurry and filled with water.

18.5) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to primer mover and put a tag over panel.

18.6) Perform the planned maintenance jobs.

18.7) After completing the jobs clear off all the tools and tackles from near the equipment.

18.8) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

18.9) Trial run shall be taken in front of operation personnel by checking all the operating parameters. Check for any abnormal sound or vibration during trial run.

18.10) If everything is within norms, clearance shall be given for operation.

19) PUGMILL

19.1) Perform the weekly preventive maintenance jobs as per the checklist provided.

19.2) As Pug mill is not continuous running equipment, small maintenance jobs shall be taken up when the machine is free. If shut down is required for any breakdown/planned jobs, take operational clearance for shut down for a predetermined length of time.

19.3) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to primer mover and put a tag over panel.

19.4) Perform the planned maintenance jobs.

19.5) After completing the jobs clear off all the tools and tackles from near the equipment.

19.6) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

19.7) Trial run shall be taken in front of operation personnel by checking all the operating parameters. Check for any abnormal sound or vibration during trial run.

19.8) If everything is within norms, clearance shall be given for operation.
20) SCREENS AND VIBROFEEDERS

20.1) Perform the monthly preventive maintenance jobs as per the checklist provided.

20.2) If shut down is required for any breakdown/planned jobs, take operational clearance for shut down for a predetermined length of time.

20.3) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to exciter and put a tag over panel.

20.4) Perform the planned maintenance jobs.

20.5) After completing the jobs clear off all the tools and tackles from near the equipment.

20.6) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

20.7) Trial run shall be taken in front of operation personnel by checking all the operating parameters. Check for any abnormal sound or vibration during trial run.

20.8) If everything is within norms, clearance shall be given for operation.

21) RAW MATERIAL CHUTES & WEIGH HOPPERS

21.1) Perform the monthly preventive maintenance jobs as per the checklist provided.

21.2) If shut down is required for any repair jobs, take operational clearance for shut down for a predetermined length of time.

21.3) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. For working inside the raw material chute, the respective conveyor feeder shall be put off. For working inside the weigh hopper the respective screen feeders shall be put off and put a tag over panel.

21.4) Before starting the job cleaning of the chute/ weigh hopper shall be done with compressed air or fire water as required.

21.5) Perform the planned maintenance jobs.

21.6) After completing the jobs clear off all the tools and tackles from inside the chute/hopper.

21.7) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

21.8) If required, trial run shall be taken in front of operation personnel for smooth operation.

21.9) If no problems are noticed, clearance shall be given for operation.
22) COMBUSTION AIR FANS

22.1) Perform the weekly preventive maintenance jobs as per the checklist provided.

22.2) Maintenance jobs on stand by CA fan (which is not running) shall be done only after taking shut down.

22.3) If shut down is required for any breakdown/planned jobs, take operational clearance for shut down for a predetermined length of time.

22.4) Proper shut down shall be taken in consultation with Electrical personnel by entering in the shut down register kept in the respective LCSS. Put off the feeder to primer mover and put a tag over panel.

22.5) Perform the planned maintenance jobs.

22.6) After completing the jobs clear off all the tools and tackles from near the equipment.

22.7) Clearance shall be given by entering in the Electrical shut down register first and switching on the feeder.

22.8) Trial run shall be taken in front of operation personnel. Check for any abnormal sound, bearing heating or vibration during trial run.

22.9) If everything is within norms, clearance shall be given for operation.

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INSTRUMENTATION AND CONTROL

ELECTRICAL ACTUATORS

1. Take operation department clearance for attending the problem on the equipment.
2. Inform electrical dept. to put off the supply to motor & lock the isolator.
3. Enter shutdown in the electrical log book.
4. At local station the switch should be put in “OFF” condition & press the emergency push button.
5. Inform mechanical dept. for additional manpower if required.
6. Required tools:
   - Spanner set
   - Allen key set
   - Multimeter
   - Screw driver & tester
   - Chain ratchet & slings
   - Pipe wrench
   - Maintenance manual
   - Required spares
7. Physical observation at the location:
   - Check the motor temperature normal / abnormal.
   - Visual checking of all cables.
   - Check Actuator mounting bolts.
   - Check for loose cable terminations.
8. Identify the nature of the problem & arrange for related spares.
9. Attend the problem as per check list.
10. After rectifying / attending the problem inform the electrical dept. to put on the supply for the motor & enter in their log book and clear the shutdown.
11. At local control station put the switch in local operation mode & release the emergency push button.
12. In case of ON/OFF actuators check the valve for OPEN/CLOSE condition and related feedbacks in the control.
13. In case of modulating actuators, check the valve for different percentage output & corresponding feedback.
14. During this check up, inform electrical person to observe the current of the motor.
15. If all the checks are normal, put the switch in remote mode at LCS station and give clearance to Operation dept. to start the unit.
16. Observe the operation of the equipment.
17. Make proper covering to avoid dust & water entry.
SENSORS

1. Take clearance from operation Dept. for working on the instrument.
2. Confirm that control command for the particular conveyor is released from control VDU & as well at PLC.
3. If the conveyor is running and status is not okay proceed to field with the following tools.
   - Spanner
   - Multimeter
   - Screwdriver
   - Maintenance manual
   - Required spares

4. At field the following physical observations to be made.
   - Speed transmitter, supply is ‘ON’.
   - Conveyor is running at the rated speed.
   - The gap between the sensor & strike should be minimum (about 8mm).

5. If the above observations are okay take shutdown on the particular conveyor.
6. At LCS (Local Control Station) put the toggle switch in ‘OFF’ condition with emergency push button pressed.
7. Check speed sensor and transmitter as per check list. Asses the nature of problem. If the problem is minor rectify in field itself. If the problem is major and time consuming, replace the unit with the spare one.
8. Once problem is rectified give clearance to Operation dept. for starting the conveyor in local mode after putting the LCS switch in local & release the emergency push button.
9. Start conveyor in local mode and observe the status of the speed switch. If status is okay and steady stop the conveyor and put the selector switch is remote mode and give clearance to Operation Dept. to start the conveyor in remote mode.
10. Call the concerned operator for assistance from mech/operation side.

CHUTE JAM SWITCHES

1. Take clearance from Operation dept. for working on the equipment.
2. Call the concerned operator for assistance from mech/operation dept.
3. Conveyor pull cord switch to be activated for ‘OFF’ condition.
4. Upstream & Downstream conveyors isolaters should be made OFF.
5. Tools required:
   - Adjustable screw spanner.
   - Medium size pipe wrench.
   - Multimeter
   - Screwdriver
   - Maintenance manual.
6. Physical observation
   - Look for any material collection inside the chute and around the probe. If so, ask the operator to clear it.
   - Ensure Transmitter power supply is ‘ON’.
   - Check Inter connecting cable between sensor and transmitter is okay and not damaged.
   - Check for loose termination at both the ends.

7. Check the sensor and transmitter as per check list.
8. Simulate the switch status physically and check its response.
9. Identify the nature of fault and rectify or replace.
10. Give clearance to the Operation Department.

LEVEL SWITCHES (FINE BUNKERS)
Capacitance & vibration type

1. Take clearance from operation Dept. for working on the equipment.
2. Call the concerned operator for assistance from mech/operation dept.
3. Tools required:
   - Adjustable screw spanner.
   - Medium size pipe wrench.
   - Multimeter
   - Screw driver
   - Maintanence manual.

4. Physical observation:
   - Ensure Transmitter supply is ‘ON’
   - Interconnecting cable is okey.
   - Check Termination at both the ends.
   - Check for material collection over the probe and that no material falling on the probe.

5. Identify the nature of problem rectify/replace.
6. Check the semor & transmitter as per the check list.
7. Give clearance to Operation Dept..

PNEUMATIC ACTUATORS

1. Take operation clearance for attending the problem on the equipment.
2. Inform mechanical department for additional manpower if required.
3. Required tools.
   - Spanner set
   - Allen key set
   - Pipe wrench
   - Chain rachet
• Multimeter
• Screwdriver
• Required spares

4. Physical observation
• Check air pressure is adequate.
• Check air leakage in the main air line, actuator tubes and ensure all isolation valves are in open condition.
• Check for visible damages to the cables
• Check for loose termination.

5. Identify the nature of the problem and requirement of spares
6. Attend the problem as per check list.
7. Check the valve operation in local mode by energising the solenoid valves for ON/OFF valves and check the feedbacks in the control.
8. Check the modulating valves by feeding the signals from signal generator and check the operation of the valve for different outputs (percentage) and corresponding feedback.
9. Give clearance to Operation department observe the operation of the equipment.

BOILER FLAME IGNITOR / SENSOR

1. Take operational clearance for working on the equipment.
2. Plan for adequate manpower
3. Tools required :
   • Screw spanners
   • Double end spanners
   • Screw drivers
   • Emery paper
   • Multimeter
   • Allen key set
   • Hand gloves
   • Safety goggles

4. Isolate LPG / air / oil connections.
5. Switch off power supply to the controller.
6. Carry out preventive maintenance as per check list.
7. Restore power supply LPG / air / oil supply.
8. Test the unit externally for ‘flame in’ indication. If faulty rectify / replace the unit.
10. Give operational clearance.
ELECTRICALLY OPERATED VALVES

1. Take Operation department clearance for attending the problem on the equipment.
2. Inform Electrical dept. to put off the supply to motor & lock isolator.
3. Enter shutdown in the electrical log book.
4. At local station the switch should be put in “OFF” condition & press the emergency push button.
5. Inform mechanical dept. for additional manpower if required.
6. Required tools
   - Spanner set
   - Allen key set
   - Multimeter
   - Screw driver & tester
   - Chain ratchet & slings.
   - Pipe wrench
   - Maintenance manual
   - Chain pulley block
   - Required spares

7. Decouple the actuator with gearbox, from the valve after noting their corresponding position.
8. Identify the problem and spares required.
9. Attend the problem as per check list.
10. Mount the actuator with gear box on to the valve in the original position.
11. After rectifying / attending the problem inform the electrical dept. to put on the supply for the motor & enter in the log book clearing the shutdown and inform operation dept.
12. In case of ON / OFF actuators check the valve for OPEN / CLOSE condition and related feedback in the control.
13. In case of modulating actuators, check the valve for different percentage output and corresponding feedback.
14. During this check up inform electrical to observe the current of the motor.
15. If all the checks are normal put the switch in remote mode at LCS station and give clearance to operation Dept. to start the unit.
16. Check the operation of the valve.

PNEUMATIC OPERATED VALVES

1. Take operation clearance for attending the problem on the equipment.
2. Inform mechanical department for additional manpower if required.
3. Required tools.
   - Spanner set
   - Allen key set
Pipe wrench
Chain ratchet
Multimeter
Screwdriver
Required spares

4. Isolate the air supply & power supply for the actuator.
5. Decouple and remove the actuator from the valve after noting down their corresponding position.
6. Identify the nature of the problem and requirement of spares
7. Attend the problem as per check list.
8. Mount the actuator on the valve in the original position.
9. Restore air and power supply.
10. Check the valve operation in local mode by energising the solenoid valves for ON/OFF valves and check the feedbacks in the control.
11. Check the modulating valves by feeding the signals from signal generator and check the operation of the valve for different outputs (percentage) and corresponding feedback.
12. Give clearance to Operation department observe the operation of the equipment.

UPS

1. Take operational department clearance for attending the problem on the unit.
2. Arrange for adequate manpower
3. Tools required:
   • Vacuum cleaner
   • Multimeter
   • Brush
   • Required spares/cards
   • Screw driver set
   • Ups manual

4. Switch Off/On the UPS as per the sequence mentioned in the UPS manual.
5. Clean the panels and cards with vacuum cleaner/brush
6. Tighten all the cable connectors/terminals.
7. Restore the power supply & switch on each unit step by step as per manual.
8. Check voltages at various test points & compare with respect to standard values.
9. If there is any variation in voltage check, rectify or replace the required unit.
10. Check the I/P, O/P & battery voltages from the panel meters.
11. Transfer the load on the working UPS.
12. Check the load current.
13. Changeover the load in case redundant unit is available and ensure changeover is bumpless.
14. Check the variation in the load current.
15. Give operational clearance.
BATTERY MAINTAINENCE

1. Arrange adequate manpower.
2. Tools required:
   - Hydrometer
   - Multimeter
   - Brush
   - Screw driver
   - Spanner
   - Consumables
   - Rubber hand gloves /apron
   - Safety goggles

3. Clean the battery terminals.
4. Ensure terminal tighteness.
5. Check the water level & top up if required.
6. Check the specific gravity.
7. Check battery voltages.
8. Note down the battery voltage and battery charge/discharge current from the ups panel meters.

MASTERPIECE / MASTERVIEW

1. Take clearance from Operation dept.
2. Plan for adequate manpower.
3. Tools required:
   - Covering tool
   - Screw driver set
   - Allen keys
   - Multimeter
   - Torch
   - ABB manuals & spares as required.

4. Note down the card numbers sequentially.
5. Stop the CPU’s.
6. Switch off the bulk power supply.
7. Remove the cards one by one.
8. Clean the cards with vaccum cleaner/ fine brush.
9. Check the address & switch settings of the individual cards.
10. Clean the racks / panel with vaccum cleaner/fine brush.
11. Tighten all the cable connectors / terminals.
12. Put back the cards in their original slots.
13. Power on the BPS & check input/output voltages at various test points.
14. Initialise the CPU’s
15. Get the software loaded.
16. Check for any faults on the cards, if any rectify/replace cards.
OXYGEN ANALYSER

1. Take clearance from operation department.
2. Arrange adequate manpower.
3. Tools required:
   - Spanner set
   - Screw driver
   - Emery paper
   - Multimeter
   - Hand gloves
4. Switch off the controller power supply.
5. Disconnect the electrical connections pertaining to the probe.
6. Loosen the nuts on the flange and remove the measuring cell.
7. Clean & emery the external protection tube.
8. Check fuses & their ratings in the controller.
9. Check the cable termination & tightness in the controller TB.
10. Put back the analyser probe in its place & ensure the tightness of the nuts & bolts.
11. Restore power supply.
12. Check the status list in the controller unit.
13. Check whether the mV generated by the cell is within the usual range of –45 mv to 267 mv.
14. If not rectify/replace the unit.
15. Give clearance to operation department.

WEIGH HOPPER CALIBRATION

1. Arrange suitable & adequate manpower avail interdepartmental help, if required.
2. Take operational clearance for working on the equipment.
3. Ensure weigh hopper is empty.
4. Tools required:
   - 5T capacity jack 2 No’s.
   - Standard weights
   - Multimeter / Screwdriver
   - Spanner set
   - Spares as required
   - Equipment maintenance manual
5. Carry out the calibration job as per the manual & equipment check list.
6. Give clearance for operation.

BELT WEIGH SCALE CALIBRATION

1. Arrange suitable & adequate manpower avail interdepartmental help if required.
2. Take operational clearance for working on the equipment.
3. To work on loadcell, weigh cradle etc take electrical shutdown and lock the isolator.
4. Tools required

- Spanner set
- Allen key set
- Multimeter & screw driver
- Standard weight & pawn
- Spares as required
- Equipment service manual for reference.

5. Carry out the calibration job as per the manual & equipment check list.
6. Give clearance for operation.

**WEIGH BRIDGE**

1. Assess the nature of the work to be done preventive/ emergency/ breakdown.
2. Arrange suitable & adequate manpower avail interdepartmental help if required.
3. Take operational clearance for working on the equipment.
4. Ensure there is no material on the platform & digitizer is showing zero.
5. Tools required
   - Spanner set
   - Allen key set
   - Multimeter & screw driver
   - Standard weight
   - Spares as required
   - Equipment service manual for reference

6. Carry out the calibration job as per the manual & equipment check list.
7. Calibrate the weighbridge using standard weight.
8. Give clearance for operation.

**STOVE DOME / COMBUSTION AIR THERMOCOUPLE**

1. Assess the nature of the work to be done preventive/ emergency/ breakdown.
2. Arrange suitable & adequate manpower avail interdepartmental help if required.
3. Take operational clearance for working on the equipment.
4. Ensure stove is in isolation mode & chimney valve is opened.
5. Tools required:
   - Hand gloves
   - Spanner set
   - Multimeter
   - Codetector
   - Screw drivers
   - Spares
6. Check T/C as per check list.
7. Give clearance for operation.

**HBT & OTHER RTD/TC’S**

1. Assess the nature of the work to be done preventive/ emergency/ breakdown.
2. Arrange suitable & adequate manpower avail interdepartmental help if required.
3. Take operational clearance for working on the equipment
4. Ensure hot blast / main line is depressurised.
5. Tools required:
   - Hand gloves
   - Spanner set
   - Multimeter
   - CO detector
   - Screw drivers
   - Spares
6. Check RTD / TC as per check list.
7. Give clearance for operation.

**SOLENOID VALVE**

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help, if required.
3. Take operational clearance for working on the equipment.
4. Ensure line is depressurised & isolation valve is closed.
5. Tools required:
   - Spanner set
   - Allen key set
   - Multimeter & screw driver
   - Spares as required
   - Equipment catalogue
6. Check the instrument as per check list.
7. Give clearance for operation.

**TRANSMITTERS PT/DPT/FT**

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help, if required.
3. Take operational clearance for working on the equipment.
4. Ensure line is depressurised & isolation valve is closed
5. Tools required:
   - Spanner set
   - Allen key set
- Multimeter & screw driver
- C.O detector
- Torch
- Equipment maintenance manual
- Spares as required.

6. Carry out the calibration job as per the manual & equipment check list.
7. Give clearance for operation.

**PR./DP. SWITCH**

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help, if required.
3. Take operational clearance for working on the equipment.
4. Ensure line is depressurised & isolation valve is closed
5. Tools required:
   - Spanner set
   - Allen key set
   - Multimeter & screw driver
   - C.O detector
   - Torch
   - Equipment maintenance manual
   - Spares as required.
6. Carry out the calibration job as per the manual & equipment check list.
7. Give clearance for operation.

**PRESSURE / DP / VACCUm GUAGES**

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help, if required.
3. Take operational clearance for working on the equipment.
4. Ensure line is depressurised & isolation valve is closed
5. Tools required:
   - Spanner set
   - Allen key set
   - Multimeter & screw driver
   - C.O detector
   - Torch
   - Equipment maintenance manual
   - Spares as required.
6. Carry out the calibration job as per the manual & equipment check list.
7. Give clearance for operation.
CONTROLLERS & INDICATORS

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help if required.
3. Take operational clearance for working on the instrument.
4. Tools required:
   - Spanner set
   - Multimeter & Screwdriver
   - Contact cleaner
   - Torch
   - Spares as required
   - Maintenance manual
5. Assess the problem, check all the contacts & terminals.
6. Check the I/P signal coming from the field, if it is ok proceed as per check list & maintenance manual
7. If the I/P signal is not proper check the sensor in the field rectify / replace.
8. Simulate the signals & check all parameters.
9. Operate the drives, check the O/P’s on indicators / controllers.
10. Give clearance for operation.

CAPACITANCE / CONDUCTIVITY TYPE LEVEL SWITCHES

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help if required.
3. Take operational clearance for working on the instrument.
4. Check sump / bin levels.
5. Tools required:
   - Spanner set
   - Multimeter & screwdriver
   - Pipe wrench
   - Maintenance manual
   - Required spares.
6. Carry out the job as per the check list / maintenance manual.
7. Ask operator to start the equipment check the interlocks & feedback.
8. Give clearance for operation.

PH METER/ CONDUCTIVITY METERS

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help if required.
3. Take operational clearance for working on the instrument.
4. Tools required
   - Multimeter
- Screw driver
- Spanner set
- Hand gloves
- Safety goggles
- Tissue paper
- Distilled water
- Spares as needed
- Maintenance manual

5. Switch off the power supply.
6. Unscrew the sensor
7. Check for any physical damage.
8. Clean it with tissue paper & distilled water.
9. Check the cable terminations at the sensor & transmitter end.
10. Check the conductivity /Ph of the fluid & cross check it with standard solutions.
11. Adjust the zero & span setting if needed.
12. Recheck the level.

**EXTERNAL LIMIT SWITCHES**

1. Assess the nature of the work to be done preventive / emergency / breakdown.
2. Avail interdepartmental help if required.
3. Take operational clearance for working on the instrument.
4. Ensure there is a proper approach.
5. Tools required:
   - Spanner set
   - Allen key set
   - Multimeter & Screwdriver
   - Contact cleaner
   - Torch, hand gloves
   - Spares as required
6. Check all the contacts & terminations, clean them.
7. Operate the switch manually, see whether contact are changing.
8. Carry out the job as per check list
9. Operate the drive, set the switch as per operation requirement.
10. Give clearence for operation.

**WEIGH HOPPER GATE ACTUATOR**

1. Asses the nature of the work to be done preventive / emergency / breakdown.
2. Arrange suitable and adequate manpower avail interdepartmental help, if required.
3. Take operational clearance for working on the equipment.
4. Ensure hopper is empty
5. Take electrical shutdown & ensure isolator is switched off & locked, enter shutdown in electrical log book.
6. Put off local stop push button.
7. Tools required:
   - Spanner set
   - Hammer & Allen key set
   - Multimeter & Screwdriver
   - Grease, gear box oil.
   - Chain pully block / rope.
   - Equipment spares required
   - Equipment maintenance manual
8. Carry out the job as per the equipment check list
9. After completing maintenance, check the valve operation in the presence of operation personnel

**CHIMNEY VALVE ACTUATORS**
**DRIVE NO. 221, 222, 241, 242, 261, 262.**

1. Asses the nature of the work to be done preventive / emergency / breakdown.
2. Arrange suitable & adequate manpower, avail interdepartmental help, if required.
3. Take operational clearance for working on the equipment.
4. Ensure stove is in isolated mode.
5. Take Electrical shutdown & ensure Isolator is switched off & locked, enter shut down in electrical log book.
6. Put off local stop push button.
7. Tools required:
   - Spanner set, double end & box
   - Allen key set
   - Multimeter / Screw driver
   - Chain pully block / rope.
   - Grease
   - Equipment spares as required
   - Equipment maintenance manual for reference
8. Carry out the job as per the equipment check list.
9. After completing maintenance, check the valve operation in the presence of operations personnel.

**CAPTIVE POWER PLANT**

1. The instructions indicated are for guidance purpose only and not exhaustive.
2. All the equipments in CPP like Pumps, Fans, Turbine, Generator, HT and LT switch gear Lighting circuits, Relay and Control panels etc. shall be maintained by the
agency as per the Maintenance procedure / Checklists recommended by the OEMS. These information would be available in department and agencies can refer the same before submitting their offer.

I. DM PLANT OPERATION:

01. Check the Raw water tank level
02. Start the Raw water pump
03. Back wash the MGF bed and take on service
04. Back wash the ACF bed and take on service
05. Take SAC in service after attending the following:
   - Backwash the bed
   - Prepare the Hydrochloric Acid solution
   - Inject the solution to the bed
   - Carry out the slow rinse
   - Carry out the fast rinse
   - Take the bed into service
06. Maintain the De-gasser tank level
07. Start the De-gas blower
08. Start the De-gas water pump
09. Take SBA in service after attending the following:
   - Backwash the bed
   - Prepare the Caustic Soda solution
   - Inject the solution to the bed
   - Carry out the slow rinse
   - Carry out the fast rinse
   - Verify the water parameters like pH, Conductivity
   - Take the bed into service
10. Take MB in service after attending the following:
    - Backwash the bed
    - Prepare the Caustic Soda solution
    - Inject the solution to the bed
    - Prepare the Hydrochloric Acid solution
    - Inject the solution to the bed
    - Carry out the slow rinse
    - Carry out the fast rinse
    - Carry out the air mixing by starting the air blowers
    - Check the water parameters like pH, Conductivity
    - Take the bed into service
11. Allow the MB outlet water to DM storage tank
12. Start the Chemical dosing pump based on the water parameters
13. Start the DM water pump
14. Inform to control room about the readiness of DM water
II. BOILER OPERATION:

1. Ensure that DM water tank is full
2. Fill the Deaerator and Boiler drum to normal level
3. Keep running DM transfer pump on re-circulation
4. Check burner and fuel oil filter condition clean if required
5. Check for sufficient fuel oil levels in day tank/main tank
6. Run ID and FD fans and maintain the required furnace draft
7. Ensure the Instrument air compressed air pressure at required level
8. Open superheater drains and drum vent fully and start-up vent by 5%
9. Run fuel oil system and ensure the adequate pressure at burner end as per the following steps:
   - If LDO is to be taken
     - Start the fuel oil pump
     - Maintain the required header pressure
   - If FO is to be taken
     - Start the fuel oil pump
     - Maintain the required header pressure
     - Start the tank pre-heater
     - Start the on-line oil heaters
     - Ensure the required oil temperature
10. Check the availability of LPG and charge the same
11. Purge the oil burner and take LPG ignitor gun in service
12. Light up the Boiler by taking permission from control room, maintain the required oil pressure, furnace draft after igniting.
13. Ensure the water level of Cooling tower sump, start the CW pumps, run the Boiler Feed Pump
14. Close all the vents of Boiler after the drum pressure reaches to 2 kg/cm², open the start up vent by 25%
15. Maintain furnace draft, drum level and deaerator level as per requirement throughout the period Boiler is in operation
16. Charge the Blast Furnace Gas to the Boiler by opening the goggle valve

III. PRDS OPERATION:

01. As soon as the Boiler attains required steam pressure and temperature open the main steam drain valve followed by operating the Main steam by-pass valve fully

02. Keep open the PRDS header drain valves fully and PRDS pressure control valve by 25%

03. When the PRDS temp. reaches to 200 deg.C. open the Boiler main steam valve fully followed by closing the main steam by-pass valve fully

04. After attaining the main steam pressure to the required level take PRDS into service and maintain the required PRDS steam temperature and pressure

IV. TURBINE OPERATION:

01. Ensure AOP and EOP auto start interlock is healthy and check that MOT level is 55% minimum
02. Run AOP and check that required lube oil pressure is available at bearings and governor
03. Engage turning gear and start the turning gear motor
04. Ensure cooling water circulation is in line for Condenser, Lube oil cooler and Generator cooler
05. Take CEP in service and maintain hotwell level in the required range
06. Charge the PRDS steam to glands of Turbine
07. Charge the PRDS steam to ejector system, open ejector steam drain valve, hogger ejector silencer drain valve. Open the hogger ejector steam valve and air valve to build up the vacuum. Ensure the required vacuum is achieved
08. Start the chest heating and rolling of Turbine as mentioned below:
   - If Turbine is being cold start, maintain main steam pressure between 25 to 30 kg/cm² and temperature >300 deg.C otherwise for hot start, maintain steam parameters same as it was before tripping of the turbine
   - Once vacuum achieved >-0.6 kg/cm², open turbine side main steam line drains following by opening of turbine by-pass valve fully
   - Carry on heating till main steam temperature in the turbine gauge board is 250 deg. C.
   - Reset the Turbine from control room open the Emergency Steam Valve
   - Keep the Turbine in chest heating for 40 mts. If it is cold start otherwise for 10 mts. And open the main steam valve fully followed by closing the by-pass valve
   - After chest heating is complete, start rolling the turbine upto 500 rpm for 10 to 15 mts., 1800 rpm for 10 to 15 mts. And then roll the Turbine to required full speed
09. Stop AOP after attaining above 5000 rpm, ensure the required steam pressure, steam temp and vacuum being maintained.

10. Maintain boiler parameters during loading by increasing fuel flow/closing start-up vent valve. Contrl main steam temperature by controlling the de-superheater control valve as per the requirement.

V. SHUTDOWN OF BOILER AND TURBINE

TURBINE:

01. Synchronise the Turbine with MESCOM Power supply and make the load zero on Turbo-Generator
02. Tripe the Turbine either locally or manually
03. Close the main steam valve
04. Isolate the ejector and break the vacuum
05. Keep AOP and Turning Gear on
06. Keep open all the steam drains of Turbine
07. Stop the Cooling water pumps and cooling tower fans if not required

BOILER:

01. Cut off the fuel either by closing the fuel oil valve or by giving burner stop command
02. Stop the fuel oil system
03. Close the BFG control valve
04. Close the main steam valve
05. Isolate PRDS by closing the corresponding valves
06. Keep running ID and FD Fans for 5 to 10 mts. and stop later
07. Maintain the drum water level as long as the Boiler is hot
08. Keep open all the vents and drains of Boiler as and when the steam pressure reduced to < 5 kg/cm$^2$
09. Stop the DM Plant and other auxiliary pumps

VI. BOILER MAINTENANCE

(Boilers have to be stopped after 45-60 days of continuous operation depending upon flue gas temperature and maintenance works as per following general guidelines have to be carried out within shortest possible time)

01. Shut down of Boiler shall be arranged in consultation with the Operation, Electrical, I & H
02. Boiler shall be allowed to cool down to atmosphere temperature and check for CO by using CO monitor
03. Open the man holes/inspection holes
04. Clean/remove scales/dust formation/clinker on the Boiler tubes with the use of wire brushes, compressed air. Check up for refractory damages for repairing if required. Remove all debris/dust from inside Boiler furnace
05. Check soot blower movement/rotation if any obstruction rectify
06. Check furnace bank tubes and burner throat, remove debris/dust/scaling etc.
07. Clean Economizer tubes/remove dust by blowing compressed air/ by using wire brush
08. Clean APH tubes inside by brush/flexible shaft driven brush/compressed air
09. Remove all loose mud, dust & maintain housekeeping in and around the Boiler
10. Check BFG seal pot by flushing the system
11. Check the components one by one as per the enlisted shut down jobs/as per check list of component

VII. DM PLANT MAINTENANCE

01. Preventive/Breakdown maintenance shall be arranged/planned
02. Proper shut down shall be taken in consultation with Operation/Electrical/ I & H personnel
03. Isolate the system where maintenance to be carried out with the help of the field operators
04. Preventive maintenance shall be carried out as per the list of the jobs
05. Breakdown maintenance shall be carried out as per the equipment component check list procedure
06. Remove all loose mud, dust & maintain housekeeping in and around the DM plant
## MECHANICAL MAINTENANCE

### SCOPE OF WORK

**BF PROPER AREA**

<table>
<thead>
<tr>
<th>Sch. No.</th>
<th>Brief description of work</th>
</tr>
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<tr>
<td>1</td>
<td><strong>CAST HOUSE, TUYERE PLATFORM, SGP &amp; DUST CATCHER AREA:</strong> Supplying 9 nos. of manpower per day including Sundays, National &amp; festival holidays for mechanical maintenance works in A, B, C &amp; G shifts including greasing, oiling, preventive &amp; breakdown maintenance, replacement of worn out parts, wire ropes, dismantling, refixing, tightening, cutting, welding, drill rod fabrication/changing replacement of blow pipe &amp; elbow assembly and any other related jobs including shifting of spares &amp; consumables from stores to site and assisting KIOCL-BFU team for rectification and attending the problems as per the direction of Engineer-in-Charge/Shift incharge for following major equipments:</td>
</tr>
<tr>
<td></td>
<td>i) Mudgun/Drilling machine and Hydraulic power pack for Mudgun/Drilling machine</td>
</tr>
<tr>
<td></td>
<td>ii) Oxygen lancing system and maintenance jobs in Oxygen/LPG manifold.</td>
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<td></td>
<td>iii) Tuyere stock assembly</td>
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<tr>
<td></td>
<td>iv) Furnace cooling water system (Box cooler, pipes, headers, valves, trough etc.)</td>
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<tr>
<td></td>
<td>v) Cast house crane</td>
</tr>
<tr>
<td></td>
<td>vi) Rigging and alignment of electrical equipments.</td>
</tr>
<tr>
<td></td>
<td>vii) SGP crane, launder, blowing box and SGP pump house with pipelines and settling tanks</td>
</tr>
<tr>
<td></td>
<td>viii) Dust catcher, dust valve, DEV &amp; power pack</td>
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<tr>
<td></td>
<td>ix) Rigging &amp; any other miscellaneous maintenance jobs pertaining to above areas.</td>
</tr>
<tr>
<td>2</td>
<td><strong>PCM 1, 2 &amp; 3, LRS &amp; GANTRY CRANE, AIR BLOWERS, PIG TRANSFER WAGON, LADLES &amp; PCM PUMP HOUSE AREA:</strong> Supplying 10 nos. of manpower per day including Sundays, National &amp; festival holidays for mechanical maintenance works in A, B, C &amp; G shifts including greasing, oiling, preventive/breakdown maintenance, replacement of worn out parts, PCM moulds, links &amp; connected items, wire ropes, dismantling, refixing, tightening, cutting, welding and any other related jobs including transportation of equipments, materials from stores to site and assisting KIOCL-BFU team for rectification and in attending the problems as per the direction of Engineer-In-Charge/shift incharge for following major equipments:</td>
</tr>
<tr>
<td></td>
<td>i) PCM 181, 182 strand and new PCM (No. 3)</td>
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<td></td>
<td>ii) LRS crane &amp; maintenance hoist</td>
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<tr>
<td></td>
<td>iii) Air Blowers &amp; connected system</td>
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<tr>
<td></td>
<td>iv) PCM runners, ladle stand, pouring stand, LTD and ladle repair job</td>
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<tr>
<td></td>
<td>v) Jib &amp; monorail crane (5/10T) in PCM pouring &amp; discharge end</td>
</tr>
<tr>
<td></td>
<td>vi) Lime spray system with pumps, agitators and pipelines/valves in all 3 PCMs.</td>
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<tr>
<td></td>
<td>vii) Flushing water system with pumps and pipelines/valves</td>
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<tr>
<td></td>
<td>viii) Spray water system with pumps and pipelines/valves</td>
</tr>
<tr>
<td></td>
<td>ix) Drainage pumps in PCM pump house with pipelines/valves</td>
</tr>
</tbody>
</table>
x) Gantry crane, Blower house crane
xi) Rigging and alignment of Electrical equipments.

xii) Pugmill

xiii) Flash guard chutes, pig discharge chutes and return chutes
xiv) Pig transfer wagon, winch and rails

xv) Rigging & any other miscellaneous maintenance jobs pertaining to above areas.

3 WINCH HOUSE & TOP CHARGING EQUIPMENTS: Supplying 6 nos. of manpower per day including Sundays, National & festival holidays for mechanical maintenance works in A, B, C & G shifts including greasing, oiling, preventive/breakdown maintenance, replacement of worn out parts, replacement of wire ropes, dismantling, refixing, tightening, cutting, welding and any other related jobs including transportation of equipments, materials from stores to site and assisting KIOCL-BFU team for rectification and in attending the problems as per the direction of Engineer-In-Charge/shift incharge for following major equipments:

i) Electric winches for SB/BB, PRV/PEV, SLI (L)/®, FBV(L)/® & CLS system complete with pipelines & dose feeders in winch house.

ii) Small bell

iii) Big bell

iv) Stock level indicators (L & R)

v) Pressure relief/equalising valve

vi) Furnace bleeder valves (L&R)

vii) Centralised Lubrication System

viii) Rotating chute

ix) Back draught valve

x) Dust catcher cut-off valve & DC bleeder valve

xi) BF top crane

xii) Rigging & alignment of electrical equipments

xiii) Any other miscellaneous maintenance jobs in BF top

4 STOVES & GCP AREA: Supplying 6 nos. of manpower per day including Sundays, National & festival holidays for mechanical maintenance works in A, B, C & G shifts including greasing, oiling, preventive/breakdown maintenance, replacement of worn out parts, replacement of wire ropes, dismantling, refixing, tightening, cutting, welding and any other related jobs including transportation of equipments, materials from stores to site and assisting KIOCL-BFU team for rectification and in attending the problems as per the direction of Engineer-In-Charge/shift incharge for following major equipments:

i) Gas Cleaning Plant

ii) Stoves 1, 2 & 3 including all valves, pipelines etc

iii) C.A.Fan 1 & 2 and connected items, pipelines

iv) GCP goggle valve, septum valve, steamlines, BF gas pipelines, Flare stack & connected valves, Waste gas Chimney etc.

v) Rigging & alignment of electrical equipments

vi) Miscellaneous maintenance jobs in and around GCP & Stoves
### SCOPE OF WORK IN STOCKHOUSE/RMHS/PUMP HOUSES

#### SCHEDULE-A (STOCK HOUSE AND RMHS AREA)

<table>
<thead>
<tr>
<th>Sch No.</th>
<th>Brief description of work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>LUBRICATION:</strong> Supplying 2 nos. of manpower per day including Sundays, National &amp; festival holidays for mechanical maintenance works in G shifts for lubrication of the equipments in the mentioned areas including shifting of grease &amp; oil drums from stores to site and assisting KIOCL-BFU team as per the direction of Engineer-In-Charge/Shift incharge for following major equipments:</td>
</tr>
<tr>
<td></td>
<td>i) Lubrication to Conveyor J1C1, J3C1, J3C2, J4C1, J7C1, SHC1, Tripper, BFC1, FC1, FC2, FC3, FC4, FC5 (All plummer blocks of pulleys &amp; return rollers, flap gates, VGTU winch and its rope routing pulleys)</td>
</tr>
<tr>
<td></td>
<td>ii) Greasing to weigh hopper gates, sector gates in fine bunkers &amp; vibro screen cardboard shafts.</td>
</tr>
<tr>
<td></td>
<td>iii) Greasing to dedusting thickener, scrubber pumps, underflow &amp; drainage pumps in DDPH</td>
</tr>
<tr>
<td></td>
<td>iv) Greasing to all gear/grid couplings of conveyors.</td>
</tr>
<tr>
<td></td>
<td>v) Replacement of oil in fluid couplings of following conveyors: BFC1 (2 NO.), J1C1, J3C1, J3C2, J4C1, SHC1</td>
</tr>
<tr>
<td></td>
<td>vi) Replacement of oil in Gear boxes of following conveyors/drives: BFC1(2 NO.), J1C1, J3C1, J3C2, J4C1, SHC1, FC1, FC2, FC3, FC4, FC5 and screen drive gear boxes- CS1, CS2, CS3, OS1, OS2</td>
</tr>
<tr>
<td></td>
<td>vii) Only topping up of oil whenever required for gear boxes, fluid couplings etc</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>OTHER MAINTENANCE JOBS OF SH/RMHS AREA IN G SHIFT:</strong> Supplying 6nos. of manpower per day including Sundays, National &amp; festival holidays for mechanical maintenance works in G shifts as mentioned below and any other related jobs including transportation of equipments, materials from stores to site and assisting KIOCL-BFU team for rectification and in attending the problems as per the direction of Engineer-In-Charge/shift incharge for following major equipments:</td>
</tr>
<tr>
<td></td>
<td>i) Carrying out preventive maintenance and running inspection of all mechanical equipments in Stock house &amp; RMHS area including EWRH.</td>
</tr>
<tr>
<td></td>
<td>ii) Replacement of carrying, return, impact &amp; guide idlers for 500mm, 800mm &amp; 1000mm B.W. conveyors and idler fixing brackets.</td>
</tr>
<tr>
<td></td>
<td>iii) Replacement of conveyor belt of 500mm, 800mm &amp; 1000mm width and assisting in belt vulcanising (hot/cold) jobs.</td>
</tr>
<tr>
<td></td>
<td>iv) Replacement of conveyor pulleys, plummer blocks with connected items, fluid/geared/grid couplings, gear boxes, motors, D.E. system fans, compressors, bag filters etc and alignment.</td>
</tr>
<tr>
<td></td>
<td>v) Assisting in rubber lagging of conveyor pulleys- Preparatory &amp; finishing jobs</td>
</tr>
<tr>
<td></td>
<td>vi) Replacement of screen decks, screen exciter motors, gear boxes, vibrofeeder/fine vibro feeder motors, weigh hopper actuators etc.</td>
</tr>
<tr>
<td></td>
<td>vii) Replacement of liners (Mn steel, SS, hard faced &amp; UHMWP) in weigh hoppers, feed chutes, conveyor discharge chutes, ground hoppers, fines chute, reject chute, bunkers etc.</td>
</tr>
<tr>
<td>Sch.No.</td>
<td>Brief description of work</td>
</tr>
<tr>
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</tr>
<tr>
<td>1</td>
<td><strong>SHIFT RUNNING MAINTENANCE</strong>: Supplying 6 nos. of manpower per day including Sundays, National &amp; festival holidays for mechanical maintenance works in A, B, C shifts for Preventive/breakdown maintenance, equipment running inspection &amp; other mechanical maintenance jobs in A, B &amp; C shifts in CWPH, ETP, Cooling Towers, Air compressors, MWPH, Blower lub oil cooling water pumps etc.</td>
</tr>
<tr>
<td>2</td>
<td><strong>OTHER MAINTENANCE JOBS OF UTILITY AREA IN G SHIFT</strong>: Supplying 3 nos. of manpower per day including Sundays, National &amp; festival holidays for mechanical maintenance works in G shifts as per the jobs described below and any other related jobs including shifting of spares &amp; consumables from stores to site and assisting KIOCL-BFU team for rectification and attending the problems as per the direction of Engineer-In-Charge. Mechanical maintenance jobs in CWPH(BF), ETP, Cooling Towers, MWPH, Blower cooling water pumps, etc area of following nature in general shift.</td>
</tr>
<tr>
<td></td>
<td>i) Preventive maintenance of mechanical equipments in all the above areas.</td>
</tr>
<tr>
<td></td>
<td>ii) Overhauling of water/slurry/dosing pumps in CWPH, ETP, MWPH, Blower lub oil cooling water pumps, etc by replacement of worn out parts, repair/replacement of pipelines, replacement of motors, couplings, servicing of diesel engine in MWPH, etc.</td>
</tr>
<tr>
<td></td>
<td>iii) Lubrication of all equipments in all the mentioned areas</td>
</tr>
<tr>
<td></td>
<td>iv) Repair/replacement of BF/GCP cooling tower fan, gear boxes, motors, shafts and connected items.</td>
</tr>
<tr>
<td></td>
<td>v) Repair/replacement of mechanical equipments in thickeners, sludge storage agitators, flash mixers, chemical preparation tank agitators, etc.</td>
</tr>
<tr>
<td></td>
<td>vi) Repair/servicing of air compressors &amp; connected items and pipelines, etc.</td>
</tr>
<tr>
<td></td>
<td>vii) Servicing of DMF/ACF, connected valves, air blower for filter backwash, etc in MWPH.</td>
</tr>
<tr>
<td></td>
<td>viii) Rigging of electrical equipments in above areas.</td>
</tr>
<tr>
<td></td>
<td>ix) Rigging, fitting, alignment and any other miscellaneous maintenance jobs in above areas.</td>
</tr>
</tbody>
</table>
SCOPE OF WORK
ELECTRICAL MAINTENANCE

Responsibility & Accountability

Grade: Supervisor
Distribution of power supply, 6.6 KV/415V/230V, 50Hz to all equipments and all areas of the Plant, as per the available network (both from MSDS & CPP). Monitoring condition and performance of electrical equipments. Monitoring of voltage, frequency, power, energy, power factor, amps, temperature, oil level.
Monitoring of MESCOM/KPTCL power supply Contract Demand & PF.
Assisting in giving shutdown and normalisation of shutdown of 110 KV power supply as per requirement to MESCOM/KPTCL.
Maintenance of all HT equipments like 110 KV switchyard equipments ( LAs, GOSs, CTs, PTs, Circuit Breakers etc), Earth pits, 110 / 6.6KV Power transformers, 6.6KV / 415V Distribution transformers, HT bus ducts, HT Panels, HT motors, HT Cables.
Co-ordination with KIOCL shift incharge, engineer for smooth operation of CPP Generator as per dept. procedure
Maintenance of all HT electrical equipments in CPP
Maintenance of all LT electrical equipments in CPP
Maintenance of all other LT (415V, 230V) equipments, including LT bus ducts, LT PCC, MCC, PDB, ACDB, ACBs, MLDBs, LT motors, Motor LCS, Cranes, hoists, Flood Light & Hand lamp Fittings. Maintenance of 24V, 230V, 415V power supply points for Lighting, ; earth pits, Equipment earthing.
Maintenance of all Lighting equipments like LDBs, area lights, Street Lights, Tower Lights etc.
Maintenance of battery banks and chargers. Maintenance of AC / DC drives
Trouble shooting of Electronic circuits of CPP Generators, DG AVR, AC / DC drives of LRS Crane, Stock Rod, PCM etc
Giving shutdown and normalisation of shutdown of plant equipments as and when required.
Follow relevant shutdown procedure of equipment as per work instructions
Allotment, organising, supervision of daily jobs of electricians.
Take all necessary safety precautions for the electrical staff and equipments.
House keeping in all Electrical rooms
Safe disposal of any waste oil, cotton waste etc generated
Monitor the consumption of critical & high value spares, project the spares requirement, co-ordinate with KIOCL planning engineer.

Co ordination with KIOCL Engineers, Co-ordination with other maintenance and Operation dept. regarding equipment operation & services. Horizontal co-ordination with other departments of Plant.

Monitor materials to prevent any theft / pilferage in plant areas

Comply to all applicable IMS standards

Any other job assigned from time to time by KIOCL dept HOD.

Note: All maintenance works shall be carried out as per KIOCL work instructions

**Grade: Electrician**

The Electricians shall assist, work in co-ordination with KIOCL Electricians in respective areas of MSDS, CPP, BF proper, RMHS/Stockhouse. All preventive and breakdown maintenance works, lighting, battery maintenance works etc shall be carried out as per work instructions, instructions of Engineer incharge. Trouble shooting in electrical equipments shall be carried out in co-ordination with Engineer incharge, electricians.

**Grade: Helper**

Assisting in cable laying / back pulling on steel structures, walls, underground. Cable clamping, cable tray erection on steel structures, walls, laying of earth strips on walls, ground etc, laying of pipes, conduit wiring etc, includes minor civil works like chipping on wall, floor etc.

Assisting in shifting / transportation of materials like cable, cable trays, steel etc from stores / department to the work spot.

Assisting in shifting of materials like electrical spares, light fittings, ladders etc within the plant premises, loading / unloading of Motors etc.

Assisting in filling of Diesel to Motovator, DG, Cleaning of equipments like Transformers, electrical panels in MCCs, cranes etc

Departmental housekeeping; segregation of scrap, shifting / transportation of scrap generated within plant premises, as per instructions of Engineer incharge
## SCOPE OF WORK
### CAPTIVE POWER PLANT

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Brief Description of Work</th>
</tr>
</thead>
</table>
| 1     | **Boiler**:  
|       | a. Start-up of Boilers and auxiliaries  
|       | b. Operation & Maintenance of Boilers and auxiliaries  
|       | c. Shutdown of Boilers and auxiliaries  
|       | d. Preventive and breakdown maintenance  
| 2     | **Turbine**:  
|       | a. Start-up of Turbines and auxiliaries  
|       | b. Operation & Maintenance of Turbines and auxiliaries  
|       | c. Shutdown of Turbines and auxiliaries  
|       | d. Preventive and breakdown maintenance  
| 3     | **DM Plant**:  
|       | a. Start-up of DM plant and auxiliaries  
|       | b. Operation & Maintenance of DM plant and auxiliaries  
|       | c. Shutdown of DM plant and auxiliaries  
|       | d. Preventive and breakdown maintenance  
| 4     | **Cooling Tower**:  
|       | a. Start-up of Cooling tower and auxiliaries  
|       | b. Operation & Maintenance of cooling tower and auxiliaries  
|       | c. Shutdown of cooling tower and auxiliaries  
|       | d. Preventive and breakdown maintenance  
| 5     | **General Maintenance as per the instruction of engineer-in-charge and housekeeping**  

## ELECTRICAL MAINTENANCE

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<th>Particulars</th>
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| 2      | PROCEDURE FOR GIVING SHUTDOWN AND NO FEED BACK CERTIFICATE FOR 110KV KPTCL POWER TRANSMISSION LINE  
| 3      | PROCEDURE FOR NORMALISING THE PLANT AFTER RECEIVING 110KV POWER SUPPLY OF KPTCL AFTER SHUTDOWN  
| 4      | PROCEDURE FOR DRAWING POWER SUPPLY FROM PELLET PLANT CPP  
| 5      | PROCEDURE FOR NORMALISING THE SOURCE OF POWER SUPPLY FROM KIOCL TO KPTCL  
| 6      | BREAKDOWN MAINTENANCE OF 6.6KV BLOWER MOTOR / PANEL  
| 7      | BREAKDOWN MAINTENANCE OF LRS CRANE  
| 8      | BREAKDOWN MAINTENANCE OF CPP, TG BREAKERS  
| 9      | BREAKDOWN MAINTENANCE OF PCM DRIVES  
| 10     | SHUTDOWN PROCEDURE FOR 6.6KV MOTORS  

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Seal & Signature of the Bidder
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<td>SHUTDOWN PROCEDURE FOR 415V MOTORS, CRANES</td>
</tr>
<tr>
<td>12</td>
<td>PREVENTIVE MAINTENANCE PROCEDURE FOR 6.6KV CAPACITOR BANK</td>
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<tr>
<td>13</td>
<td>PREVENTIVE MAINTENANCE OF ELECTRICAL DRIVES</td>
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<td>14</td>
<td>PROCEDURE FOR GREASING OF LT MOTORS</td>
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<td>15</td>
<td>STORAGE AND DISPOSAL OF SCRAP</td>
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<td>16</td>
<td>PROCEDURE FOR GIVING POWER SUPPLY FROM MOTOVATOR DURING BLACKOUT CONDITION (BOTH KPTCL &amp; CPP POWER SUPPLY FAILURE)</td>
</tr>
<tr>
<td>17</td>
<td>PROCEDURE FOR CONNECTION / DISCONNECTION / MAINTENANCE OF WELDING MACHINES</td>
</tr>
</tbody>
</table>
WI 1  SHUTDOWN PROCEDURE FOR 110KV LINE, INSIDE BFU SWITCHYARD

1.1) Fill the Work permit form and record in the shut down register.
1.1) Reduce the load on 6.6KV MSDS Bus (both Incomer1 and Incomer2) to a minimum.
1.2) Trip (electrically with TNC switch), draw out to isolated position & lock Interconnector 1 & 2 circuit breakers in MSDS.
1.3) Trip (electrically with TNC switch), draw out to isolated position & lock Incomer 1 & 2 circuit breakers in 6.6 KV MSDS switch board.
1.4) Trip both the 110KV circuit breakers in switchyard from REMOTE control panel.
1.5) Open the relevant GOS (KPTCL, individual line, bus sectionalis) in 110KV line in BFU switchyard.
1.6) Close the relevant “ Earth Switch” and discharge before starting work.
1.7) Put “SHUTDOWN TAGS” on all above circuit breakers, GOS and Earth switches.

WI 2. PROCEDURE FOR GIVING SHUTDOWN AND NO FEED BACK CERTIFICATE FOR 110KV KPTCL POWER TRANSMISSION LINE

When CPP & BF are in operation:
2.1) Record in the shutdown register.
2.2) KPTCL Kavoor SRS 220 KV substation shift in charge will contact BFU MSDS shift in charge for issue of NO FEED BACK CERTIFICATE to be issued to KPTCL to take up breakdown work on 110 KV O.H. line feeder power to BFU and other industries like KIOCL, MRPL, MCF and Baikampady substation.
2.3) On receipt of request from KPTCL, MSDS shift in charge will contact Sr. Manager (E) and inform the requirement. In consultation with AGM (I/C), BFU, 110 KV shutdown will be arranged.
2.4) MSDS shift in charge will inform BF operation shift in charge for shutdown on 110 KV KPTCL line.
2.5) Identify the loads, which are on KPTCL supply. If possible take these loads on TG provided load on TG is less and total load will be within permissible limits of TG capacity.
2.6) If not possible to changeover these loads to TG directly, reduce the load on TG to that extent by reducing the Blower flow with the concurrence of BF operation in charge. That is, if the KPTCL load is say- 400KW, reduce the load on generator by 400KW and then changeover the KPTCL load to TG.
2.7) Start the 250 KVA DG set and change over the lighting supply in BF area, CPP area and MSDS from KPTCL to DG.
2.8) Ensure that there is no load on KPTCL in any area.
2.9) Trip from remote the 110 KV Circuit breakers (S2A & S2B) at MSDS and open the KPTCL GOS and lock it.
2.10) MSDS shift in charge will give NFBC number after writing in logbook to KPTCL SRS 220 KV substation shift in charge with name and time through SRS telephone nos. – 2481381, 2481903.
2.11) KPTCL shift in charge in turn will give his confirmation by giving details of his name and designation, time of shutdown taken etc.
**Special Instructions:**

Instruct BF operation shift in charge / BF control and CPP control not to start any drive without the permission of Electrical department as that may trip the TG leading to total blackout situation.

Switch off the power supply to all welding machines, hoists except cast house crane from the PDBs, to avoid any tripping of TG due to faults in these welding machines, hoists.

Monitor the load (MW), voltage and frequency of the TG carefully.

**WI 3. PROCEDURE FOR NORMALISING THE PLANT AFTER RECEIVING 110KV POWER SUPPLY OF KPTCL AFTER SHUTDOWN**

3.1) After completion of shutdown work of 110 KV line, KPTCL contacts MSDS on telephone, and returns NFBC. Confirm the NFBC no. Enter details like name of the person of KPTCL returning NFBC, time of return in the KPTCL NFBC register.

3.2) In MSDS, close the KPTCL GOS, ensuring that 110 KV circuit breakers are OFF.

3.3) Close 110 KV circuit breakers.

3.4) Give clearance over telephone to KPTCL to charge the 110 KV power supply.

3.5) After receiving KPTCL power supply check for voltage in all 3 phases and frequency at 110 KV control panel in MSDS. In case of any hunting / fluctuation in voltage or frequency wait for sometime till it stabilises. Check for 6.6 KV + - 10% and 50 Hz + - 5% in MSDS HT panel. In case of deviation of voltage more than above, check OLTC. In case of deviation of frequency more than above contact KPTCL for corrective action.

3.6) In case 6.6 KV KIOCL power supply is taken follow WI 5 below, else proceed further as per this WI. Close 6.6 KV incomer 1,2 / buscoupler CBs through TNC switch. In case of shutdown of any 110 / 6.9 KV power transformer, 110 KV CB / GOS / lightning arrestor, 6.6 KV bus coupler CB is closed.

3.7) Close 6.6 KV interconnector 1 & 2 CBs in MSDS and charge power supply to CPP (relay no.86 of MSDS 1 & 2 circuit breakers in CPP should be in reset condition).

3.8) After confirming power supply in voltmeter, close MSDS 1 & 2 circuit breakers in CPP from remote control desk.

3.9) Give clearance to BF shift in charge / BF control room / CPP control room to start all equipments one by one.

3.10) Ensure that relay no.86 of Blower 1 & 2 are in reset condition.

3.11) Change over the lighting supply of BF area, CPP area and MSDS from DG to KPTCL. Stop the 250 KVA DG set.

3.12) Make entries like date, duration, reason of 110 KV KPTCL power supply shutdown, in the shutdown register in MSDS.

3.13) Record details of KPTCL power supply shutdown, like date, duration, reason in shift log book and PC.

**WI 4. PROCEDURE FOR DRAWING POWER SUPPLY FROM PELLET PLANT CPP in total blackout condition.**

4.1) Contact KIOCL CPP control room on telephone no.336 and request for power supply explaining the black out situation. Indicate the approximate KW of load required (normally about 500 KW).

4.2) Trip and rack out the 6.6KV circuit breakers of Bus-coupler 2 and MSDS 1 in CPP. Switch OFF the control supply of these breakers.

4.3) Rack in the 6.6 KV circuit breaker of Incomer 3 in CPP and switch ON the control supply.
4.4) Give clearance to KIOCL CPP control room to charge the power supply. Note down the energy meter reading of Incomer 3 and also inform KIOCL the same before receiving the power supply.
4.5) Check for voltage in all the 3 phases of Incomer 3 and then close the circuit breaker from remote control desk.
4.6) Give clearance to BF shift in charge / BF control room to start essential emergency loads only like BF supply / return pumps, etc.
4.7) Monitor the load and note down every half an hour in the CPP logbook.

Special Instructions:

Instruct BF operation shift in charge / BF control and CPP control not to start any drive without the permission of Electrical department.
Switch off the power supply to all welding machines, hoists except cast house crane from the PDBs.

WI 5. PROCEDURE FOR NORMALISING THE SOURCE OF POWER SUPPLY FROM KIOCL to KPTCL

5.1) Ensure that 110 KV power supply of KPTCL is received at MSDS. Close 6.6 KV Circuit Breakers of Incomer 1 & 2 at MSDS, keeping Interconnector 1& 2 OFF.
5.2) Inform KIOCL that we shall stop drawing power supply and take their clearance for switching OFF power supply.
5.3) Inform BF control that KPTCL power supply is received and there shall be momentary power supply interruption for normalisation.
5.4) Trip Incomer 3 Circuit breaker from remote control desk.
5.5) Rack out Incomer 3 and note down the energy meter reading and inform to KIOCL.
5.6) Close MSDS 1 & 2 Circuit breakers after ensuring power supply through the voltmeters.
5.7) Rack in Bus-coupler 2 and MSDS1 in CPP and switch on the control supply.
5.8) Close Bus-coupler 2 and MSDS1 from remote control desk.
5.9) Close MSDS 2 in case it is tripped.
5.10) Give clearance to BF shift in charge / BF control room to start all equipments one by one.
5.11) Ensure that relay no.86 of Blower 1 & 2 are in reset condition.

WI 6) PROCEDURE FOR BREAKDOWN MAINTENANCE OF 6.6 KV BLOWER PANEL / MOTOR (Motor not starting, motor tripping)

6.1) Check general condition, visual inspection of feeder/ motor
6.2) Check annunciation, operation of any relay, whether all relays are reset (like MPR, TSR, 86).
6.3) Check for operation of any relays in Bus P.T panel (like u/f, u/v, o/v relays) and any annunciation in Blower House Control panel
6.4) Check for power supply
6.5) Check for control supply
6.6) Check whether breaker spring is charged. If not, check in detail spring charging circuit. In case of major problem, change with spare breaker.
6.7) Check for field interlocks like release of emergency stop push button, proper position of LOR selector switches both in panel and LCS.
6.8) Check for closing and tripping circuit fuses, other interlocks as per control circuit drawing
6.9) Check closing and tripping of breaker from remote by keeping the breaker in Test Position and manually operating service position aux. contactor. In case of problem, put temporary links across closing / tripping signal terminals and locate the fault. Rectify the fault once it is found.

6.10) In case, above operation is not O.K check the breaker operation in LOCAL, TEST position, operating from feeder TNC switch. If breaker is not operating, check plug & socket and if necessary, change breaker with spare breaker.

6.11) If problem persists, check in detail control circuit.

**WI 7) PROCEDURE FOR BREAKDOWN MAINTENANCE OF LRS CRANE**

**A) NOTHING IS WORKING IN CRANE**

7.1) Check for Power Supply. Check ACBs in LCSS3, local ACB panel, crane cabin

7.2) If the power supply has tripped in LCSS3, check Current Collectors, Busbar insulators, local isolator on crane, LRS area ACB panel, crane cabin ACB. Check undervoltage release coil of crane cabin ACB.

7.3) Check control supply (Protective Panel Contactor should be ON when control supply is made ON)

7.4) Check for interlocks like release of emergency stop push button, corner switches, reset of Main Hoist and Auxiliary Hoist Gravity limit switches, door limit switches of all panels as per control drawing

**B) MAIN HOIST AND AUXILIARY HOIST NOT WORKING**

7.5) Check for power supply and control supply.

7.6) Check the master control position.

7.7) Check the corner switches and control supply ON Push button.

7.8) Check the type of fault indication code (the display of the DARA is viewed before restart).

7.9) Check the digital inputs and outputs. If inputs are not OK, check all the input references like Master controller, rotary limit switches & gravity limit switches. If inputs are OK check the output reference. It is not OK check the particular card like DATX 100, DATX 110 etc. If outputs are OK check the drives power supply (Thyristor).

7.10) If Thyristor power fuse has blown, check thyristors, output of thyristors. If thyristor output is OK, check outgoing cable, resistance box, motor, stator and rotor terminals, slip rings, brushes, JBs, festoon cables.

7.11) In case of Torque failure check brake circuit - brake contactors, rectifier units, brake fuses, economy resistors, braking mechanism and gap adjustments, rotor resistance circuits and tacho feedback.

**C) CT / LT NOT WORKING**

7.13) Check general condition, visual inspection of feeder/ motors

7.14) Check operation of O/L relay, other interlocks like end limit switches.

7.15) Check for power supply and MCCBs, power contactors.

7.16) Check for control supply, control circuit fuses, MCBs.

7.17) Check Master Controller operation and its inputs to the feeder.

7.18) Check brake contactors, thruster brake motors and brake mechanism.

7.19) Check rotor resistance circuit as per control drawing and resistance box
7.20) In case of LT drive motor failure, and in case of emergency, isolate any two motors as per scheme and operate LT.

**WI 8) PROCEDURE FOR BREAKDOWN MAINTENANCE OF CPP TG BREAKERS - breaker not closing, breaker tripping**

8.1) Check general condition, visual inspection of feeder/breaker

8.2) Check annunciation, operation of any relay, whether all relays are reset (like TSR, 86) in TG feeder, AVR panel and in GRP

8.3) Check for control supply (AC & DC)

8.4) Check in AVR panel whether voltage is generated.

8.5) Check for interlocks like release of emergency stop push button, proper position of LOR selector switches in panel, proper selection of synchronisation selection switch, synchronisation auto / manual / G1 / G2 switch.

8.6) Check for proper matching of synchronisation parameters (voltage and frequency) and operation of Check Synchronisation Relay

8.7) Check whether breaker spring is charged. If not check in detail spring charging circuit. In case of major problem, change with spare breaker.

8.8) Check closing and tripping signals from control desk

8.9) Check for other interlocks, closing and tripping circuit fuses.

**WI 9) PROCEDURE FOR BREAKDOWN MAINTENANCE OF PCM DRIVE (AC DRIVE)**

9.1) Check general condition, visual inspection of feeder/motor

9.2) Check for power supply, power contactors, power fuse conditions and surge fuse conditions

9.3) Check for control supply, MCBs.

9.4) Check for interlocks like release of emergency stop push button, proper position of LOR selector switches in LCS and CD, operation of O/L relays.

9.5) Check whether the drive is ON. If there is any fault in drive, read the code in CDP mounted on the panel, trouble shoot as per drawing. Refer ACS manual.

9.6) Check for other interlocks as per drawing.

9.7) Check brake contactors, fuses, rectifier units, economy resistors, brake coil and brake mechanism

9.8) Check whether the variable speed reference from CD/LCS is available in the panel. Check speed ref POT

9.9) Check the drive by keeping it in LOCAL mode from panel and varying the speed reference through CDP

9.10) If problem persists, provide power supply to PCM motor through DOL starter, keeping informed operation and mechanical
WI 10. SHUTDOWN PROCEDURE FOR 6.6KV MOTORS

10.1) Ask the concerned person to make necessary entries in the shut down register.
10.2) Go to the correct feeder of the equipment. Confirm the description / drive no. of the equipment. Ensure that motor has stopped and circuit breaker is in OFF condition. Check for mechanical OFF indication of the breaker.
10.3) Switch off contol supply, space heater supply and any other external source of supply.
10.4) Rack out the circuit breaker carefully to “isolated / maintenance ” position.
10.5) Ask the concerned person to lock the breaker (wherever provision is there).
10.6) Ask the concerned person to fill up and put "men at work" shutdown tag on the breaker feeder.
10.7) Make necessary entries in the shutdown register.

PROCEDURE TO RELEASE SHUTDOWN

10.8) The person taken shutdown or any other authorised person (in case of long shutdown works stretching to other shifts) shall remove lock, if any, shutdown tag from the feeder and make entries in the shutdown register clearing the shutdown.
10.9) Confirm the equipment description / drive no. from the person releasing shutdown.
10.10) Go to the right feeder. Remove any earthing done. Rack in breaker to service position keeping control supply off. Switch on control supply, space heater supply and any other interlocks. Keep selector switches in original position and reset relays. Check for electrical indications like spring charged, trip circuit healthy, breaker off etc.
10.11) Make necessary entries in the shutdown register. Inform the person releasing shutdown and other concerned persons / control room regarding release of shutdown of the particular equipment.

WI 11. SHUTDOWN PROCEDURE FOR 415V MOTORS, CRANES

PROCEDURE TO GIVE SHUTDOWN

11.1) Ensure from concerned person (operation/electrical engr./operator) that the particular equipment is available for shutdown
11.2) Ask concerned person to make necessary entries in shut down register.
11.3) Go to the correct feeder of the equipment. Confirm the description / drive no. of the equipment.
11.4) Ensure motor has stopped from the feeder and also, if in doubt, from the site of motor.
11.5) In case of higher capacity motors having ACBs (like BF supply water pumps, BFC1, SGP pumps, CA fan motors, CPP main cooling water pumps, ID fan etc.) “trip” ACB through TNC switch. Check for mechanical OFF indication of breaker. Switch OFF control supply in ACB and rack out ACB to isolated position.
11.6) In the motor starter panel, confirm the equipment description and drive no. Switch OFF isolator, and control supply. Remove power fuses wherever locking facility is not there. Ask concerned person to lock breaker / isolator wherever provision is there and to put "men at work" shutdown tag.
11.7) Make necessary entries in the shutdown register.
**PROCEDURE TO RELEASE SHUTDOWN**

11.8) The person taken shutdown or any other authorised person (in case of long shutdown works stretching to other shifts) shall remove lock, if any, shutdown tag from the feeder and make entries in the shutdown register clearing the shutdown.

11.9) Confirm the equipment description / drive no. from the person releasing shutdown.

11.10) Go to the right feeder. Remove any earthing done. Fix back fuses, if removed. Switch on isolator, control supply, space heater supply etc. In case of feeders having ACBs, rack in breaker to service position keeping control supply off. Switch on control supply and any other interlocks. Keep selector switches in original position and reset any relays. Check for electrical indications like spring charged, trip circuit healthy, breaker off etc.

11.11) Make necessary entries in the shutdown register. Inform the person releasing shutdown and other concerned persons / control room regarding release of shutdown of the particular equipment.

**WI 12. PREVENTIVE MAINTENANCE PROCEDURE FOR 6.6KV CAPACITOR BANK**

12.1) Record in shutdown register.

12.2) Go to the correct feeder of the equipment. Confirm the description and drive no. of the equipment.

12.3) If the feeder is ON, trip the circuit breaker through TNC switch. Confirm from the mechanical OFF indication that the breaker is actually OFF.

12.4) Rack out the breaker to "isolated" position, lock the breaker (wherever provision is there), and put "men at work" shutdown tag.

12.5) Wait for 30 minutes.

12.6) OPEN isolator and CLOSE the earth switch in capacitor bank room.

12.7) Discharging can be done at the feeder also. Use earth truck and discharge the outgoing side of breaker. Read and follow instructions written in the earth truck. Before opening backside of the feeder / breaker compartment in the panel, once again confirm the description & drive no. of the equipment. Adjacent compartments may be LIVE, take care. LIVE compartments / feeders should not be opened / earthed. Earthing can be done here also. Use earthing stick or suitable cable. First connect one end of cable to the earth bus in the feeder and then the other end to the phase terminals.

12.8) Before starting work near capacitor / reactor once again discharge manually at the work spot.

12.9) Carry out the preventive maintenance work as per the check list issued.

12.10) In case of any problem / doubt / abnormality call the shift I/C.

12.11) After completing the maintenance work, disconnect any earthing connections, open the earth switch / earth truck, and then close the isolator in the capacitor room.

12.12) Remove the shutdown tag, and any lock. Keeping the control MCB OFF, rack in the breaker to test position. Connect the plug and socket, switch ON all control supply, space heater supply. Check for proper breaker operation, by closing and tripping of breaker using TNC switch.

12.13) Switch OFF control supply and rack in the breaker to service position. Switch ON control supply, keep all other controls, selector switches, etc to original position.


12.15) Fill up the check list and return to I/C electrical engineer.
WI 13. PROCEDURE FOR PREVENTIVE MAINTENANCE OF ELECTRICAL DRIVES.

13.1) Consult the concerned shift in charge / Control room for taking shutdown of the particular drive for preventive maintenance.

13.2) After the clearance is given for taking shutdown, necessary entries are made in the shutdown log register of the area.

13.3) Take shutdown of the feeder as explained in detail in the "relevant WI" (WI 10, 11 for 6.6 KV motor, 415V motor etc).

13.4) The preventive maintenance is carried out as per the steps indicated in the checklist. Refer drawings wherever necessary. In case of any problem call the concerned electrical shift I/C.

13.5) After completing the maintenance work, disconnect any earthing connections. At the local control station, switch on emergency stop push button and put LOR selector switch in original position. Any other local controls should be put back to original positions.

13.6) Remove the shutdown tag, and any lock. Switch on isolator and fix power fuses, if removed. In case of 6.6 KV motors, and 415V motors having ACBs, keeping the control MCB OFF, rack in the breaker to test position. Switch ON all control supply, space heater supply. Check for proper breaker operation, by closing and tripping of breaker using TNC switch. Switch OFF control supply and rack in the breaker to service position. Switch ON control supply, keep all other controls, selector switches, etc in original position.

13.7) Make necessary entries in the shutdown register and clear shutdown. Inform concerned shift I/C / electrician regarding shutdown clearance.

13.8) Fill up the check list and return to I/C electrical engr. . .

WI 14. PROCEDURE FOR GREASING OF LT MOTORS (PREVENTIVE / PREDICTIVE MAINTENANCE)

14.1) PROCEDURE FOR GREASING OF LT MOTORS IN RUNNING CONDITION (Motors of higher capacity having grease inlet and outlet extension lines)

a) Fill up the grease pump with correct and good quality grease. The type of grease should be IOC Servoplex LC3 / equivalent Li complex. Confirm the exact type of grease from engineer I/C. Grease should be free from dust, moisture etc.

b) Go to the right equipment and confirm the description and drive no.

c) Ensure the motor is in running condition.

d) Ensure that grease inlet and grease outlet pipes are there on both drive end (DE) and non drive end (NDE) sides of motor.

e) Pump the grease on DE side and NDE side bearings one by one. Stop greasing once new grease comes out. But, take care not to do excess greasing in case grease outlet is blocked. Approximately 25 gms. of grease is to be used on each side. Refer the motor name plate for exact quantity of grease to be used. Grease points to be closed with suitable caps to avoid entry of dust, water inside bearings. Take care not to spill grease. Collect old grease from drain point, if any, into a separate container. Observe the colour of the old grease. Observe the sound of motor bearings before and after greasing. Observe the bearing temperature before and after greasing. Report any abnormality to engineer I/C.

f) Any other maintenance work to be done as indicated in the check list issued.

g) Fill up the check list and return to engineer I/C.
14.2) PROCEDURE FOR GREASING OF LT MOTORS IN STOPPED CONDITION (Motors of lower capacity having no grease inlet and outlet extension lines)

a) Confirm the availability of shutdown from concerned operator / engineer / control room.
b) Enter in the shutdown register of the area and take shutdown as per related WI (WI 11).
c) Fill up the hand grease pump with correct and good quality grease. The type of grease should be IOC Servoplex LC3 / equivalent Li complex. Confirm the exact type of grease from engineer I/C. Grease should be free from dust, moisture etc.
d) Go to the right equipment and confirm the description and drive no.
e) Ensure the motor is in stopped condition.
f) Pump the grease on DE side and NDE side bearings one by one. Stop greasing once new grease comes out. But, take care not to do excess greasing in case grease outlet is blocked. Approximately 25 gms. of grease is to be used on each side. Refer the motor name plate for exact quantity of grease to be used. Grease points to be closed with suitable caps to avoid entry of dust, water inside bearings. Take care not to spill grease. Collect old grease from drain point, if any, into a separate container. Observe the colour of the old grease. Observe the sound of motor bearings before and after greasing. Observe the bearing temperature before and after greasing. Report any abnormality to engineer I/C.
g) Any other maintenance work to be done as indicated in the check list issued.
h) Release the shutdown. Remove shutdown tag. Refer relevant WI (WI 11).
i) Fill up the check list and return to engineer I/C.

WI 15. PROCEDURE FOR STORAGE AND DISPOSAL OF SCRAP
STORAGE AND DISPOSAL OF SCRAP
1. Collect the scrap materials like Fused Bulbs and Tubes, Burnt Chokes / Starters / igniters, Scrap cable, faulty contactors and Capacitors, torch cells, light fittings in the work spot.
2. Store the above scrap materials in one place.
3. As and when required, scrap materials are handed over to central stores for proper disposal.
4. Empty distilled water cans, diesel barrel, grease barrel is handed over to stores.

WI 16. Procedure for giving power supply from Motovator during blackout condition (Both KPTCL & CPP power supply failure)
1. Visual inspection of Motovator.
2. Check fuel level and batteries.
3. Release the emergency Push Buttons, Switch ON the control supply in Motovator.
4. Trip and rack out the 6.6 KV Circuit breakers of Blower-2, TG-2, B/C1 and MSDS-2 in CPP switchgear
5. "Rack in" the 6.6 KV Circuit breaker of Motovator in CPP switchgear and switch ON the control supply.
6. In motovator keep the toggle switch in idle mode and start the engine, after 3/5 minutes keep the toggle switch in engine mode.
7. Before closing the motovator breaker monitor the voltage, frequency and radiator water level.
8. Close the motovator Circuit breaker and then close the circuit breaker in CPP switchgear in local mode.
9. Give clearance to BF shift in-charge/BF control room to start essential emergency loads only (BF supply and return pumps).

10. Monitor the load.

11. Inform BF control room, BF shift in-charge and CPP control not to start any drive without permission of electrical shift in-charge or electrical HOD.

12. After restoring the KPTCL supply, switch OFF the circuit breaker in CPP switchgear, switch OFF the control supply and rackout the circuit breaker.

13. Switch OFF the motovator circuit breaker and run the engine in idle mode for about 5 minute. Switch OFF the control supply & press the emergency push buttons.

14. "Rack in" 6.6 KV Circuit breakers of Blower-2, TG-2, MSDS-2 and B/C 1 and switch ON control supply and close the breakers.

15. Give clearance to BF shift in-charge/BF control room to start the required drives.

**WI 17. Procedure for Connection / Disconnection / Maintenance of Welding machines**

Use proper personal protection equipments. Visual inspection of Welding socket, busbars of junction box etc. Clean the socket, busbars if there are traces of water / dust.

Identify and confirm the correct source of power supply to the socket. Check for healthiness of incoming power cable of the socket.

Ensure proper earthing of the welding socket and incoming cable.

Switch On the isolator of the socket and check availability of 3 phase power supply.

Switch Off the isolator. Ensure to use appropriate size of outgoing power cable to connect the welding machine to the socket.

Visual inspection of Welding machine. If machine is idle for long time, check the insulation value, open circuit voltage (OCV) of the machine. Connect the power supply of the machine as per the connection diagram, links given on the machine. If the OCV is as per the name plate details of the machine, switch ON the isolator and the welding machine.

Ensure there are no joints in the welding cable. If there are unavoidable joints, ensure they are properly insulated. Give clearance to the concerned dept. to carry out the welding work.

For disconnecting the welding machine, switch off the machine by using local switch on the machine. Then switch off the power supply. Ensure there is no power supply using test lamp. Then disconnect the power supply cable at the socket. Later, switch off the isolator of the welding socket.
FORMAT NO. KIOCL/B/TS/QF-03/REV-1

FORM OF BANK GUARANTEE FOR SECURITY DEPOSIT

In consideration of KIOCL Limited (hereinafter called Company) having agreed to exempt.........(hereinafter called the said Supplier(s) / Contractor(s)) from demand under the terms and conditions of LOI/Work Order No.................. Dated............... made between .................... and .................. for ............ (hereinafter referred to as “contract”) of security deposit for the due fulfillment by the said suppliers(s) / Contractor (s) of the terms and conditions contained in the said contract on production of a Bank Guarantee for Rs........ (Rupees..................only)

1. We,.............................. (hereinafter referred as "the Bank") at the request of Supplier, (s) Contractor (s) do hereby guarantee the payment to the Company an amount not exceeding Rs.............. (Rupees.............only) and interest thereon at 15.5 percent per annum from the date of demand till payment against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reason of any breach by the said Supplier(s)/ Contractor(s) of any of the terms and conditions contained in the said Contract.

2. We.................. do hereby unconditionally and irrevocably undertake to pay to the Company an amount to the extent of Rs. .................. (Rupees ............only) and interest thereon at 15.5 percent per annum from the date of demand till payment without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused to or suffered by the Company by reason of breach by the said Supplier(s) / Contractor(s) of any of the terms and conditions contained in the said Contract or by reason of the Supplier(s)/ Contractor(s) failure to perform the said contract. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs.................. (Rupees.............................................................only) and interest thereon as mentioned above from the date of demand till payment.

3. Our liability under these presents is absolute and unequivocal and we undertake to pay to the Company the amount so demanded notwithstanding the Supplier(s)/Contractor(s) raising any dispute and / or disputes or filing any suit or proceeding before any Court or tribunal or other Authority. The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment there under and the Contractor(s) Supplier(s) shall have no claim against us for making such payment.

4. We.......................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 contract and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said contract have been fully paid.
and its claims satisfied or discharged or till the Company certifies that the terms and conditions of the said contract have been fully and properly carried out by the said Supplier(s) / Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under this Guarantee is made on us in writing on or before.........................we shall be discharged from all liability under this Guarantee thereafter.

5. This Guarantee shall not be revocable by us except with the written consent of the Company and shall continue to be enforceable till.................................should it be necessary to extend Guarantee beyond the said date, we undertake to extend the validity of this Guarantee for such further period as may be required by the Company, and such extension shall be given one month before the expiry of this Guarantee filing which the amount covered under this Guarantee shall become forthwith payable, notwithstanding that the Contract is continuing and /or the Company has or has not terminated the Contract or preferred any claim against the Supplier(s) Contractor(s).

6. We................................. further agree with the Company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the Contract or to extend time or performance by the said Supplier(s)/ Contractor(s) from time to time or to postpone for any time or from time to time in exercise of any of the powers exercisable by the Company against the said Supplier(s) Contractor(s) and to forbear or enforce any of the terms and conditions relating to the Contract and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Supplier(s)/Contractor(s) or for any forbearance, act or omission on the part of the Company or any indulgence by the Company to the said Supplier(s)/Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties, but for this provision, have effect of so relieving us.

7. This Guarantee shall not in any way be affected due to change in our constitution or by your taking or varying or giving up any securities from the CONTRACTOR(S)/ SUPPLIERS or any other person, firm or Company on its behalf or by the change in the constitution, winding up dissolution, insolvency or death as the case may be of the CONTRACTOR(S)/SUPPLIER(S).

8. In order to give full effect to the Guarantee herein contained you shall be entitled to act as if we were your principal debtors in respect of all your claims against the CONTRACTOR(S)/ SUPPLIER(S) hereby Guaranteed by us as aforesaid and we hereby expressly waive all our rights of suretyship and other rights if any which are in any way inconsistent with the above or any other provisions of this Guarantee.

9. We................................. also undertake not to revoke this Guarantee during its currency except with previous consent of the Company in writing.

Dated the ...............day of .................20

For...........................................................................

(Indicate the name of Bank)
IMPORTANT NOTE

The following Points should be taken care of while submitting the Bank Guarantee:-

1. The Bank Guarantee should be on non-judicial stamp paper having a value of Rs.100/- or as applicable in the State of Karnataka.

2. The stamp paper should be purchased in the name of the Bank, who give the guarantee and not in the name of the Supplier.

3. The Bank Guarantee should be strictly as per the profoma.

4. The Bank Guarantee should be from any of the Nationalised Bank, Scheduled Bank or any other bank Acceptable to KIOCL

5. If any correction is made on the guarantee the same should be endorsed by the Bank with its official seal.
### BUSINESS RULE AND TERMS & CONDITIONS OF ONLINE PRICE BIDDING CUM REVERSE AUCTION

Sub: Operation and Maintenance contract for KIOCL’s Blast Furnace Unit at Panambur, Mangalore.

<table>
<thead>
<tr>
<th>BUYER NAME</th>
<th>KIOCL LIMITED, TECHNICAL SERVICES DEPARTMENT KORAMANGALA BANGALORE – 560 034</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUCTION TO BE CONDUCTED BY</td>
<td><strong>M/s Bob eProcure Solutions Pvt. Ltd</strong> #3/4, 3rd Floor, Maruthi Towers, Hosur Main Road, Madiwala, Bangalore - 560068</td>
</tr>
<tr>
<td>DATE OF AUCTION</td>
<td><strong>Online Price Bid cum Reverse Auction Date:</strong> Dynamic Sealed Bid Time: Reverse Auction Time: (will be specified at later) (** Auto extension as applicable)**</td>
</tr>
<tr>
<td>DOCUMENTS ATTACHED</td>
<td>Business rule for Online price bidding cum reverse auction (Annexure-1) Terms &amp; conditions of Online price bidding cum reverse auction Process Compliance Statement (Annexure-2) Price Confirmation (Annexure-3) Contact Information</td>
</tr>
</tbody>
</table>

**Note:**

The bidders are requested to note that they should have a valid digital Certificate issued by any of the valid certifying authorities to participate in the online bidding. Those vendors who are not in possession of a valid digital certificate are requested to apply for the same well in advance to avoid any last minute hassles. The bidders may contact the service provider if they are not in possession of a valid digital certificate.

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**CONTRACTOR**
A) General Terms and Conditions of Online Price Bidding cum Reverse Auction

1. Against this Enquiry for the subject item/system with detailed scope of supply as per our specification, KIOCL Limited, hereinafter referred to as KIOCL, may resort to “ONLINE PRICE BIDDING CUM REVERSE AUCTION PROCEDURE”.

2. For the proposed Online price bidding cum reverse auction, technically and commercially acceptable bidders only shall be eligible to participate. Bidders are requested to ensure that they have valid digital certificate well in advance so as to confirm participation before the online price bidding cum reverse auction.

3. KIOCL will engage the services of a service provider who will provide all necessary training and assistance before commencement of online price bidding on Internet. Service provider shall also explain to the bidders, all the rules related to the Online Price bidding cum Reverse Auction / Business Rules.

4. Business rules like event date, time, bid decrement, extensions, etc. also will be communicated through service provider.

5. Any commercial loading shall be intimated to bidders in advance and it shall be added to price during ONLINE PRICE BID dynamic auction process. For evaluation purpose, commercial loading if any, shall be added to the quoted price of respective bidder. However for ordering only the final bid placed by you shall be considered.


7. Vendors have to fax / e-mail the compliance form in the prescribed (provided by service provider) before start of Online price bidding. Without this the vendor will not be eligible to participate in the event.

8. Online price bidding cum Reverse auction will be conducted on schedule date & time.

9. At the end of Online price bidding cum reverse auction event, the bidders who had participated in the event has to fax / e-mail the duly signed filled-in prescribed format in their company letter head as provided on case-to-case basis to KIOCL through service provider within 24 hours of auction without fail.
B) Business Rule for finalization of the Online Price Bidding cum Reverse Auction.

KIOCL has made arrangement with M/s BOB eProcure Solution Pvt. Ltd., who shall be KIOCL’s authorized service provider for the same. Please go through the guidelines given below and submit your acceptance to the same along with your Commercial Bid.

1. Online price bidding cum reverse auction shall be conducted by KIOCL, on pre-specified date, while the vendors shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by vendors themselves. In extreme case of failure of Internet connectivity, (due to any reason whatsoever may be) it is the bidders’ responsibility/ decision to send fax communication immediately to M/s BOB eProcure Solution Pvt. Ltd., furnishing the price the bidder wants to bid online with a request to the service provider to upload the faxed price on line so that the service provider will up load that price on line on behalf of the Bidder. It shall be noted clearly that the concerned bidder communicating this price to service provider has to solely ensure that the fax message is received by the service provider in a readable/ legible form and also the Bidder should simultaneously check up with service provider about the clear receipt of the price faxed. It shall also be clearly understood that the bidder shall be at liberty to send such fax communications of prices to be up loaded by the service provider only within the closure of Bid time and under no circumstance it shall be allowed beyond the closure of Bid time/ reverse auction. It shall also be noted that the service provider should be given a reasonable required time by the bidders, to upload such prices online and if such required time is not available at the disposal of the Service provider at the time of receipt of the fax message from the bidders, the service provider will not be uploading the prices and either KIOCL or the service provider are not responsible for this unforeseen circumstances.

In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the online price bidding cum reverse auction successfully. Failure of power at the premises of vendors during the Online price bidding cum Reverse auction cannot be the cause for not participating in the Online bidding auction. On account of this, the time for the auction cannot be extended and neither KIOCL nor M/s. BOB eProcure Solution Pvt. Ltd .is responsible for such eventualities.
2. The detailed process for online price bidding cum reverse auction is explained below:

**The online price bidding event will be conducted in three stages :-**

**STAGE -I : Online initial price bid**

At scheduled time, the screen for On-line price bidding will be launched wherein the techno-commercially qualified bidders will be allowed to submit their offers through online.

During the Stage-I online initial price bidding, the bidders would be required to quote price only on the basis of price terms indicated in their sealed price bid submitted along with techno-commercial bid before.

**STAGE –II : Start Bid Price**

After the expiry of the time for submission of on-line initial price bids, the lowest Price will be frozen by the system as the Start Bid Price (SBP) for Stage – III online bidding.

**Stage – III: Reverse Auction on Start Bid Price**

a) In Stage III of the online competitive bidding, computer screen will display Start Bid Price and which shall be visible to the all vendors participated in the initial online price bid auction during the start of the reverse Auction. You will be required to start bidding after announcement of Start Bid Price and decrement amount. Also, please note that the start price of an item in online reverse auction is open to all the participated online bidders. Any bidder can start bidding, in the online reverse auction, from the start price itself. If the start price is your own price, you still need to bid in the online reverse auction. Also, please note that the first online bid that comes in the system during the online reverse auction can be equal to the auction's start price, or lesser than the auction's start price by one decrement, or lesser than the auction's start price by multiples of decrement. The second online bid and onwards will have to be lesser than the L1 rate by one decrement value, or lesser than the L1 rate by multiples of the decrement value.

b) **Those vendors who have participated in the Initial online Price Bid Auction, will only be eligible to participate in the subsequent English Reverse Auction.**

c) Online Initial Price Bid will be for **30 minutes** and Online English Reverse (no ties) Auction shall be for a **period of one hour** with a 30 minutes time difference between Initial Price Bid and RA. If a bidder
places a bid in the last 10 minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction’s duration shall get extended automatically for another 10 minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last 10 minutes and if that bid gets accepted. If the bid does not get accepted, the auto-extension will not take place even if that bid might have come in the last 10 minutes. In case, there is no bid in the last 10 minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, vendors are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

d) The commercial loading factor, bid decrement amount shall be specified by KIOCL before start of bidding. The bidder can bid lower than the start bid price in reverse auction by a bid decrement or multiple of Bid decrement.

e) Any commercial loading shall be intimated to bidders in advance and it shall be added to price during dynamic auction process. For evaluation purpose, commercial loading if any, shall be added to the quoted price of respective bidder.

f) Bidder will be able to view the following on your screen along with the necessary fields in the English Reverse (no ties) (Reverse Auction):

   a. Leading Bid in the Auction (only total price)
   b. Bid Placed by you
   c. Your Own Rank
   d. Start Bid Price & Bid Decrement value.

   g) After the completion of English Reverse (no ties), the **Closing Price (CP)** shall be available.

   **h)** **At the end of the Reverse Auction, Service Provider will evaluate all the bids (final price) submitted and final price comparative statement will be forwarded to KIOCL for further processing.**

   i) The bidders who have participated in the event, shall be required to submit the final prices, quoted during the English Reverse (no ties) in **Annexure-C Format** after the completion of Auction to Service Provider / KIOCL duly signed and stamped as token of acceptance without any new condition other than those already agreed to before start of auction.

   j) Bids once made by the bidders, cannot be cancelled / withdrawn.

   k) During the Online English Reverse (No Ties) Auction, if no bid is received in the auction system/website within the specified time duration
of the online price bidding cum reverse auction, then KIOCL, at its discretion, may scrap the online price bidding cum reverse auction process and open only sealed price bids of all technically and commercially acceptable bidders submitted earlier along with techno-commercial bids.

1) KIOCL shall be at liberty to cancel the reverse auction process / tender at any time, before ordering, without assigning any reason.

3. Other terms and conditions shall be as per your techno-commercial offers and other correspondences till date.

4. KIOCL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause.

5. Bidders are required to submit their acceptance to the terms and conditions given above before participating in the reverse auction.

6. Our Service provider shall explain all the Rules related to the Online Price Bidding cum Reverse Auction/ Business Rules Document to be adopted along with bid manual. You are required to give your compliance on it before start of bid process.

7. **Bidding Currency, Price Terms, Unit of Measurement, and Validity of Bids: As per techno-commercial bid submitted before.**

8. At the end of the reverse auction, bidder has to provide a detail price break up for his lowest offer (if KIOCL insists the same) within 24 hours

**OTHER TERMS & CONDITIONS:**

1. The Bidder shall not involve himself or any of his representatives in Price manipulation of any kind directly or indirectly by communicating with other suppliers / bidders.

2. The Bidder shall not divulge either his Bids or any other exclusive details of KIOCL to any other party.

3. KIOCL’s decision on award of Contract shall be final and binding on all the Bidders.

4. Our Service Provider M/s. BOB eProcure Solution Pvt. Ltd shall not have any liability to Bidders for any interruption or delay in access to the site irrespective of the cause.

5. M/s BOB eProcure Solution Pvt. Ltd is not responsible for any damages, including damages that result from, but are not limited to negligence.
6. M/s BOB eProcure Solution Pvt. Ltd. will not be held responsible for consequential damages, including but not limited to systems problems, inability to use the system, loss of electronic information etc.

**Change in Business Rules, Terms & Conditions of Reverse Auction :**

1) KIOCL reserves the right to modify / withdraw any of the Business rules, Terms & conditions of online price bidding cum reverse Auction at any point of time.

2) Modifications of Business rules, Terms & conditions of Reverse Auction will be made available on website immediately.

3) Modifications made during the online price bidding and Reverse Auction event will be advised to participating Bidders immediately.

__________________________  
CONTRACTOR
Process Compliance Form

(The bidders are required to print this on their company’s letter head and sign, stamp before faxing)

To
M/s. BOB eProcure Solution Pvt. Ltd.
Bangalore.

Sub: Agreement to the Process related Terms and Conditions for the online price bidding cum Reverse Auction

Dear Sir,

This has reference to the Terms & Conditions for the Online Price bidding cum Reverse Auction mentioned in the Tender No. TS/BFU/O&M/F-288/*** Date: **.09.2016 for Operation and Maintenance contract for KIOCL’s Blast Furnace Unit at Panambur, Mangalore.

This letter is to confirm that:

1. The undersigned is authorized representative of the company.
2. We have studied the Commercial Terms and the Business rules governing the Online price bidding cum Reverse Auction as mentioned in your letter and confirm our agreement to them.
3. We also confirm that we have a valid digital certificate which will be valid for the subject tender whenever we sign on the bid submission.
4. We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
5. We also confirm that we will fax the price confirmation & break up of our quoted price as per Annexure 3 & the price bid format in the tender document.
6. We, hereby confirm that we will honour the Bids placed by us during the auction process.

With regards
Signature with company seal
Name –
Company / Organization –
Designation within Company / Organization –
Address of Company / Organization –

CONTRACTOR
To:

M/s BOB eProcure Solution Pvt. Ltd.
#3/4, 3rd Floor, Maruthi Towers,
Hosur Main Road,
Madiwala, Bangalore – 560068

Sub: Final price quoted during online price bidding cum reverse auction and price break up for Operation and Maintenance contract for KIOCL’s Blast Furnace Unit at Panambur, Mangalore.

Ref: 1. Tender Enquiry No. TS/BU/O&M/F-288/153 Date 09.01.2017
2. E-Auction date. ........................................
3. Our Offer No. dt.

Dear Sir,

We confirm that we have quoted final Price is as under:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>Reference</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Service provider manpower Cost per year</td>
<td>Annexure – G (a)</td>
<td>Quoted</td>
</tr>
<tr>
<td>2</td>
<td>Supply of Hydra, JCB, Tractor, Tipper, Loader etc by Service provider per year</td>
<td>Annexure – G (b)</td>
<td>Quoted</td>
</tr>
<tr>
<td>3</td>
<td>Total cost Sl. no. 1 + 2 =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Total estimated PIG IRON production per year ‘ = 550 MT/day X 360 days in a year</td>
<td></td>
<td>198000 MT</td>
</tr>
<tr>
<td>5</td>
<td>Cost per Tonne (Sl. no. 3. vvvvvv total cost in Rs. /198000 MT) in Rs.</td>
<td></td>
<td>Rs. XXXXX</td>
</tr>
<tr>
<td>6</td>
<td>Manual loading of pig iron into trucks/containers(Annuxure Gc)</td>
<td></td>
<td>Rs……/MT</td>
</tr>
<tr>
<td>7</td>
<td>Total cost(Sl.no.5+6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
1. Bidders shall submit the price breakup as per Annexure-G Price bid format.
2. The quoted rate / amount shall be exclusive of Applicable Service tax & Cess

Thanking you and looking forward to the valuable order from KIOCL.

Yours sincerely,

Signature and Name & Company Seal

For ________________

CONTRACTOR

Seal & Signature of the Bidder
CONTACT INFORMATION

M/s Bob eProcure Solutions Pvt. Ltd  
#3/4, 3rd Floor, Maruthi Towers, Hosur Main Road, Madiwala, Bangalore - 560068

Ms. Marita Ravi : 080 4900213  
E-mail : marita.ravi@bobeprocure.com  
Fax Nos : 080 49000211 / 42001251

KIOCL Limited, Technical Services Department, Block II, Koramangala, Sarjapur Road, Bangalore -560 034 Karnataka State

Mr. B. R. Alva  
Joint General Manager I/c, BFU Blast Furnace Unit, Panambur, Mangalore  
Mobile: 09449871533  
Email: bfugmp@kioclltd.com

Mr. Noor Ahmed  
Dy. General Manager (CP&TS)  
P&T: 080-25531461-70(Ext.-275)  
Mob. No. 8105133993  
Fax : (080) – 25532153  
E-Mail : bgmcpts@kioclltd.com

Mr. Kolar Srinivasan  
Asst. General Manager (Oprn) Blast Furnace Unit, Panambur, Mangalore  
Mobile: 09449871536  
Email: bfuoperation@kioclltd.com
INTEGRITY PACT

THIS AGREEMENT is entered into between the following Parties:
KIOCL Limited, IInd Block, Koramangala, Bangalore 560 034 hereinafter referred to as “The Principal”,

and

Name & Address of the Party
……………………………………
……………………………………
……………………………………
hereinafter referred to as “The Tenderer/ Contractor”

Preamble

The Principal intends to award a contract, following its laid-down organizational procedures, Operation and Maintenance contract for KIOCL’s Blast Furnace Unit at Panambur, Mangalore. The Principal values full compliance with all relevant laws and regulations and the principles of economical use of resources and of fairness and transparency in its relations with its Tenderer(s) and /or Contractor(s).

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organization, "Transparency International" (TI). Following TI's national and international experience, the Principal will appoint an Independent External Monitor (IEM) who will monitor the tender process and the execution of the Contract for compliance with the principles mentioned below.

IT IS AGREED AS FOLLOWS:

Definitions:

a) “Principal” means KIOCL LIMITED, incorporated under the Companies Act 1956, having their registered office at Koramangala, Bangalore – 560 034 and includes their successors.

b) “Tenderer” means the person, firm or company submitting a tender against the Invitation to Tender and includes his/ its/ their staff, consultants, parent and associate and subsidiary companies, agents, consortium and joint venture partners, sub-contractors and suppliers, heirs, executors, administrators, representatives, successors.
c) “Contractor” means the Tenderer whose tender has been accepted by the principal or Company whose tender has been accepted and shall be deemed to include his/ its/ their successors, representatives, heirs, executors and administrators unless excluded by the Contract.

d) "Independent External Monitor" means a person, hereinafter referred to as IEM, appointed, in accordance with clause 8.a below, to verify compliance with this agreement.

e) "Party" means a signatory to this agreement.

f) “Contract” means the contract entered into between the Principal and Tenderer/Contractor for the execution of work mentioned in the preamble above.

Commitments of the Parties

Section 1 - Commitments of the Principal:-

The Principal commits itself to take all measures necessary to prevent corruption (inducement to violate duty assigned to its employees) and to observe the following principles;

i) No employee of the Principal, personally or through family members or any third person, will in connection with all stages of tendering or the execution of Contract, demand or take a promise, or accept, for him/herself or any third person, any material or non-material benefit which he/she is not legally entitled to;

ii) The Principal will, during the tender process, treat all Tenderers with equity and reason. The Principal will in particular, before and during the tender process, provide to all Tenderers the same information and will not provide to any Tenderer any information/clarification through which the Tenderer could obtain an advantage in relation to the tender process or the Contract execution;

iii) The Principal will not take, directly or indirectly, any steps, which could unduly influence the functioning of IEM.

iv) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti-corruption Laws of India/guidelines of Govt. / guidelines of CVC/guidelines of Principal, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

v) If the Principal obtains information 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 a substantive suspicion in this regard, the Principal will inform the Vigilance Department of the principal.
Section 2 - Commitments of the Tenderer(s)/Contractor(s):

2.1 The Tenderer /Contractor commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the Contract execution;

i) The Tenderer / Contractor will not directly or through any other person(s) or firm, offer, promise or give to the Principal, or to any of the Principal’s employees involved in the tender process or the execution of the Contract or to any third person any material or immaterial benefit which he / she is not legally entitled to in order to obtain, in exchange, an advantage during the tender process or to vitiate the Principal’s tender process or the execution of the Contract.

ii) The Tenderer / Contractor will not enter with other Tenderers into any illegal agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or actions to restrict competitiveness or to vitiate the Principal’s tender process or the execution of the Contract.

iii) The Tenderer / Contractor will not commit any criminal offence under the relevant Anti-corruption Laws of India; further, the Tenderer / Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

iv) The Tenderer / Contractor of foreign origin shall disclose the name and address of the agents/representatives in India, if any. Similarly, the Tenderer / Contractor of Indian Nationality shall furnish the name and address of the foreign principals, if any.

v) The Tenderer / Contractor will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

vi) The Tenderer/ Contractor will not take, directly or indirectly, any steps, which could unduly influence the functioning of IEM.

vii) The Tenderer / Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.2 Obligation to Ensure Compliance

a). Each Party will take all reasonable steps to ensure that the provisions of this agreement which are binding on it are complied with by all of its staff, consultants, parent and associated and subsidiary companies, agents, consortium and joint venture partners, sub-contractors and suppliers.

b). Each Party will appoint an appropriate senior manager with responsibility for ensuring that the provisions of this agreement are complied with.
Section 3 - Disqualification from tender process and exclusion from future contracts

a). If the Tenderer, before award of Contract, has committed a transgression through violation of any of the terms **under section 2 above** or in any other form such as to put his reliability or credibility as Tenderer into question, the Principal is entitled to disqualify the Tenderer from the tender process or to terminate the Contract, if already signed, for such reason.

b). If the Tenderer / Contractor has committed a transgression through a violation of any of the terms **under section 2 above** or in any other form such as to put his reliability or credibility into question, the Principal is entitled also to exclude the Tenderer / Contractor from future Contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressors within the company hierarchy of the Tenderer / Contractor and the amount of the damage. The exclusion will be imposed for a minimum of six (6) months and a maximum of three (3) years.

c). If the Tenderer / Contractor can prove that he has restored/ recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion before the expiry of the period of such exclusion.

d). A transgression is considered to have occurred if, in light of all available evidence, a reasonable doubt is possible.

Section 4 - Compensation for Damages

a). If the Principal has disqualified the Tenderer from the tender process prior to the award according to **Section 3 above**, the Earnest Money Deposit (EMD) furnished, if any, along with the offer as per the terms of the Invitation to Tender (ITT) shall be forfeited. This is apart from the disqualification of the Tenderer as may be imposed by the Principal as brought out at section **3 above**.

b). If the Principal has terminated the Contract according to **Section 3 above**, or if the Principal is entitled to terminate the Contract according to **section 3 above**, the EMD/Security Deposit furnished by the contractor, if any, as per the terms of the ITT/Contract shall be forfeited. This is apart from the disqualification of the Tenderer, as may be imposed by the Principal, as brought out at **section 3 above**.

Section 5 - Previous Transgression

a) The Tenderer hereby declares that no previous transgressions with respect to provisions of Integrity pact occurred in the last three (3) years with any other Company in any country or with any other Public Sector Enterprise in India and, as such, there is no case for his exclusion from the tender process.

b) The Tenderer hereby agrees that if he has made/makes incorrect statement in regard to this aspect, he can be disqualified from the tender process or the Contract, if already awarded, can be terminated for that reason.
Section 6 - Equal treatment of all Tenderers/Contractors/ Sub-contractors

a) The Tenderer / Contractor undertakes to obtain from all sub-contractors a commitment consistent with this integrity pact, and to submit it to the Principal at the time of seeking approval of the principal for appointment of sub-contractors.

b) The principal will enter into agreements with identical conditions as that of this Integrity Pact, with all Tenderers / Contractors

c) It is essential for all tenderers / contractors to sign the Integrity Pact with the company if the value of the transaction is more than 30 lakhs. The principal will disqualify from the tender process all tenderers/ contractors who do not sign this Pact or violate its provisions.

Section 7 - Breaches of this Agreement

a) In the event that any Party believes that there is prima facie evidence that there has been a failure by a Party to comply with any provision of this agreement, such Party will take the following actions:

i) It will report full details of such suspected non-compliance to the IEM and CVO with copies to the Chief Executives of each of the Parties.

ii) If any such non-compliance has been carried out, or assisted by an individual who is a member of a professional association, and such non-compliance may constitute a breach of any disciplinary code of such professional association, such Party may report such matter to the professional association.

b) If such non-compliance may constitute a criminal offence, either in the country in which the Contract is being carried out, or in the home country of the organization or individual which carried out or assisted such non-compliance, such Party may report such matter to the appropriate criminal authorities in those territories.

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b) If such non-compliance may constitute a criminal offence, either in the country in which the Contract is being carried out, or in the home country of the organization or individual which carried out or assisted such non-compliance, such Party may report such matter to the appropriate criminal authorities in those territories.

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Section 8 - Independent External Monitor/Monitors (IEM)

a). The Principal, will appoint a competent and credible IEM/Number of IEMs for the duration of this agreement from the panel of IEMs appointed in consultation with the Central Vigilance Commission (CVC).
b). The IEM will assess, on an independent and objective basis, the extent to which the Parties comply with their obligations under this agreement.

c). The Parties will, after submission of a tender; after the award of any contract to them and for the duration of the contract:

   i) Allow the IEM unrestricted access to all books, records and staff relevant to such tender;

   ii) Ensure that the IEM has unrestricted access to the relevant books, records and staff of their consultants, parent and associated and subsidiary companies, agents, consortium and joint venture partners, sub-contractors and suppliers.

d). In the event that the IEM believes that there is *prima facie* evidence that there is a violation of this agreement, the IEM will report the same to CEO of the Principal.

e). Upon receipt of a report from the IEM, CEO of the Principal and the Board will discuss and try to agree upon the appropriate action to be taken in line with *sections 3, 4 & 5 above* to deal with such violation.

f). The IEM has no power to inquire any of the Parties to undertake any actions. No statement by the IEM, whether oral or in writing, is binding on any of the parties. Any Party in legal or dispute resolution proceedings can use all reports and other documentation issued by the IEM. The IEM can be called as a witness in legal or dispute resolution proceedings.

g). Fee and /or any other incidentals including traveling/conveyance expenses, if any, payable to IEM shall be borne by the Principal.

h). The IEM can only be removed from his appointment, if:

   1. All parties agree in writing to remove him; or
   2. He resigns; or
   3. He is removed from his office by order of a Court having appropriate jurisdiction.

i) On completion of the term by the IEM or if the IEM is removed from his appointment or in case of death of IEM (whichever is earlier), the Principal will appoint another IEM as per *section 8.a) above* for the remaining duration of this agreement.

**Section 9 - Duration of Agreement**

a). This agreement comes into force as soon as it has been signed by all the Parties have signed it. It cannot be terminated or varied except by the written agreement of all the Parties.

b). This agreement will expire after 12 months from the date of last payment under the respective Contract for the Contractor, and for all other Tenderers 6 months after the award of the Contract.
Section 10 - Other Provisions

a). The Principal will disqualify from the tender process all Tenderers who do not sign this Pact or violate its provisions.

b). Should any occasion arise entailing IEM to undertake any investigation under the provisions of this agreement, the venue for such investigation shall generally be at KIOCL Corporate Office, Kormangala, Bangalore –560 034.

c). This agreement is subject to Indian law. Place of performance and jurisdiction is the corporate office of the Principal. In case of any dispute, the courts at Bangalore only shall have jurisdiction.

d). Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

e). Addresses along with other relevant details of the Chief Executives of the Parties are as given under;

<table>
<thead>
<tr>
<th>1. Principal:</th>
<th>Tel : 080-25531322(O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairman-cum-Managing-Director,</td>
<td>080-25531272(O)</td>
</tr>
<tr>
<td>KIOCL Limited</td>
<td>Fax : 080-25521584(O)</td>
</tr>
<tr>
<td>II–Block, Koramangala,</td>
<td></td>
</tr>
<tr>
<td>BANGALORE – 560 034</td>
<td></td>
</tr>
<tr>
<td>INDIA.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Tenderer / Contractor</th>
<th>Tel:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mobile:</td>
</tr>
<tr>
<td></td>
<td>Email:</td>
</tr>
<tr>
<td></td>
<td>Fax:</td>
</tr>
</tbody>
</table>

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

g). If the contractor is a partnership or consortium, all partners or consortium members must sign this agreement.

For the Principal                                      For the Tenderer/ Contractor

Place……………………               Place……………………

Date …………………...               Date …………………...

Seal & Signature of the Bidder
## SCHEDULE OF ITEMS
(UN-PRICE FORMAT)

Name of the job: Operation and Maintenance of KIOCL’s Blast Furnace Unit, Panambur, Mangalore.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>Reference</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bidder manpower Cost per year</td>
<td>Annexure – G (a)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supply of Hydra, JCB, Tractor, Tipper, Loader etc by Bidder per year</td>
<td>Annexure – G (b)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Total cost(Sl.no. 1+2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Total estimated production of Pig Iron (including small pigs and pig iron chips) per year (= 550 \text{MT/day} \times 360 \text{days in a year})</td>
<td></td>
<td>198000 MT</td>
</tr>
<tr>
<td>5</td>
<td>Cost per Tonne of Pig Iron (including small pigs and pig iron chips) in Rs.(Sl.no. 3 total cost/198000)</td>
<td></td>
<td>Rs. .........../MT</td>
</tr>
<tr>
<td>6</td>
<td>Manual loading of pig iron into trucks/containers</td>
<td>Annexure-G (c)</td>
<td>Rs .........../MT</td>
</tr>
<tr>
<td>7</td>
<td>Total cost(Sl. No.5+6)</td>
<td></td>
<td>Rs. .........../MT</td>
</tr>
</tbody>
</table>

**Note:**

1. The cost of tone of pig iron (including small pigs and pig iron chips), as per weighment weighed in weigh bridges of BFU premises, KIOCL Limited, Mangalore.

2. The payment will be made on tonnage basis of pig iron (including small pigs and pig iron chips) produced plus actual tonnage of manual loading of pig iron.

Seal & Signature of the bidder
### SCHEDULE OF ITEMS
**(UN- PRICE FORMAT)**

Name of the job: Operation and Maintenance of KIOCL’s Blast Furnace Unit, Panambur, Mangalore.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>Reference</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bidder manpower Cost per year</td>
<td>Annexure – G (a)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supply of Hydra, JCB, Tractor, Tipper, Loader etc by Bidder per year</td>
<td>Annexure – G (b)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Total cost(Sl.no. 1+2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Total estimated production of Pig Iron (including small pigs and pig iron chips) per year $\times$ 550 MT/day $\times$ 360 days in a year</td>
<td></td>
<td>198000 MT</td>
</tr>
<tr>
<td>5</td>
<td>Cost per Tonne of Pig Iron (including small pigs and pig iron chips) in Rs.(Sl.3 total cost/198000)</td>
<td></td>
<td>Rs. ........../MT</td>
</tr>
<tr>
<td>6</td>
<td>Manual loading of pig iron into trucks/containers</td>
<td>Annexure-G (c)</td>
<td>Rs. ........../MT</td>
</tr>
<tr>
<td>7</td>
<td>Total cost(Sl. No.5+6)</td>
<td></td>
<td>Rs. ........../MT</td>
</tr>
</tbody>
</table>

**Note:**

1. The cost of tone of pig iron (including small pigs and pig iron chips) as per weighment weighed in weigh bridges of BFU premises, KIOCL Limited, Mangalore.

2. The payment will be made on tonnage basis of pig iron (including small pigs and pig iron chips) produced plus actual tonnage of manual loading of pig iron.

Seal & Signature of the bidder
### PRICE BREAK UP DETAILS FOR ANNEXURE- G (a), G (b) & G (c)

#### Annexure G (a)

**BIDDER MANPOWER COST PER YEAR**

(During BFU Operation & Maintenance period)

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>DESCRIPTION</th>
<th>MANPOWER PER DAY</th>
<th>RATE / day per person</th>
<th>AMOUNT / day</th>
<th>No. of days in a year</th>
<th>Total amount in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>OPERATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>13</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>b</td>
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<td>38</td>
<td></td>
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<td>365</td>
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<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>20</td>
<td></td>
<td></td>
<td>365</td>
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</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>38</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td><strong>SUB TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>MECHANICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>03</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>18</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
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<td></td>
<td></td>
<td>365</td>
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</tr>
<tr>
<td>d</td>
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<td>14</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td><strong>SUB TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><strong>ELECTRICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>1</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>11</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>3</td>
<td></td>
<td></td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>0</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td><strong>SUB TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><strong>CPP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>HIGH SKILLED</td>
<td>4</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>SKILLED</td>
<td>8</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>SEMI SKILLED</td>
<td>2</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>UNSKILLED</td>
<td>2</td>
<td></td>
<td></td>
<td>365</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td><strong>SUB TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note: Above mentioned manpower to be supplied by bidder on all 365 days including Sundays and closed holidays with no extra cost to kiocl. Relivers to be provided with no extra cost to KIOCL.
SUPPLY OF HYDRA, JCB, TRACTOR, TIPPER, LOADER Etc BY BIDDER PER YEAR - Annexure – G (b)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description of Item</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate (Rs)</th>
<th>Amount (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Supply of one mobile crane (8/10 MT) for 24 hours basis with operators with valid licence and Model 2010 onwards for collection of splash guard/ runner jams, shifting of flash guard jams from flash guard to designated yards, assistance to removal of flash guard jams and runner jams, shifting of runner jams to designated locations, Loading of jams, scraps and other materials to tractors, tippers etc., shifting of pumps, motors and other equipments/pipes and tools and tackles to locations as directed by shift in charges, Shifting of boxes in and around PCM and LRS area, shifting of materials to cast house and PCM platforms if required and other jobs as per the instruction of shift in charges.</td>
<td>Hour</td>
<td>8,760</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Supply of one backhoe loader (JCB) along with operator with valid driving license daily on 16 hours basis, in A&amp;B shifts, for collection of auxiliary materials from PCM and LRS, Clearing of scrap and runner jams from in between ladle positioning area in LRS. Loading of the same into tipper/tractors, Assistance to removal of flash guard jams and runner jams, if required, Assistance in shifting of runner jams and flash guard jams to designated locations, Clearing of ladle dumping area jams on a daily basis and loading of the removed materials into tipper/tractor, Housekeeping in LRS area, Shifting of materials to cast house and PCM platforms if required, Clearing of return pigs in PCM, Loading of return pigs to wagon or trucks, Collection and clearing of accumulated scraps and other debris materials from PCM and LRS, Clearing of PCM pouring end area as and when required, Clearing of slag and debris</td>
<td>Hour</td>
<td>5,840</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
accumulated in SGP and other areas. Digging jobs, if any in KIOCL BF Unit premises and other jobs as directed by Shift-In-Charges in the company premises.

03 Supply of two tractors with body having hydraulic lift arrangement, along with operators having valid driving license, daily on 16 hour basis in A & B shift, for shifting of auxiliary materials to designated locations. Shifting of runner jams, flash guard jams to designated locations, Shifting of ladle dumping area jams and other debris material from PCM and LRS to designated locations. Shifting of consumables/ tools & tackles, slag, pig and dust. Weighing of all the above materials shall be taken up at KIOCL BF Unit weigh bridges, if required, before dumping in yards, and other jobs as directed by Shift -In -Charges in the company premises.

| 03 | Supply of two tractors with body having hydraulic lift arrangement, along with operators having valid driving license, daily on 16 hour basis in A & B shift, for shifting of auxiliary materials to designated locations. Shifting of runner jams, flash guard jams to designated locations, Shifting of ladle dumping area jams and other debris material from PCM and LRS to designated locations. Shifting of consumables/ tools & tackles, slag, pig and dust. Weighing of all the above materials shall be taken up at KIOCL BF Unit weigh bridges, if required, before dumping in yards, and other jobs as directed by Shift -In -Charges in the company premises. | Hour | 11,680 |

04 Supplying 02 no 10MT capacity Tipper, in good working condition, on hire basis for full day (24 hours continuously) with heavy vehicle driving licensed drivers and cleaners for transportation of Pig Iron, Iron ore Pellet, Iron ore lump, Limestone, Dolomite, Manganese Ore, Quartzite, Coke, Iron ore fines, coke fines, Dust, Dry pit slag, Granulated slag and any other material from one place to another area inside KIOCL Limited BFU area and also to KIOCL Limited during the validity of contract. The shifting of materials shall be done as per the requirement of the Plant and as per the instructions of Engineer-in-charge.

| 04 | Supplying 02 no 10MT capacity Tipper, in good working condition, on hire basis for full day (24 hours continuously) with heavy vehicle driving licensed drivers and cleaners for transportation of Pig Iron, Iron ore Pellet, Iron ore lump, Limestone, Dolomite, Manganese Ore, Quartzite, Coke, Iron ore fines, coke fines, Dust, Dry pit slag, Granulated slag and any other material from one place to another area inside KIOCL Limited BFU area and also to KIOCL Limited during the validity of contract. The shifting of materials shall be done as per the requirement of the Plant and as per the instructions of Engineer-in-charge. | Month | 12 |

05 Supplying 02 No Tipper of 20 MT capacity in good working condition on hire basis for full day (24 hours continuously) with heavy vehicle driving licensed drivers and cleaners, for Transportation of Pig Iron, Iron ore Pellet, Iron ore lump, Limestone, Dolomite, Manganese ore, Quartzite, coke, iron ore fines, coke fines, Dust, Dry pit slag, Granulated slag and other material form one place to another.

| 05 | Supplying 02 No Tipper of 20 MT capacity in good working condition on hire basis for full day (24 hours continuously) with heavy vehicle driving licensed drivers and cleaners, for Transportation of Pig Iron, Iron ore Pellet, Iron ore lump, Limestone, Dolomite, Manganese ore, Quartzite, coke, iron ore fines, coke fines, Dust, Dry pit slag, Granulated slag and other material form one place to another. | Month | 12 |
area inside KIOCL Limited BFU area and also to KIOCL Limited during the validity of contract. The shifting of material shall be done as per the requirement of the Plant and as per the instructions of Engineer-in-charge.

| 06 | Supply of 02 nos of Front End Loaders (1.7m³ Bucket Capacity) on hourly basis for full day (24 hours continuously) with operators and helpers, for shifting of Coke, Iron ore, Iron Ore Pellet, Limestone, Dolomite, Manganese ore, Quartzite from raw material yard to the ground hoppers. The work also includes shifting, heaping and loading of Pig Iron, Iron ore pellet, Iron ore lump, Limestone, Dolomite, Manganese ore, Quartzite, coke, Iron ore fines, Coke fines, Dust, Dry pit slag, granulated slag and any other material from one place to another area, inside KIOCL BFU Project area and also to KIOCL PF/PP Unit. Shifting of operational consumable items like, mud gun mass, runner mass, salt, husk, mortar, refractory, cylinders (oxygen and LPG) lime etc. The shifting of materials shall be done as per the requirement of the plant and as per the instructions of Engineer-in-charge. Also they have to shift or load any other materials and they have to carry out any other job including removal of hot slag from BF dry pit, granulated slag and miscellaneous jobs as directed by Engineer-in-charge. | Hour | 17,520 |

Total amount Sl. no. 01 to 06 =

Seal & Signature of the bidder
### MANUAL LOADING OF PIG IRON INTO TRUCKS/CONTAINER

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
<th>Rate (Rs.)</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Manual loading of single pieces of pig iron into trucks (to be broken by bidder with no extra cost to KIOCL BF Unit) or unloading of Pig Iron from Wagons</td>
<td>MT</td>
<td>1,38,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Manual loading of single pieces of pig iron into containers / any other type of vehicle as arranged by the customer (to be broken by bidder with no extra cost to KIOCL BF Unit)</td>
<td>MT</td>
<td>59,400</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The quantity in Item No - 01 & 02 are interchangeable.

| Total  | MT   | 198000 | Total amount/ 198000 MT |

Seal & Signature of the bidder
### COMMERCIAL TERMS

Name of the job: Operation and Maintenance of KIOCL’s Blast Furnace Unit, Panambur, Mangalore.

The bidder will be paid as under:

<table>
<thead>
<tr>
<th>Production in MT</th>
<th>Rate / MT</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Production PIG IRON</td>
<td>Rs.……………. as per Sl.No. 5 of Annexure F</td>
<td>Minimum guaranteed production of Pig Iron (Including small pigs and pig iron chips) shall be 16,500 MT per month</td>
</tr>
<tr>
<td>2. Pig Iron loading</td>
<td>Rs. ……………….. as per Sl. No.6 of Annexure F</td>
<td>Total tonnage of Pig iron loaded into trucks/containers per month.</td>
</tr>
<tr>
<td>Total Payment</td>
<td>Sl.No.1 + 2</td>
<td>Minimum guaranteed production of Pig iron per month + Total tonnage of Pig iron loaded into trucks / containers per month.</td>
</tr>
</tbody>
</table>

**Below Minimum guaranteed production of Pig Iron**

For any shortfall in production against minimum guaranteed production of 16500 MT, a penalty of 10% of the quoted rate per ton of shortfall quantity is applicable which will be deducted from the payment.

**Above minimum guaranteed production of Pig Iron**

In the event of increase in production beyond the minimum guaranteed production of 16500 MT, a bonus of 5% of the quoted rate per ton of increased quantity is applicable which will be paid.

**In case of non deployement of machinery & equipment**

In the event of non deployement of machinery & equipment indicated Annexure-G(b), a penalty comprising of quoted rate of the referred equipment plus 10% of quoted rate of referred equipment is applicable which will be deducted prorata basis from the payment.

**In case of non deployement of manpower**

In the event of non deployement of manpower as indicated in Annexure-G(a), a penalty comprising of quoted rate of the referred manpower plus 10% of quoted rate of referred manpower is applicable which will be deducted prorata basis from the payment.

**In case of BF shut down upto 15 days.**

I) In case of furnace planned shut down for the reasons attributable to KIOCL Limited like non availability of raw materials etc, BIDDER SHALL PROVIDE FULL MAN POWER and MACHINERY AS INDICATED IN ANNUXURE –I & II for first 3 days of shut down from 4 day to 15 day service provider shall deploy reduced manpower and machinery as indicated in Annexure-III & IV. KIOCL will pay as per the man power and machinery supplied accordingly.

II) In case of furnace shutdown due to equipment failure, chilling etc due to reasons attributable to KIOCL Ltd, service provider should provide manpower and machinery as instructions of KIOCL Ltd. Pay...
| In case of plant start up, before pig iron production starts | for supplied manpower and machinery will be paid accordingly based on quoted manpower and machinery rates only. |

Bidder shall deploy required manpower and machinery as per instructions of KIOCL LTD. Pay for supplied manpower and machinery will be paid accordingly based on quoted manpower and machinery rates only.