RASHTRIYA ISPAT NIGAM LIMITED
VISAKHAPATNAM STEEL PLANT
VISAKHAPATNAM-530 031

MATERIALS MANAGEMENT DEPARTMENT
(PURCHASE WING)
BLOCK-A, III FLOOR, ADMINISTRATIVE BUILDING
VISAKHAPATNAM STEEL PLANT
VISAKHAPATNAM-530 031 (A.P) INDIA

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OPEN TENDER NOTIFICATION

Invitation to Tender (I T T) No.Pur.6.13.607/WMD/0580 DT. 28/07/2016

FOR CHEMICALWATER TREATMENT OF RECIRCULATION WATER SYSTEMS OF WRM-2, SBM & STM OF VSP

Last date & time for receipt of Tenders : 02/09/2016 **by 10.30 HRS (IST)**

Tender Details can be downloaded from our Website:
WWW.VIZAGSTEEL.COM<TENDERS><MM><TENDERS>.

Note: The bidder should refer to VSP's website regularly for any corrigendum/addendum.

- EXECUTIVE DIRECTOR (MM)

RASHTRIYA ISPAT NIGAM LIMITED

VISAKHAPATNAM STEEL PLANT

VISAKHAPATNAM

Invitation to Tender (I TT) No.Pur.**6.13.607/WMD/0580 DT. 28/07/2016**

FOR CHEMICAL WATER TREATMENT OF RECIRCULATION WATER SYSTEMS OF WRM-2, SBM & STM OF VSP

INDEX

Note: Link for formats for free downloading the following from VSP website

1) **DETAILED TERMS AND CONDITIONS OF INVITATION TO SUPPLY**
2) G C C

Link:www.vizagsteel.com, Click on “Tenders”, Click on “Materials Management Tenders” and Click on “Detailed terms and conditions of Invitation to Tender (ITT”)

RASHTRIYA ISPAT NIGAM LIMITED
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OPEN TENDER NOTICE FOR CHEMICAL WATER TREATMENT OF RECIRCULATION WATER SYSTEMS OF WRM-2, SBM & STM OF VSP

INVITATION TO TENDER (ITT) NO Pur.**6.13.607/WMD/0580 DT. 28/07/2016**

NOTICE INVITING TENDERS FOR CHEMICAL WATER TREATMENT OF RECIRCULATION WATER SYSTEMS OF WRM-2, SBM & STM OF VSP

1.0 Rashtriya Ispat Nigam Limited (RINL), Visakhapatnam Steel Plant (VSP), Hereinafter referred to as PURCHASER, hereby invites tenders CHEMICAL WATER TREATMENT OF RECIRCULATION WATER SYSTEM OF WRM-2, SBM & STM OF VSP conforming to Technical specifications at **Annexure -III** of tender documents.

2.0 QUANTITY: To be specified by the tenderer.

3.0 NO OF SOURCES: One

3.1 Integrity Pact: To be submitted along with the techno –commercial bid duly signed on all pages.

4.0 DELIVERY: The successful Tenderer shall supply material within two weeks' time from the date of LOI / PO without fail for a period of initial 15 days of passivation and 365 days of regular treatment and continue supplies at the offered monthly scheduled quantity basis till completion of treatment period.

5.0 Tenderers should submit their tenders in accordance with the instructions given in the detailed terms of this Invitation to Tender and the formats, which are available for free downloading on our website :**www.vizagsteel.com, Click on "Tenders", Click on "Materials Management Tenders" and Click on "Detailed terms and conditions of Invitation to Tender (ITT") and G C C .**

5.1 Tenderers shall submit their offers in two parts:

Part-A : Techno-Commercial Bid and
Part-B: Price Bid
Please **submit both theabove bids in** separate sealed envelopes super scribing clearly on the envelopes whether it contains Part A: Techno- Commercial Bid or Part B : Price Bid.
Both these covers are to be placed in a third sealed outer cover super-scribing the ITT No. with date and due date.
PART-A Techno-commercial Bid should contain a) Technical Specification duly signed on all pages. b) Commercial format (Annex-II of Detailed Terms and Conditions) c) EMD d) Blanked price bid (Annexure-IV), d) Integrity Pact
Part-B Price bid should contain no caveat conditions.

6.0 Reverse-e-auction : RINL/VSP will go in for Reverse-e-auction for this treatment on one lot basis. Hence tenderers are requested to indicate **their user ID** for participation in reverse-e-auction as per Clause No.17.0 of "Detailed terms & Conditions of ITT" available in our website www.vizagsteel.com. .tenderers shall ensure compliance Clause No. 2.1(g & h) and 17.0 of

"Detailed Terms and Conditions of Invitation to Supply Tender" and ensure submission of all relevant documents complete in all respects.

7.0 Tenders are required to keep their offers valid for a minimum 120 days from the date of tender opening and/ 30 days from the actual date of Reverse-e-auction/price bid opening. The date and time of Reverse-e-auction shall be intimated separately to technically and commercially acceptable tenderers.

8.0 Tenders will be accepted up to **10.30 Hrs. (IST) on the date of tender opening.** Techno-Commercial part of the Tender (Part-A) will be opened immediately thereafter in the presence of the Tenderers or Authorized Representatives of the Tenderers, who may choose to be present. The date and time of price bid opening shall be intimated separately to technically and commercially acceptable tenderers. Price Bids (Part-B) of those Tenderers who have been Techno-Commercially accepted shall be opened in the presence of the Tenderers or Authorized Representatives of the Tenderers who may choose to be present.

9.0 TENDER DOCUMENTS: Tenderers who are interested to participate in the tender can download the tender documents from our website **Website:WWW.VIZAGSTEEL.COM<TENDERS><MM>< TENDERS> and submit their offer on or before 10.30 (IST) on last date of receipt of tender as per the instructions given in the tender documents.**

10.1 All the tenders shall be evaluated on the basis of LANDED Net of CENVAT (LNCP)/ VAT cost.

10.2Notwithstanding anything specified in these Tender Documents, RINL, in its sole discretion and without having to assign any reason reserves to itself the rights:

a) To accept or reject the lowest tender or any other tender or all the tenders;
b) To accept any tender in full or in part;
c) To reject the offers not conforming to the tender terms and
d) To give Purchase preference to Central Public Sector Enterprises (CPSE) as per Government of India guidelines if any.

10.3Notwithstanding anything that is stated in the various documents specified in the tender notice, in case of contradiction, the interpretation shall be in accordance with the statements contained in the Open tender notice CHEMICAL WATER TREATMENT OF RECIRCULATION WATER SYSTEM OF WRM-2, SBM & STM OF VSP and special instructions to tenderers (Annexure-I). Detailed Terms and Conditions of Invitation to Supply Tender and General Conditions of contract (G C C) of VSP which are available at VSP's website: www.vizagsteel.com is a part of this tender.

EXECUTIVE DIRECTOR (MM)

ANNEXURE–I TO TENDER NO.**Pur.6.13.607/WMD/0580 DT. 28/07/2016**

SPECIAL INSTRUCTIONS TO TENDERERS

1.0 ESTABLISHMENT OF CREDENTIALS OF VENDORS WHO ARE NOT ENLISTED PRESENTLY WITH RINL/VSP:

If a tenderer who responds to this tender is not presently enlisted with RINL / VSP, he is requested to furnish copies of the following documents separately in a sealed envelope super scribing "**CREDENTIALS" and the ITT REFERENCE** as the case may be along with the tender:

i)Notarized Statutory manufacturing / service industry certificate, i.e., EM-Part II issued by DIC / NSIC registration certificate for the same / similar items for MSEs.
(Or)
Notarized copy of Certificate of Registration of Shops and Establishments for a dealer / Agent /Trade etc.
(Or)
Notarized copy of Certificate of Incorporation along with Memorandum and Articles of Association of the Private / Public Limited companies.

ii) Notarized Copy of Proprietary / Partnership deals in case of Proprietary / Partnership firms.
iii) Notarized copy of Excise, Sales Tax (CST, VAT), Service Tax Registration certificates and PAN card copy in the name of company in case of Limited companies or in the name of individuals in case of Proprietary firms.
iv) Self-certified Financial worth and audited financial statements for the last three (3) years.
v) Self-certified Purchase Orders / contracts copies for the same or similar tendered item/s.
vi) Self-certified ISO certificate, if any

Kindly note that the above information is required to assess the credibility of the vendor not presently enlisted with RINL / VSP. The tender of un-listed vendor shall be liable for rejection in case of non-submission or incomplete submission of the above documents except (vi) of above or RINL/VSP finds that the credibility of the un-listed Vendors is not satisfactory on the basis of the documents furnished. The Vendor shall produce originals of the above documents for verification, if RINL / VSP so desires. RINL / VSP's decision in this regard is final.

1.1 PRE QUALIFICATION CRITERIA (VITAL)

Party should have treated any one of the contaminated recirculation water systems like Blast furnace, Steel Melt Shop and Hot rolling Mills in any integrated steel plant (minimum 2 million tons per year) at least for one year without any interruption in the last 5 years. The party should have undertaken both supply of chemicals and their application with performance guarantee. Party should produce order copies and satisfactory performance certificate.

2.0 **GENERAL INFORMATION / DATA / DOCUMENTS TO BE FURNISHED BY TENDERERS:**

Tenderers who may be the Manufacturers or the Suppliers of the system as at Annexure.III shall furnish information / data / documents / printed and illustrated literature / brochures covering the following aspects:

a) Detailed information of the Manufacturer along the latest copies of the Executed / ongoingorders (during the last 1 year) of similar system with different clients in India.
b) Documents showing the exact nature of ownership.

c)Tenderers who may be suppliers, offering on behalf of a Principal Manufacturer, shall furnish in original the Letter of Authority of the concerned manufacturer, as per the proformaavailable at detailed terms and conditions of Invitation to tender(Available at VSP website), specifically authorized the said supplier to make an offer in response to this Invitation to Tender. This Letter of Authority should be submitted along with Part - A: Techno-commercial bid. The formats are available inDetailed Terms and Conditions of Invitation to Supply Tender (See VSP website.)

2.1 Only one offer should be received from each principal manufacturer either directly or through their Agents. **In case more than one offer is received from the same Principal Manufacturer, then all the offers of the same Principal Manufacturer will be rejected including the direct offer, if any.**

2.2 The tenderers are requested to fill up the check list as at **Annexure – II** of theTender document.

3.0 SUBMISSION OF OFFERS & QUOTING OF PRICE(S):

3.1.1 PRICE BASIS : The price quoted should be on FOR VSP Site basis inclusive of applicable taxes, duties, levies, Insurance and Freight. However, the rate of taxes, duties, levies, Insurance and freight considered are to be indicated separately. **The prices shall remain firm and fixed during the tenure of the contract.** However, any change in statutory taxes and duties shall be reimbursed at actuals during the original contractual delivery period. Any change in taxes and duties beyond the original contractual delivery period is to be borne by the Supplier. **Offer with variable price shall not be considered**

3.1.2 **VALUE ADDED TAX (VAT)**: Tenderers from the State of Andhra Pradesh should be registered under VAT and shall confirm submission of VAT invoice to enable RINL/VSP to avail the input tax credit. Also, the tenderers from A.P shall indicate the TIN (Tax Identification Number) under VAT. For the purpose of evaluation of tenders/bids floated by RINL/VSP for the financial year 2016-17, the rate of ITC that would be available to RINL/VSP shall be as under :

i) Item with 5% VAT qualifies for Input Tax Credit @ 1.74%
ii) Item with 14.5% VAT qualifies for Input Tax Credit @ 11.23%

3.1.3 The price shall remain firm and fixed during the period of contract. Offer with variable price shall be rejected (VITAL)

3.1.4 However, in case tenderers quote any other terms, other than those mentioned in this tender documents, the same shall be loaded as per VSP norms while evaluating their offer.

4.0 TERMS OF PAYMENT:

4.1 **a) Payment for supply of Chemicals**

100% payment along with 100% taxes and duties shall be released on monthly basis for the quantity of chemicals consumed and as certified by the User Department regarding actual

consumption & satisfactory performance certificate within 60 days from the date of Receipt and Acceptance of Material against submission of following documents:

a) Tax Invoice in duplicate for quantity consumed during the month.
b) Copy of GARN for the quantity consumed.
c) Certificate from User Department towards satisfactory performance of the chemicals.

b) Payment for Application Charges :

Application charges along with Service Tax @ 15% (or as applicable) , shall be released within 15 days based on Satisfactory Performance Certificate to be issued by User dept, as per Application Contract..

4.1.1 In case of indigenous offers, PURCHASER encourages Electronic Fund Transferfor payment direct to Seller's Bank account on due date for which Seller has to furnish Bank account details in the format prescribed by PURCHASER. Cheque date will be considered for arriving at 60th day wherever payment is made by Cheque. Any other mode of payment term will be suitably loaded while evaluating the tender.

4.1.2 The price bid should only contain the price quoted and other financial terms should be given in the techno-commercial bid and not in any other accompanying documents or statement. No extra weightage shall be given for any extra credit offered beyond ITT payment terms of 60 days interest free credit from the date of acceptance of material for ranking / evaluation purpose.

4.1.3 In case an offer with deviations to payment terms is considered by RINL/VSP, it shall be loaded suitably for the purpose of comparison with other offers. The general principal is to load for the additional financial implication to which RINL / VSP may possibly be exposed on account of such deviation. The decision of RINL / VSP in this regard shall be final and binding.

5.0 **VALIDITY OF THE OFFER**:

The offer shall be firm and valid for a period of **120 (one hundred & twenty days**) from the date of opening of tenders.

6.0 BID MONEY : (VITAL)

6.1 The tender shall be considered only if BID MONEY in Indian Rupees by means of Demand Draft or Bankers' Cheque (both subject to realization) drawn on any Scheduled Bank and payable to Rashtriya Ispat Nigam Ltd. at Visakhapatnam or in Electronic Mode, **for an amount Rs.3,75,000/- (Rupees Three Lakhs Seventy Five thousand only) submitted along with or prior to Opening of Part-A: Techno-commercial Bid.**

NOTE : The following are exempted from submission of EMD/BID MONEY

1) **Central/State Public Sector Enterprises of India**
2) **Vendors registered with VSP for the tendered items.**
3) SSI Units/Micro and Small scale enterprises (MSEs) registered with NSIC/District Industries Centre of the State Government concerned for the items(s)/item category of tendered items(s) for which the tenderer is registered with the respective authority.

SSIs/MSEs and units registered with RINL need to submit notarized copies of the relevant valid registration certificates for claiming exemption of EMD.

6.2 The BID Money should be valid for 180 (One hundred and eighty) days from the date of tender opening. **Tenders received without the Bid MONEY of requisite value will be summarily rejected. BID MONEY , if paid in cash, shall not accrue interest.**

6.3 The BID MONEY must be submitted along with or prior to Opening of Techno-Commercial Bid (Part-A). **Tenders received without the BID MONEY of requisite value shall not be considered by RINL.**

6.4 The BID Bond as mentioned above should be established either in the form of Bank Guarantee issued by any of the Nationalized Bank or any standard scheduled Bank (whether situated at Visakhapatnam or outstation)) with a clause to enforce the same on their local branch at Visakhapatnam

The Bank Guarantees from other Scheduled Banks (other than Indian Nationalized Banks) should however be from the branch located in Visakhapatnam only. The Bond established through Co-operative Banks are not acceptable. The BID Bond should be valid for 180 (One hundred and eighty) days from the date of tender opening.

6.5 The BID MONEY shall be forfeited:

a) if a Tenderer withdraws or modifies his BID during the period of BID validity specified by the Tenderer, or

b) in case of a successful Tenderer fails to furnish Performance Guarantee Bond in accordance with clause 12.0 of Annexure – I of the Tender documents.

7.0 STATEMENT OF DEVIATIONS:

7.1 If any tenderer is unable to accept any particular term(s) as incorporated in the Tender document, or proposes any deviation there from, the Tenderer shall enclose along with his offer, a statement of deviations clearly spelling out the deletions / deviations proposed, which may, however, have an impact on the **evaluation of his offer or rejection by RINL**. **Each tenderer shall give an undertaking along with his offer confirming his acceptance to all the terms and conditions of the Tender document, except for the deletions / deviations specifically proposed by them in their offer**.

7.2 Offers with any deviation to the following terms and conditions contained in the tender document such offers are liable for rejection:

(a) Specification (b) Validity of offer (c) Price firmness (d) Liquidated damages,
(e) Weighment (f) Risk Purchase (g) Submission of BID BOND/BID MONEY
(h) Consent for opening Performance Guarantee Bond (i) Inspection (j) Penalty and total rejection
(k) Arbitration and Jurisdiction and (l) Default (m) offers received by cable, e-mail, telex, fax or Telegram (s) late / delayed offers.

8.0 **OTHER GENERAL POINTS RELATING TO THE PREPARATION / SUBMISSION / DESPATCH OF THE OFFER:**

8.1 The detailed offer together with its enclosures should be submitted in two parts:

Part-A – Techno-Commercial Bid

Part-B – Price Bid.

in two separate sealed envelopes.

Part-A should contain all details on technical specifications, other information/ data/ documents/ confirmations/ deviations, if any. A price format as in the Part-B after **blanking the prices** is also to be placed in the Part-A. However, no indication of price in any form, shall be given in Part-A. Confirmation with regard to information/ data/ documents to be furnished by tenderers above are also to be enclosed in Part-A.

Part-B: Price Bid should be submitted separately. (Price bid format is available at Detailed Terms and Conditions of Invitation to Supply Tender which is available at our website. In case, the tenderer is a dealer or trader who is participating on behalf of a manufacturer, the tenderer shall furnish assessable value for each item they have quoted along with Excise Tariff Nos.

8.2 Each page of the offer should be numbered consecutively, referring to the total number of pages comprising the entire offer, at the top right-hand corner of each page.

8.3 Each page of the offer should be signed by the authorizing officer(s) of the Tenderer.

The Part-A & Part-B of the offer together with its enclosures in separate sealed envelopes, should be placed in an envelope which should bear, in Block capital letters, superscription **"ITT No: Pur.6.13.607/WMD/0580 DT. 28/07/2016**and should also bear superscription:

Part-A: Techno-Commercial Bid or
Part-B: Price Bid.

The two envelopes should then be sealed separately. The name and address of the tenderer should be mentioned on each of this envelope.

8.4 The envelopes referred to in para8.3 above should be placed in another envelope which should be addressed to the **Executive Director (MM), Administration Building, Block-A, Purchase Dept, Visakhapatnam Steel Plant, Visakhapatnam 530 031, Andhra Pradesh, India** and should bear in Block Capital Letters the superscription **"OFFER IN RESPONSE TO TENDER NO.Pur.6.13.607/WMD/0580 DT. 28/07/2016.** This envelope should also be sealed. The name and address of the Tenderer should be mentioned on this envelope as well.

8.5 Tenders will be accepted upto**10.30 Hrs (IST), on tender opening.** The Techno-Commercial bid of the tenders shall be opened immediately thereafter in the presence of the tenderers or authorized representative of the tenderers, who may choose to be present. The date and time of opening of price bid shall be intimated separately to technically and commercially accepted tenderers. Price Bids (Part-B) of those Tenderers who have been Techno-Commercially accepted shall only be opened in the presence of the tenderers or Authorized representatives of the Tenderers who may choose to be present.

8.6 In case any tenderer is silent on any clauses mentioned in this tender document, VSP shall construe that the tenderer had accepted the clauses as per this Invitation to Tender.

8.7 The price quotations should be given in the Part – B : Price bid should not contain any other accompanying documents or statement. No revision in the price (s), terms and conditions quoted in the offer will be entertained after the last date and time fixed for receipt of tenders.

8.8 Offers received by VSP by cable, e-mail, telex, fax or telegrams and tenders received late /

delayed will not be considered under any circumstances.

9.0 Inspection: No pre despatch inspection shall be carried out by VSP. However, the party should submit test certificate for the supplies made.

10.0<u>WEIGHMENT</u>:

The weight recorded at VSP Weigh bridge shall be the basis for release of payment. The payment shall be restricted to the weight recorded at VSP Weigh bridge or LR or the Invoice weight , whichever is lower.

11.0 <u>LIQUIDATED DAMAGES</u>:

Delivery is the essence of the Contract and hence should any consignment be delayed, liquidated damages @ 0.5% of the price of the delayed consignment, for each week or part thereof shall be levied and recovered subject to a maximum of 10% of the total order value.

12.0 **PERFORMANCE BANK GUARANTEE : (VITAL)**

The successful tenderer shall submit performance bank guarantee to the tune of 10%of the total landed value including application charges as per VSP format (Annexure.V)

13.0 **<u>DEFAULT :</u>**

Should the SELLER fail to provide the MATERIAL for delivery by the time or times agreed upon or should the SELLER IN ANY MANNER OR OTHERWISE FAIL TO PERFORM THE ACCEPTANCE TO Tender should a receiver be appointed on its assets or make or enter in any arrangements or composition with Creditors or suspend payments (or being a company should enter into liquidation either compulsory or voluntary), the PURCHASER shall have power to declare the Acceptance to Tender as at an end at the risk and cost of the SELLER in every way. In such a case, SELLER shall be liable for any expenses, damages or losses which the PURCHASER may incur, sustain or be put to by any reason of or in connection with SELLER'S DEFAULT. This Clause is however subject to Force Majeure, ass specified in the General Conditions of Contract, available in VSP's website.

14.0 **<u>RISK PURCHASE</u>**

The PURCHASER reserves the right to take Risk Purchase action at the cost and risk of the SELLER, in case he fails to deliver the materials in the specified schedule and the differential cost shall be recovered. The cancellation of the Acceptance to Tender as stated in para 10 herein above may be either for whole or part of the Acceptance to Tender at PURCHASER's option. In the event of the PURCHASER terminating the Acceptance to Tender in whole or in part, he may procure, on such terms and in such manner as he deems appropriate, supplies similar to those so terminated and the SELLER shall be liable to the PURCHASER for any excess costs for such similar supplies. However, in case of part termination of Acceptance to Tender by the PURCHASER, the SELLER shall continue the performance of the Acceptance to Tender to the extent it is not terminated under the provisions of this Clause.

15.0 **<u>FORCE MAJEURE</u>**:

15.1 If either the SELLER or the PURCHASER be prevented from discharging his or their obligation under this Acceptance to Tender by reason of arrests or restraints by Government of

people, war blockade, revolution, insurrection, mobilization, strikes, civil commotion, Acts of God, Plague or other epidemics, destruction of the MATERIAL by fire or flood or other natural calamity interfering with the production, loading or discharge, the time for delivery shall be extended by the time or times not exceeding one year, during which production, loading or discharge is prevented by any such causes as herein above mentioned. The party invoking protection under this clause shall within 15(fifteen) days of the occurrence of Force Majeure causes put the other party on notice supported by Certificate from the Chamber of Commerce or concerned Governmental authority and shall likewise intimate the cessation of such causes. The delivery shall be resumed by the Party/Parties within 15 (fifteen) days from the cessation of the Force Majeure causes.

15.2 Should there be any interruption in the delivery of the MATERIAL due to Force Majeure circumstances detailed in para 17.1 herein above, it is hereby mutually agreed between the PURCHASER and the SELLER that the period of offtake of the MATERIAL by the PURCHASER/period of delivery of the MATERIAL by the SELLER shall automatically stand extended by a period not exceeding one year, equal to the actual duration of the causes interrupting the offtake by the PURCHASER and/or delivery of the MATERIAL by the SELLER plus a period of six weeks to enable the affected party to make suitable arrangements for normalization of shipments.

16.0 **ARBITRATION AND JURISDICTION**:

16.1 All disputes arising out of or in connection with the Acceptance to Tender shall be finally settled by Arbitration in accordance with the rules of Arbitration of the Indian Council of Arbitration and the Award made in pursuance thereof shall be binding on the parties. The Arbitration bench shall give a reasoned award. Cost of arbitration to be borne by the losing party. The venue of arbitration shall be Visakhapatnam, India and language of arbitration shall be in English.

16.2 In case of any legal proceedings are instituted against Rashtriya Ispat Nigam Limited, Visakhapatnam Steel Plant, they shall be instituted in the appropriate Civil courts of Visakhapatnam and the Courts at Visakhapatnam only shall have Jurisdiction.

17.0 **RECOVERY OF SUMS DUE:**

17.1 Whenever under this Acceptance to Tender any sum of money is recoverable from and payable by the SELLER, the PURCHASER shall be entitled to deduct such sum from any amount then found payable to the SELLER by the PURCHASER or which at any time thereafter may be found to be payable to the SELLER by the PURCHASER under this or any other Acceptance to Tender with the PURCHASER. Should this sum be not sufficient to cover the full amount recoverable, the SELLER shall pay to the PURCHASER on demand the remaining balance amount. This action shall be without prejudice to the right of the PURCHASER to take legal action against the SELLER for the breach of the Acceptance to Tender.

18.0 **RESPONSIBILITY:**

18.1 The PURCHASER on the one hand and the SELLER on the other hand shall be responsible for the performance of all their respective obligations under this Acceptance to Tender.

19.0**TRANSFER AND SUB-LETTING:**

19.1 The SELLER shall not sublet, transfer, assign or otherwise part with the Acceptance to Tender or any part thereof, either directly or indirectly, without the prior written permission of the PURCHASER.

20.0**COMPLETENESS OF THE AGREEMENT AND MODIFICATION:**

20.1 This Acceptance to Tender cancels all previous negotiations between the parties hereto. There are no understandings or agreement between the PURCHASER and the SELLER which are not fully expressed herein and no statement or agreement, oral or written, made prior to or at the signing hereof shall affect or modify the terms hereof or otherwise be binding on the parties hereto. No change in respect of the terms covered by this Acceptance to Tender shall be valid unless the same is agreed to in writing by the parties hereto specifically stating the same as an amendment to this Acceptance to Tender.

21.0 **LEGAL INTERPRETATIONS:**

21.1 The Acceptance to Tender and the arbitration shall be governed by and construed according to the laws of India for the time being in force.

22.0 **LIABILITY OF GOVT. OF INDIA:**

22.1 It is expressly understood and agreed by and between the SELLER and the PURCHASER that the PURCHASER is entering into this Acceptance to Tender solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that the Govt. of India is not a party to this Acceptance to Tender and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that the PURCHASER is an independent legal entity with power and authority to enter into contracts solely in its own behalf under the applicable laws of India and general principles of Contract Law. The SELLER expressly agrees, acknowledges and understands that the PURCHASER is not an agent, representative or delegate of the Govt. of India. It is further understood and agreed that the Govt. of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of this Acceptance to Tender. Accordingly, the SELLER hereby, expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Govt. of India arising out of this Acceptance to Tender and covenants not to sue the Govt. of India as to any manner, claim, cause of action or thing whatsoever arising of or under this Acceptance to Tender.

23.0 Tenderers shall fill up and confirm their acceptance with signature and stamp to our Technical specification(Annexure-III) and submit it back along with the Techno commercial bid Part-A else the offer shall not be considered

24.0 All other terms and conditions shall be as per VSP's G.C.C for supply of Material.
as uploaded in RINL/VSP website: www.vizagsteel.com

25.0 PUNITIVE ACTIONS TO BE TAKEN AGAINST AGENCIES WHO SUBMIT FALSE/FORGED DOCUMENTS TO VSP:

If it comes to the notice of VSP at any stage from request for enlistment/ tender document that any of the certificates / documents submitted by applicants for enlistment or by bidders are found to be false/ fake/ doctored, the party will be debarred from participation in all VSP tenders for a period of 5 years including termination of contract, if awarded. BID MONEY/ Security Deposit etc. if any, will be forfeited. The contracting Agency in such cases shall make good to VSP any loss or damage resulting from such termination. Contracts in operation anywhere in VSP will also be terminated with attendant fall outs like forfeiture of BID MONEY/ Security Deposit, if any, and recovery of risk and cost charges etc. Decision of VSP Management will be final and binding.

-- GM (MM)

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ANNEXURE-II TO TENDER NO Pur.Pur.6.13.607/WMD/0580 DT. 28/07/2016
CHECK LIST TO BE FILLED UP AND SENT ALONG WITH THE TECHNO COMMERCIAL OFFER

SL. NO.	TENDER TERMS	AS REQUIRED BY VSP	TO BE CONFIRMED PARTY ACCEPTED / NOT ACCEPTED	DEVIATIONS IF ANY
1	Name and address of the Tenderer			
2	Quantity offered	To be confirmed as per Para 2.0 of OPEN Tender notice		
3	Technical specifications	To be confirmed as per Annex-III of tender document		
4	Delivery schedule	To be confirmed as per para4.0 of OPEN Tender notice		
5	Payment terms	To be confirmed as per Cl.4.0 of Annx-1 of ITT		
6	BID MONEY	To be confirmed as per Cl. 6.0 of Annx-I of ITT		
7	Price Basis	To be confirmed as per Cl.3.1.1 of Annx-I of ITT		
8	Price firmness	To be confirmed as per Cl. 3.1.3 of Annx-I of ITT		
9	Insurance	To Tenderer's a/c		
10	Weighment	To be confirmed as per Cl.No.10.0 of Annexure –I		
11	Validity of offer	To be confirmed as per Cl.5.0 of Annx-I of ITT		
12	Test certificate	To be confirmed as per Cl.9.0 of Annex-I of ITT		
13	Liquidated damages	To be confirmed as per Cl. 11.0 of Annx-I of ITT		
14	Default	To be confirmed as per Cl.13.0 of Annx-I of ITT		
15	Other General conditions of contract for supply (GC C)	To be confirmed as uploaded & available in VSP's Website:www.vizagsteel.com		

ANNEXURE.III

TECHNICAL SPECIFICAION

CHEMICAL TREATMENT OF WIRE ROD MILL-2, SPECIAL BAR MILL (SBM) AND STRUCTURAL MILL (STM) RECIRCULATION COOLING WATER SYSTEMS

INTRODUCTION:

Visakhapatnam Steel Plant is the only shore based integrated steel plant in India. The Plant is operating at a capacity of 3.6 Million Tonnes per annum and is expanding its capacity to 6.3 Million Tonnes Per Annum (MTPA). Wire rod mill-2 (WRM-2) of 6,00,000 Tonnes per year, Special Bar mill (SBM) of 7,50,000 Tonnes per year capacity and Structural Mill (STM) of 7,50,000 Tonnes per year are envisaged under the 6.3 MTPA expansion stage.

DESCRIPTION OF THE SYSTEM AND OVERALL PROCESS:

To cater the water requirements of Wire Rod MiLL-2 (WRM-2), two different systems of recirculation cooling water are provided in Recirculation Pump House (RCPH) of Wire Rod Mill-2 (WRM-2) zone. They are:

I) Direct cooling water system: - It supplies water for direct cooling (Contact type) and is contaminated water cycle.
II) Indirect cooling water system: - It supplies water to the indirect cooling needs of rolling mills (Non- Contact type).

To cater the water requirements of SBM, two different systems of recirculation cooling water are provided in Recirculation Pump House (RCPH) of Special Bar mill (SBM) zone. They are:

I) Direct cooling water system: - It supplies water for direct cooling (Contact type) system of SBM and is contaminated water cycle.
II) Indirect cooling water system: - It supplies water to the indirect cooling needs of SBM (Non- Contact type).

To cater the water requirements of STM, two different systems of recirculation water are provided in Recirculation Pump House (RCPH) of Structural Mill (STM) zone. They are:

I) Direct cooling water system: - It supplies water for direct cooling (Contact type) system of STM and is contaminated water cycle.
II) Indirect cooling water system: - It supplies water to the indirect cooling needs of STM (Non- Contact type).

This specification consists of following 7 parts

1. PART-A: Chemical treatment of WRM-2 Direct cooling water system.
2. PART-B: Chemical treatment of WRM-2 Indirect cooling water system.
3. PART-C: Chemical treatment of SBM Direct cooling water system.

4. PART-D: Chemical treatment of SBM Indirect cooling water system.
5. PART-E: Chemical treatment of STM Direct cooling water system.
6. PART-F: Chemical treatment of STM Indirect cooling water system.
7. PART-G: Application Contract.

PART-A

1.0 DIRECT COOLING WATER SYSTEM OF WRM-2:

The direct cooling water is mainly supplied to following consumers:-

Sl. No.	Consumer	Purpose
1	a) De-scalers b) Scale flume flushing	To flush back the scales generated during rolling process back to scale pit through scale flume.
2	a) Roll Cooling. b) Charging and discharging equipment of furnaces, water trough. c)Roughing and Intermediate Mills.& finishing mill	The water is being used for direct contact Cooling of equipments.
3	a)Water boxes for metal conditioning. b) Pinch rolls. c) Side looper & breakout box.	The water is being used for cooling and metal conditioning & heat treatment of final products.

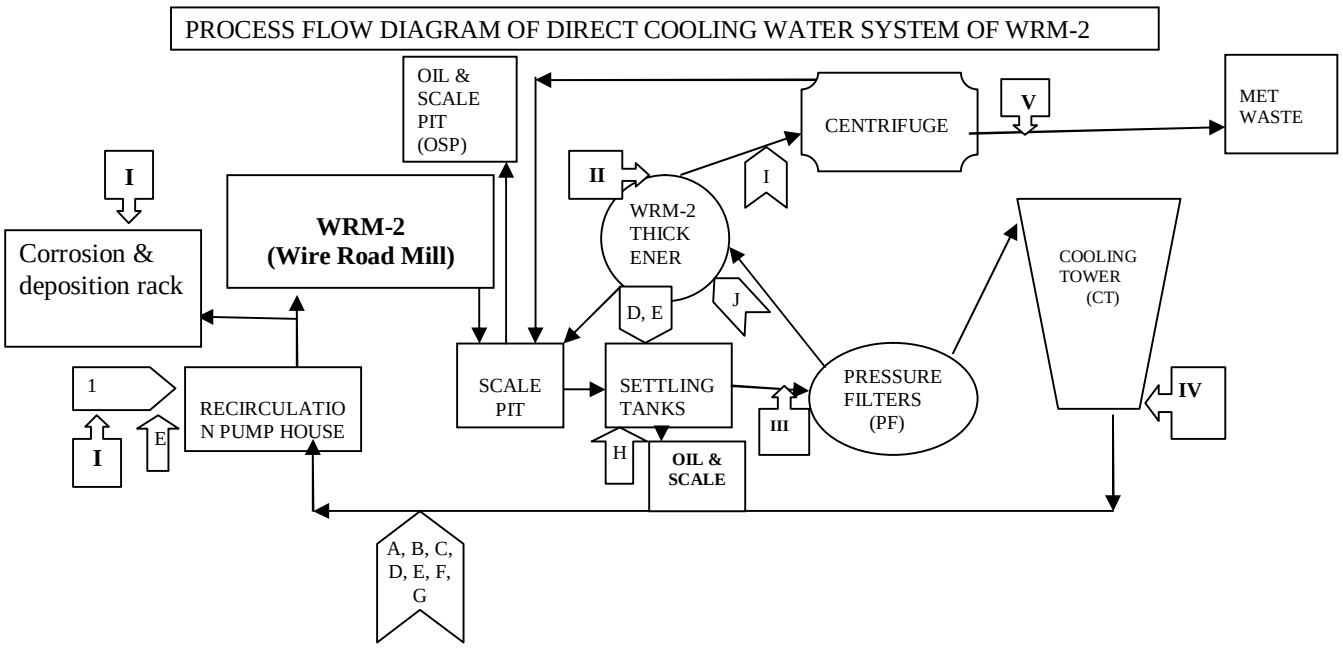
The return water contaminated with scale and oil from the Wire Rod Mill -2 (WRM-2) enter the scale pit through an open flume where heavier scale will be settled. From the scale pit, settled scale is taken out with grab crane. The Oil Skimmers are provided to take out floating oil from water surface.

From the scale pit, the water is pumped to Settling tanks where further settling of particles takes place. At settling tank, moving scrapper mechanism & oil skimmers are also present for further removal of oil. The settled scale is taken out with grab crane.

After settling & scrapping, the water is pumped to Pressure filters where further reduction of particles takes place. After passing through Pressure filters, the water goes to hot basin of direct water cooling tower where it gets cooled & goes into cold sump through connecting pipe. The backwash water from Pressure filters (from all mills) is pumped to Treatment Plant. In the treatment plant water is passed through a thickener to remove the suspended particles. The clarified water from the thickener is taken to scale pit. The slurry collected at the bottom of thickener is pumped by underflow slurry pumps to centrifuges. In the centrifuges the sludge get separated from water. The sludge accumulated at the bottom of centrifuges is taken by dumpers to Storage area. The water separated in the centrifuges is sent to scale pit.

NOTE: - To make up the losses in system, make up water is taken from Raw Water Treatment Plant (RWTP) into system in cold sump & Scale pit.

PROCESS FLOW DIAGRAM OF DIRECT COOLING WATER OF WRM-2:



Legends:

i. The sign ⇨ indicates the compulsory points of chemical dosing. The sign ⇨ indicates the optional points of chemical dosage. The sign ☞ indicates water testing sampling points. Howsoever party is free to choose any ***additional points*** of dosage for better effectiveness.

ii. The alphabets indicated inside the dosage point signs in the flow diagram denote the following chemicals:

A- Corrosion inhibitors
B- Antiscalents
C- Iron dispersant
D - Oil dispersant
E- Oxidizing biocide
F- Non Oxidizing biocide
G- Bio dispersant
H- Oil de-emulsifier
I - Dewatering polymer/ Polyelectrolyte
J- Polyelectrolyte
1- Makeup water addition point.

iii. Water testing sampling points.

I - All water parameters as per every day analysis ,**II** – TSS , **III** – Oil & grease, **IV** – Temperature , **V**- Moisture content.

2.0 DETAILS OF COOLING WATER SYSTEM (DIRECT) WRM-2

2.1. System operating parameters:

S.No	Parameter	Units	Direct
1.	Recirculation rate	m^3/hr	Avg 3270*
2.	Hold-up volume	m^3	6300
3.	Make up rate	m^3/hr	85-125 (Avg 105)
4.	Source of makeup water		RWTP (Pump House-1 Outlet)
5.	Blow down rate	m^3/hr	Range: 0-20
6.	ΔT across cooling tower	^0C	13 (Max)
7.	Supply water temperature	^0C	34-36
8.	Return water temperature	^0C	45-47
9.	Major equipment/systems through which water is passing		1)Scale flume 2) Rolls 3) Charging, discharging equipment of furnaces. 4) Roughing .Intermediate & finishing mills. 5) Water boxes for metal conditioning. 6) Pinch rolls. 7) Side looper & breakout box. 8) Supply & return centrifugal pumps. 9) Scale pit & settling tank. 9) Pressure sand filters. 10) Thickener & centrifuges.

***** A variation of $\pm$ 10% on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

2.2. Equipment wise details:

The water which is to be treated will be passing through the following equipment whose details and metallurgy is given below.

2.2.1. Pumps details (Supply pumps to consumers):

S.No	Parameter	Direct (Low pressure)	Direct (High pressure)
1.	No of pumps	05	03
2.	Working	03	01
3.	Stand by	02	02
4.	Type	Horizontal Centrifugal	Horizontal Centrifugal

5.	Make	Kirloskar Brothers Ltd	Kirloskar Brothers Ltd
6.	Capacity of each pump(m^3/hr)	762	965
7.	Discharge pressure (Kg/cm^2)	8.5	11.0
8.	Casing Metallurgy	Cast steel,CA6NM	Cast steel, CA6NM
9.	Impeller Metallurgy	Stainless steel	Stainless steel

2.2.2. Pipe line and valve details

Pipe line metallurgy : Carbon Steel.
Metallurgy of Valves : Cast Iron, Cast steel, Brass

2.2.3. Cooling towers details:

S.No	Parameters	Direct circuit
1.	Cooling tower No.	DCW C.T.
2.	Make	Sriram Hammon
3.	Type	Cross flow
4.	No of Cells	04
5.	Frame work	RCC
6.	Filling	PVC on SS grids
7.	Total hold up volume (pump basin, cooling tower sump and system hold up) m3	6300
8.	Cooling Water circulation rate(m^3/hr)	3270
9.	Normal supply Temp ^oC	34
10.	Maximum supply Temp ^oC	36
11.	Normal average Return Temp ^oC	45
12.	Maximum average Return Temp ^oC	47
13.	Temp drop , ΔT	13(max)
14.	Make up water rate, m^3/hr	85-125 (Avg 105)
15.	Blow down + Drift losses (m^3/hr)	Max 30

2.2.4. Filters details:

S.No	Parameters	Direct circuit
1.	Type	Pressure
2.	Total number of filters	09
3.	Working (In line)	07
4.	Stand by	01
5.	Under Back wash	01

6.	Capacity of each m^3/hr	515 (Max)
7.	Filter inlet TSS (ppm)	100
8.	Filter outlet TSS (ppm)	<5

2.2.5. Treatment plant details

S.No	Equipment	Details
a.	No of thickeners	01
b.	Working thickeners	01
c.	Standby thickeners	Nil
d.	Thickener volume m3	1215
e.	Thickener retention time (Minutes)	205
f.	Thickener inlet TSS	***3500*** mg/l
g.	Thickener outlet TSS	20 mg/l
h.	Centrifuge inflow(m3/hr)	40
i.	Centrifuge outflow water TSS (PPM)	200
j.	Centrifuge underflow sludge TSS	30% Wt.

2.2.6. Equipment details at consumer side:

S.No	Circuit	Equipment name	Highest temp attained (^{0}C)	Water side metallurgy	2nd side fluid
1	Direct circuit	Mill Train	60	Cast Steel	------
2		Furnace Seal through	50	Mild steel	------

2.3. The makeup water is as follows:

Losses in the system viz., Evaporation, blow down, wind and process leaks are compensated with makeup water. The makeup water to the cooling towers is the water coming from Raw Water Treatment plant (RWTP). The makeup water analysis is generally in following range.

S.No	Parameter	Units	Make up water from RWTP
1.	pH	-	7.5-8.5
2.	Conductivity	Mho/cm	270-400
3.	Calcium Harness (as $CaCO_3$)	mg/l	40-70
4.	Magnesium Hardness (as $CaCO_3$)	mg/l	40-70
5.	Total Hardness (as $CaCO_3$)	mg/l	80-140
6.	P-Alkalinity (as $CaCO_3$)	mg/l	0-60
7.	T-Alkalinity (as $CaCO_3$)	mg/l	100-160
8.	Turbidity	NTU	10-30
9.	Total Dissolved solids	mg/l	150-250
10.	Chlorides as Cl_2	mg/l	20-40

While designing the treatment program, Party shall take in to consideration the seasonal variations in the makeup water quality from RWTP mainly, the turbidity level and the dust ingress into the system from the atmosphere. Make up water analysis for the last one year (month wise) is enclosed as Annexure-3.

3. PURPOSE OF COOLING WATER TREATMENT PROGRAMME

Chemical treatment is aimed for deposit free operation and control of corrosion and biomass. The problems likely to occur in the system are improper cooling of rolls due to chockage of nozzles leading to surface cracks on the rolls and indentation of the finished products resulting rejection due to scale formation/deposits/fouling/muck/suspended solids accumulation and slime formation.

The Chemical Treatment programme should be designed in such a way

i. To provide acceptable day to day performance and at the same time having the capacity to function well in case of mishaps, leaks, airborne contamination, etc. in recirculation water.

ii. To provide protection against fouling by corrosion products, water borne deposits, silt, muck formation due to oil & grease suspended matter etc. and the recirculation water quality is to be kept within the limits.

iii. To provide protection against biological contaminations like algal growth, slime formation and anaerobic sludge formation in cooling towers and common sumps of pump house and the recirculating water quality is to be kept within the limits.

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3.1. Treatment Objectives: The cooling water treatment programme offered by the Party shall be effective and shall meet general and specific treatment objectives given below.

A. General objectives:

i) Corrosion control (to keep system's water carrying pipelines and equipment corrosion levels at desired rate).

ii) Scaling and fouling control.

iii) Deposition control (to avoid water borne deposition on system pipeline and equipment).

iv) Elimination/ minimization of deposit at Cooling tower nozzles & Drift eliminator in the cooling tower. Elimination /minimization of oil and grease muck formation in recirculation water.

v) Enhancement of oil and grease dispersion in recirculation water.

vi) De-emulsification of oil and grease (separation of oil and grease at scale pit & settling tanks)

vii) Effective iron dispersant to disperse the iron compounds which cause fouling

B. System specific objectives:

i) The Cycles of concentration (COC) w.r.t Ca, Mg, Cl, Conductivity and TDS shall match within $\pm$ 10 %. If Chlorine compounds are added in to the system, the COC of chloride will not be considered for comparison.

ii) Critical equipments like Rotary shears.roll coolers, pinch rolls, furnace and side looper and breakout boxes etc. are to be free from water borne deposits. Cooling Tower nozzles are also to be free from water borne deposits.

iii) Eliminate/ minimize the chockage in pressure filters media and nozzles.

3.2. Parameters likely to be maintained during treatment in Recirculation water

The following Parameters are likely to be maintained in the Recirculation water.

S.No	Parameter	Unit	Direct circuit	
			Normal range	Maximum/control limit
1	pH		7.5 -8.7	8.7
2	Conductivity	Mho/ cm	500-1200	1600
3	Calcium Hardness (as $CaCo_3$)	mg/l	70-250	300
4	Magnesium Hardness (as $CaCo_3$)	mg/l	50-150	200
5	Total Hardness (as $CaCo_3$)	mg/l	120 -400	450
6	P-Alkalinity (as $CaCo_3$)	mg/l	0-20	30
7	T-Alkalinity (as $CaCo_3$)	mg/l	100-250	300
8	Total Dissolved solids	mg/l	320-780	1050
9	Chlorides as Cl	mg/l	50-150	200
10	Total Iron as Fe	mg/l	1.5-3.0	4.0
11	Oil & grease	mg/l	0-5	5
12	TSS	mg/l	5-10	20

4. REQUIREMENTS OF PROPOSED COOLING WATER TREATMENT PROGRAMME:

4.1. General requirements of cooling water treatment package:

VSP requires Party to provide cooling water treatment package for chemicals supply, application of chemicals, monitoring and controlling the performance of the treatment programme of cooling water system of pump house of WRM-2. Party should guarantee that scaling, corrosion, biological growth Suspended solids and oil &grease will be minimized so that it will not pose any limitation to the process.

4.2. Control of Scaling, Corrosion and Fouling:

4.2.1. The formulations of the chemicals offered shall contain the following to take care of deposition, scaling, fouling and corrosion in the system.

a. Effective corrosion inhibitors to protect Mild Steel (MS).

b. Effective antiscalents to prevent the precipitation of alkaline earth salts (Calcium & Magnesium).

c. Effective Scale dispersants to retard the deposition of corrosion products, scale & other suspended material etc.

d. Antifoulants to retard the effects of inorganic foulants & prevent corrosion products.

e. The formulation shall be effective for all operating parameters as mentioned at relevant clause.

f. Polyelectrolyte to control the suspended solids at thickner.

4.3. De-emulsifier & Oil Dispersants: Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

4.3.1. The formulations of the chemicals offered shall contain the following to take care of de-emulsification and dispersion of oil & grease present in the system.

a. Effective de-emulsifier to separate oil from water at scale pit.

b. Oil Dispersants: Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

4.4. <u>Biological control:</u>

The micro and macro organisms (bio mass) growth control is required for the circuit. For this, dosing of NaOCl, ClO_2 (oxidizing biocides) can be done continuously to maintain a positive free residual chlorine level in the supply header of the consumer. Any excess of chlorine should be avoided due to its harmful effects. Party shall offer their biocides and bio-dispersants to achieve the guaranteed biological norms, with specified biocides dosing recommended by the party. All statutory regulations in this connection shall be followed by the party. On site generation is allowed for ClO_2.

The Chemicals offered shall contain the following to take care of biological control in the system

a. Effective biocides to control algae growth on cooling tower cells and its related components like fan blade, CT nozzles, etc and fouling.

b. Effective biocides to control slime formation.

c. Effective biocides to control Microbiological growth i.e. total viable count (TVC), Sulphate Reducing Bacteria (SRB) and Iron forming bacteria.

d. Effective biocides to control Microbiological induced corrosion (MIC).

e. Effective biocide activators / biocide supplements to improve the performance of the biocide.

f. Effective bio dispersants to prevent the accumulation of deposits of silt, and biological products.

Note: Only non foaming type biocides & biodispersents are to be used in treatment progamme.

4.5. <u>Dewatering polyelectrolyte:</u> should assist and increase separation efficiency of centrifuges. De watering poly electrolyte is required for increasing solids concentration in thickner under flow water.

4.6. <u>Total Suspended Solids (TSS) Control:</u>

4.6.1. Effective coagulants and flocculants for floc formation in thickner within the given retention time.

4.7. Special emphasis is to be given to the following by the party while designing the treatment program for effective scaling, fouling, corrosion, oil, grease, TSS and micro-biological control

a. Recirculation Water parameters to be maintained as specified at relevant clause.

b. High temperature in CW rotary shear, roll coolers and pinch rolls etc. (Both on process and CW side).

c. Material of construction of pipes, equipments etc. coming in contact with recirculation water

d. Quality and quantity of make-up water .

e. Surrounding atmospheric environment of the cooling tower.

4.8. The chemicals offered for Scaling, Corrosion, oil, grease, TSS and Biological control shall be effective for specified range of P^H and temperature.

4.9. The chemicals offered shall be non-corrosive and formulation should have surface-active agents for proper cleaning action on fouled surfaces.

4.10. The biocides& biodispersents should be compatible with Antiscalents / corrosion Inhibitors, de-emulsifiers, oil dispersants, coagulants, flocculants and all other chemicals/ formulations offered by the party.

4.11. Party may note that flow to coupon rack (corrosion) may fluctuate and the flow may even go to zero as per the requirement of the consumer. Hence party has to provide a local recirculation pump for maintaining required flow to coupon rack during such times which may take suction from cold sump.

5. JOB SCOPE OF TREATMENT PACKAGE FOR DIRECT WATER SYSTEM

5.1. Reports:

5.1.1. Daily Reports:

i. Party's representative will generate daily electronic reports of the previous day, which will include Analysis of make up and recirculation water streams covering the following parameters.

Sl.No	Parameter	Unit
1.	**Conductavity**	mho/cm
2.	**TDS**	mg/l
3.	**Total Iron**	mg/l
4.	**Total Hardness**	mg/l
5.	**Ca-Hardness**	mg/l
6.	**Mg-Hardness**	mg/l
7.	**P-alklanity**	mg/l
8.	**Total-alklanity**	mg/l
9.	**Chlorides**	mg/l
10.	**FRC**	mg/l
11.	**T-Phosphates**	mg/l
12.	**O-Phosphates**	mg/l
13.	**C.O.C with Ca**	----
14.	**C.O.C with Mg**	----
15.	**C.O.C with Cl**	----
16.	**C.O.C with TDS**	----

17.	**TSS of Filter outlet**	mg/l
18.	**Thickner outlet TSS**	mg/l
19.	**Oil & Grease at Settling tank outlet**	mg/l
20.	**P^H at supply header**	
Note: Any parameter other than mentioned above (like Zinc, Azole etc.) should be analysed as per VSP's requirement.		

ii. Cooling Water Inlet, Outlet temperatures and make up water rate.

iii. Chemical Active Ingredient report for each circuit.

iv. Visual observation report of cooling tower for healthiness of the internal structures, leakages in the system.

v. Chemical stock accounting, Consumption and Penalties report of each circuit

vi. Cumulative Chemical Consumption and Penalties report of each circuit

vii. Daily report should also include abnormality like undesirable odor, color raise in makeup rate, action taken and results achieved etc.

5.1.2. Fortnightly Reports: (once in 15 days)

Party's representative shall generate fortnightly electronic reports and shall contain the following.

a) Cooling tower algae report

b) TVC & SRB Results

c) Biocides consumption details.

d) Sieve Analysis (Particle Size Distribution)

5.1.3. Monthly Reports

Party's representative will generate monthly electronic reports of the previous month which shall contain the following.

a) Corrosion rates

b) Microbiology readings

c) Cumulative chemical consumption and penalties report of circuit.

d) Action plan taken / planned to achieve the system parameters as given at relevant clause in case of non-performance only.

5.1.4. On monthly basis actual consumption of the chemicals deviations if any with reasons and explanations are to be reported.

5.1.5. Actions taken for any abnormal / emergency situations shall be reported by the party to EIC immediately.

5.1.6. The signed hard copies of the monthly/fortnightly/daily reports shall be submitted to Engineer-In charge immediately after generation of reports. The soft copies shall be sent to HOD (WMD).

6. GUARANTEE PERFORMANCE PARAMETERS:

With the above treatment - the party shall guarantee the following: -

6.1. **Corrosion rate:** This is measured as per IS 8188-1999 on monthly basis.

6.1.1. MS Corrosion Less than 5.00 mpy

6.2. **Microbiology:** This is measured as per IS 1622-1981 once in '15' days.

6.2.1. TVC count Less than 5, 00,000 col. / ml.

6.2.2. SRB 150 org/100ml.

6.3. **Residual availability:**

6.3.1. Presence of minimum residual of active ingredient of each quoted chemicals as per offer given by party.

6.3.2. For MS corrosion inhibitor -- Total phosphates content minimum 6ppm --- Zn content minimum- 1.0 ppm

6.4. **Oil & Grease:** Should be less than 5 mg/l at settling tank out let.

6.5. **TSS:** Should be less than 20 mg/l at thickner out let.

6.6. **STOCK LEVELS OF CHEMICALS:**

6.6.1. Stock levels of chemicals as mentioned at relevant clause.

7. PENALITIES:

The performance evaluation of the system is done based on the Guarantee Performance Parameters. In case of any deviation from the Guarantee Performance parameters, the penalty rate shall be imposed in terms of percentage of chemical quantity dosed during the period performance parameters are evaluated.

Party shall note that the chemical treatment is being started in the system for the first time and a passivation /stabilization period of 15 days can be provided. The performance evaluations shall start after completion of 15 days passivation/stabilization. However, the payment for passivation chemicals / stabilization chemicals for 15 days shall be released along with the first month payment. In case of penalty imposition either on antiscalents/corrosion inhibitors or on bio-dispersants etc. in the first month, the same penalty rate is applicable to passivation / stabilization chemicals also. Party shall maintain the guarantee performance parameters throughout the period of treatment. Corrosion, Deposition rates, TVC & SRB counts will be carried out at QATD lab/ WMD labs of VSP. In case of any deviation from the guaranteed parameters mentioned above, penalty shall be levied as below.

7.1. **Corrosion rate for MS:**

One MS coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation.

7.1.1. For less than or equal to 5.0 mpy: Nil

7.1.2. For above 5.0 mpy and up to 6.0 mpy: Deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

7.1.3. For above 6.0 mpy and up to 7.0 mpy: Deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

7.1.4. Above 7.0 mpy. No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

7.2. TVC & SRB counts:

7.2.1. For TVC up to 500000 col/ml & SRB up to 150 org/100 ml-- No Penalty

7.2.2. For TVC above 500000 col/ml and up to 550000 col/ml & SRB above 150 org/100 ml and below 200 org/100 ml--Deduction of 20% of the Quantity of the biocides and relevant chemicals dosed during the period.

7.2.3. For TVC above 550000 col/ml and up to 600000 col/ml & SRB above 200 org/100 ml and below 250 org/100 ml.--- Deduction of 50% of the Quantity of the biocides and relevant chemicals dosed during the period.

7.2.4. For TVC above 600000 col/ml. & SRB above 250 org/100 ml -- No Payment to the Quantity of the biocides and relevant chemicals dosed during the period.

7.2.5. Penalty is applicable even if one of the parameters deviates from the norm. TVC & SRB count shall be measured once in '15 days' for performance evaluation.

7.3. Oil & Grease:

7.3.1. $\leq$ 5 mg/l------ No Penalty

7.3.2. 5 to 10 mg/l------- Deduction of 20% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

7.3.3. Above 10 and upto 15 mg/l------- Deduction of 50% of the Quantity of the oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

7.3.4. Above 15 mg/l ------ No payment to the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

7.4. Total Suspended Solids:

7.4.1. $\leq$ 20 mg/l------ No Penalty

7.4.2. Above 20 and up to 30 mg/l---- Deduction of 20% of the Quantity of the coagulants, flocculants, polyelectrolytes and relevant chemicals dosed during the period.

7.4.3. Above 30 and up to 50 mg/l---- Deduction of 50% of the Quantity of the coagulants, flocculant, polyelectrolytes and relevant chemicals dosed during the period

7.4.4. Above 50 mg/l---- Deduction of 100% of the Quantity of the coagulants, flocculant, polyelectrolytes and relevant chemicals dosed during the period.

7.5. Penalty on residual availability of active ingredient in recirculation water

If it is lower than the Lower Limit (LL) of concentration of each chemical quoted by party, penalty will be levied as given below.

7.5.1. Residual achieving lower limit (LL) in ppm – No penalty

7.5.2. Residual achieving <100-70% of LL in ppm : Deduction of 20% of the Quantity of relevant chemicals consumed during the period for the system.

7.5.3. Residual achieving <70-55% of LL in ppm : Deduction of 50% of the Quantity of relevant chemicals consumed during the period for the system.

7.5.4. Residual achieving <55% of LL in ppm.: No Payment for relevant chemicals consumed during the period for the system.

7.6. Stock of Chemicals:

The stock accounting of all chemicals shall be done by the party at 5.00 P.M daily. In case on any day (except at the end of the treatment period) during the chemical treatment period, the stock level of any chemical / chemicals at site depletes to less than 30 days or mutually agreed stock levels, a penalty of 100% of one-day consumption of chemical / chemicals day shall be imposed on the party for that particular day till the stock levels reach the values as mentioned at relevant clause. VSP's decision is final in this regard.

Example: Stock at site will be accounted every day at the end of General shift and balance stock availability will be intimated to Engineer I/C. Stock out penalty applicability on a particular chemical will start from the day on which stock at site is less than 30 days stock. A penalty equivalent to one day chemical dosage (particular stock out chemical), will be imposed for each day of such stock out till the stock is replenished to 30 days stock.
For any continuous dosing chemical "A" at a recommended dosage of 1 Kg/day (as specified in offer) a stock of 30 Kg is to be maintained at site always. If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock.
In case of slug dosing chemical having a recommended dosage of 7 Kg for every 7 days (as specified in offer) a stock of 30 Kg is to be maintained at site always If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock. Similar is the case with fort nightly and monthly dosage chemicals.

7.7. In case simultaneous imposition of penalties is levied under the clauses 7.1 to 7.5 for the same duration, the penalties applicable shall be summed up. However, the sum of all penalties imposed for any particular chemical shall not exceed 100 %. The penalty imposed under stock of chemicals of clause 7.6 shall be in addition to the sum of penalties imposed under clauses 7.1 to 7.5.

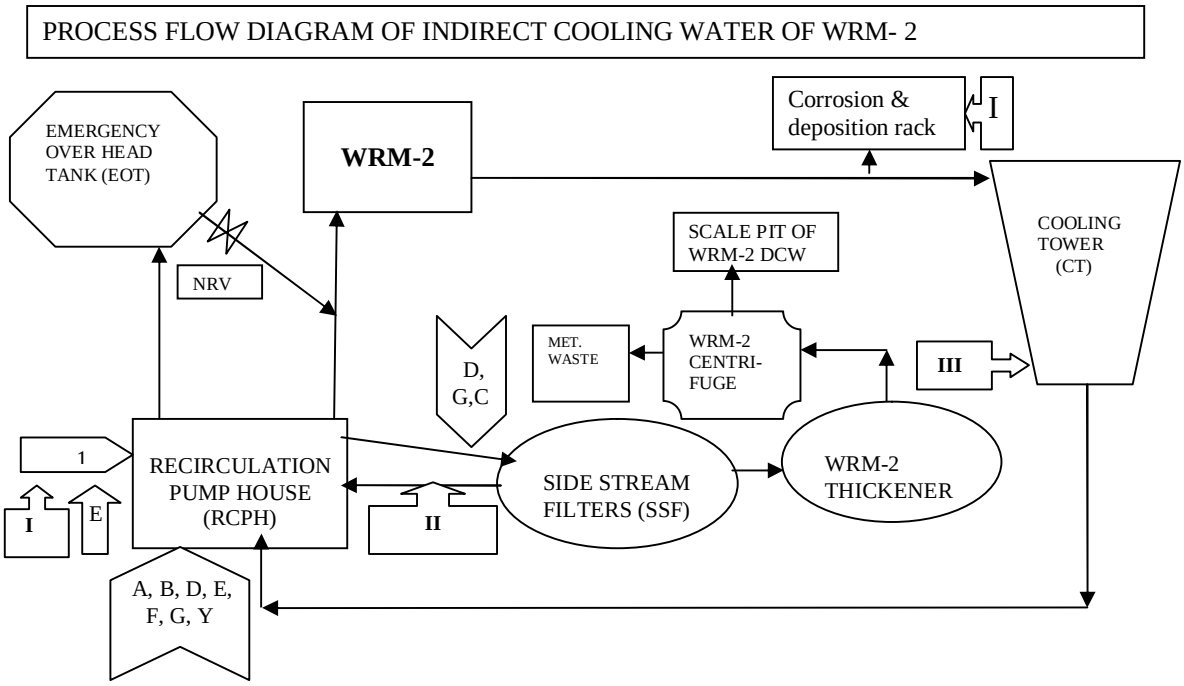
7.8. If the corrosion rate of MS maintained in 100% penalty range for 3 times either consecutively or intermittently during the treatment period, from 4th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for direct cooling water system of WRM-2 till corrosion rate comes to below 100% penalty limit.

7.9. If the TVC or SRB maintained in 100% penalty range for 6 times continuously or intermittently during the treatment period, from 7th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for direct cooling water system of WRM-2 till TVC or SRB comes to below 100% penalty limit.

PART-B

8. WRM-2 INDIRECT COOLING WATER SYSTEM:

8.1. PROCESS FLOW DIAGRAM:



Legends:

(A) The no.s shown on top of arrows is indication of corresponding quality of water at the particular place.

(B) The sign ⇨ indicates the compulsory points of chemical dosing. The sign ⇨ indicates the optional points of chemical dosage. Howsoever party is free to choose any ***additional points*** of dosage for better effectiveness.

The sign ⇨ indicates water testing sampling points.

C) The alphabets indicated inside the dosage point signs in the flow diagram denote the following chemicals:

A- Corrosion inhibitors
B- Antiscalents
C- Filter backwash aid
D - Oil dispersant
E- Oxidizing biocide
F- Non Oxidizing biocide
G- Bio dispersant
Y- Yellow metal inhibitor

D) Water sampling point

I - All water parameters as per every day analysis ,**II**– Oil & grease, **III** – Temperature .

8.2. DESCRIPTION OF THE SYSTEM AND OVERALL PROCESS:

The recirculating water shall be pumped from the cold sump of cooling tower to WRM-2**.** After being used by the various consumers in WRM-2 where water is not coming in direct contact with media it cools & used in equipments like furnace ,hydraulic & lube oil cooling equipments, electrical m/c cooling etc., the hot return water shall get discharged at the top of the cooling tower**.** The water then gets cooled in the cooling tower and is collected into the cooling tower basin**.** A pipe from the cooling tower basin connects the cold well from where the water is again sent for re-circulation by the respective pumps**.** A part of the water from the cold well is pumped and re-circulated back to the cold well through the Side Stream Pressure Filter (SSPF) for improvement of water quality**.**

9. DETAILS OF INDIRECT COOLING WATER SYSTEM:

9.1. System operating parameters:

S.No	Parameter	Units	Indirect
1.	Recirculation rate	m^3/hr	2002
2.	Hold-up volume	m^3	1950
3.	Make up rate	m^3/hr	50-70 (Avg 60*)
4.	Source of makeup water		River stream (RWTP Outlet)
5.	Blow down rate	m^3/hr	Range 0-20
6.	ΔT across cooling tower	^0C	10 to 13
7.	Cycles Of Concentration (COC)		Avg.: 2.5 Range: 1.5 - 3.5
8.	Supply water temperature	^0C	34 to 36
9.	Return water temperature	^0C	47
10.	Major equipment through which water is passing		1) Walking beam furnaces. 2) Descalers 3) Machine room and ventilation systems. 4) Oil & Hydraulic Cellars. 5) Supply centrifugal pumps. 6) Sidestream sand filters. 7)Emergency Over head tank

***** A variation of $\pm$ 10% on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

9.2. Equipment wise details:

The water which is to be treated will be passing through the following equipment whose details and metallurgy is given below.

9.2.1. Pumps details(Supply pumps to consumers):

S.No	Parameter	Indirect circuit
1	No of pumps	05
2	Working	03
3	Stand by	02
4	Type	Horizontal Centrifugal
5	Make	Kirloskar Brothers Ltd

6	Capacity of each pump(m^3/hr)	668
7	Discharge pressure (Kg/cm^2)	6.5
8	Casing Metallurgy	Cast Iron, IS 210 Gr 2
9	Impeller Metallurgy	Bronze

9.2.2. Pipe line and valve details

Pipe line metallurgy : Carbon Steel.
Metallurgy of Valves : Cast Iron, Cast steel, Brass

9.2.3. Cooling towers details:

S.No	Parameters	Indirect circuit
1	Cooling tower No	ICW C.T.
2	Make	Sriram Hammon
3	Type	Cross flow
4	No of Cells	03
5	Frame work	RCC
6	Filling	PVC on SS grids
7	Total hold up volume (pump basin, cooling tower sump and system hold up)	1950
8	Cooling Water normal circulation rate(m^3/hr)	2002
9	Temp drop , ΔT	11
10	Maximum supply Temp ^oC	36
11	Normal Return Temp ^oC	45
12	Maximum Return Temp ^oC	47
13	Make up water rate, m^3/hr	Max 70
14	Cycles of Concentration(COC)	1.5-3.5
15	Blow down m^3/hr	Max 20

9.2.4. Side Stream Filter(SSF) details:

S.No	Parameters	Indirect circuit
1	Type	Pressure
2	Total number of filters	02
3	Working (In line)	01
4	Stand by	01
5	Under Back wash	---
6	Capacity of each m^3/hr	110
7	% of total flow through	05

	SSF	
8	Filter inlet TSS(ppm)	50
9	Filter outlet TSS(ppm)	5
10	Filter backwash flow(m3/hr)	310

9.2.5. Equipment details at consumer side:

S. No	Circuit	Equipment name	Highest temp attained (^{0}C)	Water side metallurgy	2nd side fluid
1	Indirect circuit	Furnace Skid	50	Alloy steel	Flue gases
2		Hydraulic & Lub. system	45	Stainless Steel	Oil
3		Electrical Equipments	45	Copper & Stainless Steel	Air

9.3. The makeup water is as follows:

Losses in the system viz., Evaporation, blow down, wind and process leaks are compensated with makeup water. The makeup water to the cooling towers is the water coming from Raw Water Treatment plant (RWTP). The makeup water analysis is generally in following range.

S.No	Parameter	Units	Make up water from RWTP
1.	pH	-	7.5-8.5
2.	Conductivity	Mho/cm	270-400
3.	Calcium Harness (as $CaCO_3$)	mg/l	40-70
4.	Magnesium Hardness (as $CaCO_3$)	mg/l	40-70
5.	Total Hardness (as $CaCO_3$)	mg/l	80-140
6.	P-Alkalinity (as $CaCO_3$)	mg/l	0-60
7.	T-Alkalinity (as $CaCO_3$)	mg/l	100-160
8.	Turbidity	NTU	10-30
9.	Total Dissolved solids	mg/l	150-250
10.	Chlorides as Cl	mg/l	20-40

While designing the treatment program, Party shall take in to consideration the seasonal variations in the makeup water quality from RWTP mainly, the turbidity level and the dust ingress into the system from the atmosphere. Make up water analysis for the last one year (month wise) is enclosed as Annexure-3.

10. PURPOSE OF COOLING WATER TREATMENT PROGRAMME OF INDIRECT COOLING WATER SYSTEM:

Chemical treatment is aimed for deposit free operation, control of corrosion and biomass. The problems likely to occur in the system are improper cooling of Furnace skid, Hydralic & lub. Systems & Electrical equipments etc. leading to total failure of equipments resulting breakdowns due to corrosion/scale formation/deposits/fouling/muck/suspended solids accumulation and slime formation.

The Chemical Treatment programme should be designed in such a way

i. To provide acceptable day to day performance and at the same time having the capacity to function well in case of mishaps, leaks, airborne contamination, etc.

ii. To provide protection against fouling by corrosion products, water borne deposits, silt, suspended matter slime formation etc.

iii. To provide protection against biological contaminations like algal growth, slime formation and anaerobic sludge formation in cooling towers and common sumps of pump house.

10.1. <u>Treatment Objectives:</u> The cooling water treatment programme offered by the Party shall be effective and shall meet general and specific treatment objectives given below.

A. <u>General objectives:</u>

i. Corrosion control (to keep system pipeline and equipment corrosion levels at desired rate).

ii. Effective yellow metal Inhibitors to protect Cu/CuNi, brass, and other noble metallurgy from corrosion.

iii. Scaling and Fouling control.

iv. Deposition control (to avoid water borne deposition on system pipeline and equipment).

v. Elimination/ minimization of deposit at Cooling tower nozzles, Drift eliminator & wooden structure. Choking should not occur in the cooling tower drift eliminator.

vi. Elimination /minimization, dispersion of oil and grease in recirculation water.

vii. P^H control.

B. <u>System specific objectives:</u>

i. The Cycles of concentration (COC) w.r.t. Ca, Mg, Cl, Conductivity and TDS shall match within $\pm$ 10 %. If Chlorine compounds are added in to the system, the COC of chloride will not be considered for comparison. The system shall operate in the range of 1.5 to 3.5 and function satisfactorily up to 4 COC.

ii. Critical equipments like of Furnace skid, Hydraulic & lub. Systems & Electrical equipments etc. are to be free from water borne deposits & Cooling Tower nozzles are also to be free from water borne deposits.

iii. Microbiological induced corrosion (MIC) to be controlled.

iv. Eliminate/ minimize the chock age in pressure filters media and nozzles.

v. Inhibit algae growth (bio mass) and ensure no visible algae growth in the system at cooling towers and sumps.

10.2. Parameters likely to be maintained during treatment in Recirculation water:

The following Parameters are likely to be maintained in the Recirculation water.

S.No	Parameter	Unit	Indirect circuit	
			Normal range	Maximum/control limit
1	pH		7.5 -8.5	8.6
2	Conductivity	Mho/ cm	300-1400	1600
3	Calcium Harness (as $CaCo_3$)	mg/l	60-250	300
4	Magnesium Hardness (as $CaCo_3$)	mg/l	40-200	230
5	Total Hardness (as $CaCo_3$)	mg/l	100-450	530
6	P-Alkalinity (as $CaCo_3$)	mg/l	0-20	60
7	M-Alkalinity (as $CaCo_3$)	mg/l	50-250	300
8	Total Dissolved solids	mg/l	190-900	1050
9	Chlorides as Cl	mg/l	20-140	160
10	Total Iron as Fe	mg/l	1.5-3.0	4.0
11	Oil & grease	mg/l	0-5	5
12	TSS	mg/l	<5	10
13	Turbidity	NTU	20-40	50
14	Cycles of Concentration	-------	1.5-3.5	4

11. REQUIREMENTS OF PROPOSED COOLING WATER TREATMENT PROGRAMME:

11.1. General requirements of cooling water treatment package:

VSP requires Party to provide cooling water treatment package for chemicals supply, application of chemicals, monitoring and controlling the performance of the treatment programme of cooling water system of pump house-WRM-2 (expansion). Party should guarantee that scaling, corrosion and biological growth will be minimized so that it will not pose any limitation to the process.

11.2. Control of Scaling Corrosion and Fouling:

11.2.1. The formulations of the chemicals offered shall contain the following to take care of deposition, scaling, fouling and corrosion in the system.

a. Effective corrosion inhibitors to protect Mild Steel (MS).

b. Effective yellow metal Inhibitors to protect Cu/Ni, brass and other noble metallurgy from corrosion.

c. Effective antiscalents to prevent the precipitation of alkaline earth salts (Calcium &Magnesium).

d. Effective Scale dispersants to retard the deposition of corrosion products & other suspended material etc.

e. Antifoulant to retard the effects of inorganic foulants & prevent corrosion products.

f. The formulation shall be effective for all operating parameters as mentioned at relevant clause in the specification.

11.3. <u>Biological control:</u>

The micro and macro organisms (bio mass) growth control is required for the circuit. For this, dosing of NaOCl, ClO_2 can be done continuously to maintain a positive free residual chlorine level in the supply header of the consumer. Party shall offer their biocides and bio-dispersants to achieve the guaranteed biological norms, with specified biocides dosing recommended by the party. All statutory regulations in this connection shall be followed by the party. On site generation is allowed for ClO_2.

The Chemicals offered shall contain the following to take care of biological control in the system

a. Effective biocides to control algae growth on cooling tower cells and its related components like fan blade, CT nozzles, etc and fouling.

b. Effective biocides to control slime formation.

c. Effective biocides to control Microbiological growth i.e. total viable count (TVC), Sulphate Reducing Bacteria (SRB) and Iron forming bacteria.

d. Effective biocides to control Microbiological induced corrosion (MIC).

e. Effective biocide activators / biocide supplements to improve the performance of the biocide.

f. Effective bio dispersants to prevent the accumulation of deposits of silt, and biological products.

Note: Only non foaming type biocides & biodispersents are to be used in treatment progamme.

11.4. <u>Oil Dispersants:</u> Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

11.5. Special emphasis is to be given to the following by the party while designing the treatment program for effective control of scaling, corrosion, fouling, oil and grease and micro-biology

a. Recirculation Water parameters likely to be maintained as specified at clause 10.2.
b. High temperatures attained both on process and CW side.
c. Material of construction of pipes, equipments etc. coming in contact with recirculation water
d. Quality and quantity of make up water and
e. Surrounding atmospheric environment of the cooling tower.

11.6. The chemicals offered for Scaling, Corrosion, oil dispersion and Biological control shall be effective for specified range of pH and temperature.

11.7. The chemicals offered shall be non-corrosive and formulations offered should have surface-active agents for proper cleaning action on fouled surfaces.

11.8. The biocides& biodispersents should be compatible with Antiscalents /corrosion inhibitors, oil dispersants and all other chemicals/ formulations offered by the party.

11.9. To control PH sulphuric acid/HCl will be supplied by VSP at free of cost. Storage, Safe handling and application of sulphuric acid will be in party's scope which includes supply of suitable sulphuric acid/HCl dosing pumps on returnable basis.

11.10. At present there is no provision for acid dosing facilities including storage tank. Party has to make their own arrangement for storage of acid and dosing facilities, if required.

11.11. COC to be maintained in the recirculation water as given at relevant clause.

12. JOB SCOPE OF TREATMENT PACKAGE FOR INDIRECT SYSTEM

12.1. Reports:

12.1.1. Daily Reports:

i. Party's representative will generate daily electronic reports of the previous day in the format enclosed at Annexure-7, which will include Analysis of make up and recirculation water streams covering the following parameters.

Sl.No	Parameter	Unit
1.	**Conductavity**	µmho/cm
2.	**TDS**	mg/l
3.	**Total Iron as Fe**	mg/l
4.	**Turbidity**	mg/l
5.	**TSS**	mg/l
6.	**Total Hardness**	mg/l
7.	**Ca-Hardness**	mg/l
8.	**Mg-Hardness**	mg/l
9.	**P-alklanity**	mg/l
10.	**T-alklanity**	mg/l
11.	**Chlorides**	mg/l
12.	**FRC**	mg/l
13.	**T-Phosphates**	mg/l
14.	**O-Phosphates**	mg/l
15.	**Azole**	
16.	**C.O.C with Ca**	----
17.	**C.O.C with Mg**	----
18.	**C.O.C with Cl**	----
19.	**C.O.C with TDS**	----
20.	**Oil & Grease**	mg/l
21.	**p H**	
Note: Any parameter other than mentioned above (like Zinc, Azole etc. should be analysed as per VSP's requirement.		

ii. Cooling Water Inlet, Outlet temperatures and make up water rate

iii. Chemical Active Ingredient report for each circuit.

iv. Visual observation report of cooling tower for healthiness of the internal structures, leakages in the system.

v. Chemical stock accounting, Consumption and Penalties report of each circuit

vi. Cumulative Chemical Consumption and Penalties report of each circuit

vii. Daily report should also include abnormality like undesirable odor, color raise in makeup rate, action taken and results achieved etc.

12.1.2. Fortnightly Reports: (once in 15 days)

Party's representative shall generate fortnightly electronic reports and shall contain the following

a) Cooling tower algae report

b) TVC & SRB Results

c) Biocides consumption details.

12.1.3. Monthly Reports

Party's representative will generate monthly electronic reports of the previous month in the format enclosed at Annexure-9 which shall contain the following.

a) Corrosion rates

b) Microbiology readings

c) Cumulative chemical consumption and penalties report of circuit.

d) Action plan taken / planned to achieve the system parameters as per the relevant clause in case of non- performance only.

12.1.4. On monthly basis actual consumption of the chemicals deviations if any with reasons and explanations are to be reported.

12.1.5. Actions taken for any abnormal / emergency situations shall be reported by the party to EIC immediately.

12.1.6. The signed hard copies of the monthly/fortnightly/daily reports shall be submitted to Engineer-In charge immediately after generation of reports. The soft copies shall be sent to HOD (WMD).

13. GUARANTEE PERFORMANCE PARAMETERS:

With the above treatment - the party shall guarantee the following:

13.1. CORROSION RATE: This is measured as per IS 8188-1999 on monthly basis.

13.1.1. MS Corrosion Less than 3.00 mpy

13.1.2. Ad. Brass Less than 0.20 mpy

13.2. Microbiology: This is measured as per IS 1622-1981 once in '15' days.

13.2.1. TVC count : Less than 5, 00,000 col. / ml.

13.2.2. SRB : 150 org/100ml.

13.3. Residual availability:

13.3.1. Presence of minimum residual of active ingredient of each quoted chemicals as per offer given by party.

13.3.2. For MS corrosion inhibitor --Total phosphate content minimum 6ppm and Zn content minimum 1.0 ppm.

13.3.3. For Yellow metal corrosion inhibitor-- Azoles minimum 1ppm

13.4. Oil & Grease: Should be less than 5 mg/l at side stream filter out let water.

13.5. P^H: P^H at supply header should be controlled with in the range as mentioned at clause 10.2.

13.6. STOCK LEVELS OF CHEMICALS: Stock levels of chemicals as mentioned at relevant clause.

14. PENALITIES:

The performance evaluation of the system is done based on the Guarantee Performance Parameters. In case of any deviation from the Guarantee Performance parameters, the penalty rate shall be imposed in terms of percentage of chemical quantity dosed during the period performance parameters are evaluated.

Party shall note that the chemical treatment is being started in the system for the first time and a passivation /stabilization period of 15 days can be provided. The performance evaluations shall start after completion of 15 days passivation/stabilization. However, the payment for passivation chemicals / stabilization chemicals for 15 days shall be released along with the first month payment. In case of penalty imposition either on antiscalents/corrosion inhibitors or on bio-dispersants in the first month, the same penalty rate is applicable to passivation / stabilization chemicals also. Party shall maintain the guarantee performance parameters throughout the period of treatment. Corrosion, Deposition rates, TVC & SRB counts will be carried out at QATD lab/ WMD labs of VSP. In case of any deviation from the guaranteed parameters mentioned above, penalty shall be levied as below.

14.1. Corrosion rate for MS:

One MS coupon will be installed in the system and the corrosion rate as measured will be rounded off to first decimal point and considered for performance evaluation

14.1.1. For less than or equal to 3.0 mpy - No penalty.

14.1.2. For above 3.0 mpy and up to 4.0 mpy- Deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

14.1.3. For above 4.0 mpy- and up to 5.0 mpy – Deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

14.1.4. Above 5.0 mpy: - No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

14.2. Corrosion rate for Ad. Brass:

One Ad Brass coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation

14.2.1. Less than or equal to 0.20 mpy: No penalty.

14.2.2. Above 0.20 mpy and up to 0.35 mpy –deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

14.2.3. Above 0.35 mpy and up to 0.50 mpy – deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

14.2.4. Above 0.50 mpy – No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

14.3. <u>TVC & SRB counts:</u>

14.3.1. For TVC up to 500000 col/ml & SRB up to 150 counts/100 ml-- No Penalty

14.3.2. For TVC above 500000 col/ml and up to 550000 col/ml & SRB above 150 org/100 ml and below 200 org/100 ml--Deduction of 20% of the Quantity of the biocides and relevant chemicals dosed during the period.

14.3.3. For TVC above 550000 col/ml and up to 600000 col/ml & SRB above 200 org/100 ml and below 250 org/100 ml. Deduction of 50% of the Quantity of the biocides and relevant chemicals dosed during the period.

14.3.4. For TVC above 600000 col/ml. & SRB above 250 org/100 ml --No Payment to the Quantity of the biocides and relevant chemicals dosed during the period.

14.3.5. Penalty is applicable even if one of the parameters (TVC or SRB) deviates from the norm. TVC & SRB count shall be measured once in '15 days' for performance evaluation.

14.4. <u>Oil & Grease:</u>

14.4.1. ≤ 5 mg/l------ No Penalty

14.4.2. 5 to 10 mg/l------- Deduction of 20% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

14.4.3. Above 10 and up to 15 mg/l------- Deduction of 50% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

14.4.4. Above 15 mg/l ------ No payment to the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

14.5. <u>Penalty on residual availability of active ingredient in recirculation water(for indirect cooling water):</u>

If it is lower than the Lower Limit (LL) of concentration of each chemical quoted by party, penalty will be levied as given below.

14.5.1. Residual achieving lower limit (LL) in ppm – No penalty

14.5.2. Residual achieving <100-70% of LL in ppm : Deduction of 20% of the Quantity of relevant chemicals consumed during the period for the system.

14.5.3. Residual achieving <70-55% of LL in ppm : Deduction of 50% of the Quantity of relevant chemicals consumed during the period for the system.

14.5.4. Residual achieving <55% of LL in ppm.: No Payment for relevant chemicals consumed during the period for the system.

14.6. Penalty on P^H of Recirculation Water:

Party has to operate the recirculation water within range as mentioned in clause 10.2 normal range i.e. 7.5 to 8.5 pH. If the pH crosses this limit, party has to restore it to the normal range with in 8 hrs.

14.6.1. For pH less than 7.5: Deduction of 10% of the Quantity of all chemicals for indirect system consumed (except oil dispersants) during the period.

14.6.2. For pH above 8.5: Deduction of 10% of the Quantity of all chemicals for indirect system consumed (except oil dispersants) during the period.

14.7. Stock of Chemicals:

The stock accounting of all chemicals shall be done by the party at 5.00 P.M daily. In case on any day (except at the end of the treatment period) during the chemical treatment period, the stock level of any chemical / chemicals at site depletes to less than 30 days or mutually agreed stock levels, a penalty of 100% of one-day consumption of chemical / chemicals shall be imposed on the party for that particular day till the stock levels reach the values as mentioned at relevant clause. VSP's decision is final in this regard.

Example: Stock at site will be accounted every day at the end of General shift and balance stock availability will be intimated to Engineer I/C. Stock out penalty applicability on a particular chemical will start from the day on which stock at site is less than 30 days stock. A penalty equivalent to one day chemical dosage (particular stock out chemical), will be imposed for each day of such stock out till the stock is replenished to 30 days stock.
For any continuous dosing chemical "A" at a recommended dosage of 1 Kg/day (as specified in offer) a stock of 30 Kg is to be maintained at site always. If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock.
In case of slug dosing chemical having a recommended dosage of 7 Kg for every 7 days (as specified in offer) a stock of 30 Kg is to be maintained at site always If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock. Similar is the case with fort nightly and monthly dosage chemicals.

14.8. In case simultaneous imposition of penalties is levied under the clauses 14.1 to 14.6 for the same duration, the penalties applicable shall be summed up. However, the sum of all penalties imposed for any particular chemical shall not exceed 100 %. The penalty imposed under stock of chemicals of clause 14.7 shall be in addition to the sum of penalties imposed under clauses 14.1 to 14.6.

14.9. If the corrosion rate of MS or Ad Brass for indirect system maintained in 100% penalty range for 3 times either consecutively or intermittently during the treatment period, from 4th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for indirect cooling water system of WRM-2 till corrosion rate comes to below 100% penalty limit.

14.10. If the TVC or SRB maintained in 100% penalty range for 6 times either consecutively or intermittently during the treatment period, from 7th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for indirect cooling water system of WRM-2 till TVC or SRB comes to below 100% penalty limit.

PART-C

15. DIRECT COOLING WATER SYSTEM OF SBM:

The direct cooling water is mainly supplied to following consumers:-

Sl. No.	Consumer	Purpose
1	a) De-scalers b) Scale flume flushing	To flush back the scales generated during rolling process back to scale pit through scale flume.
2	a) Roll Cooling. b) Charging and discharging equipment of furnaces, water trough. c)Roughing and Intermediate Mills.& finishing mill	The water is being used for direct contact Cooling of equipments.
3	a)Water boxes for metal conditioning. b) Pinch rolls. c) Side looper & breakout box.	The water is being used for cooling and metal conditioning & heat treatment of final products.

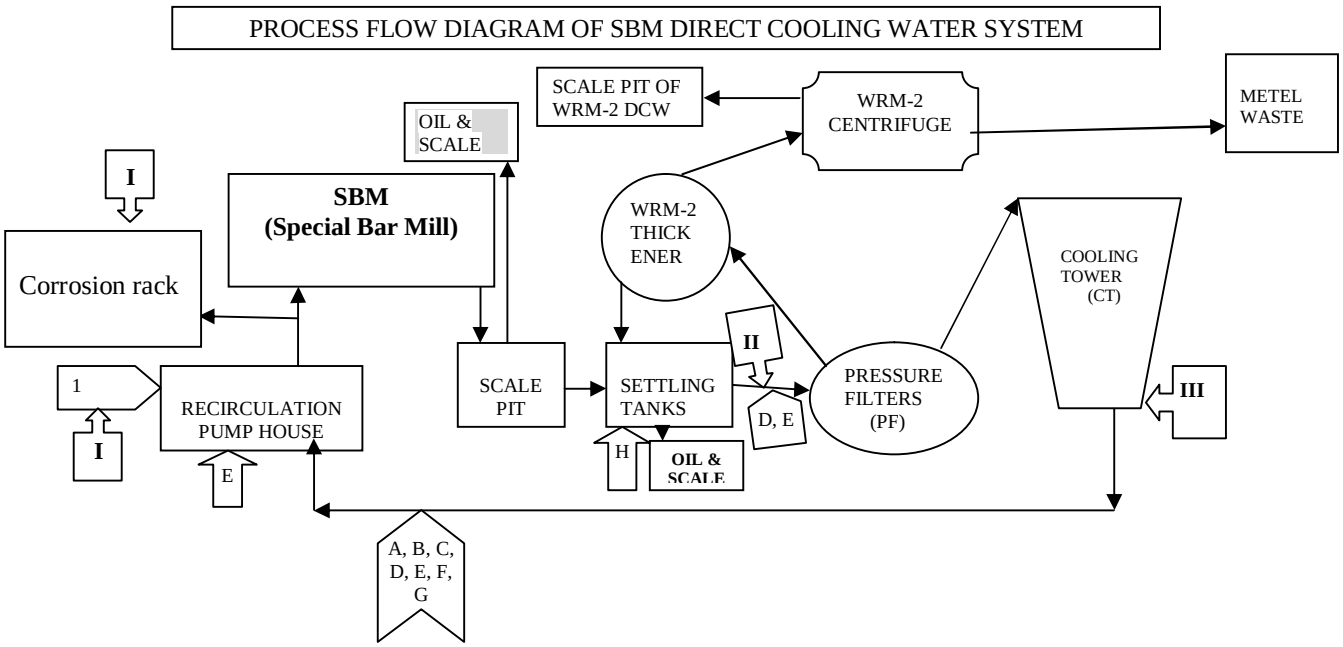
The hot return water contaminated with scale and oil from the Special Bar mill (SBM) enter the scale pit through an open flume where heavier scale will be settled. From the scale pit, settled scale is taken out with grab crane. The Oil Skimmers are provided to take out floating oil from water surface.

From the scale pit, the water is pumped to Settling tanks where further settling of particles takes place. At settling tank, moving scrapper mechanism & oil skimmers are also present for further removal of oil. The settled scale is taken out with grab crane.

After settling & scrapping, the water is pumped to Pressure filters where further reduction of particles takes place. After passing through Pressure filters, the water goes to hot basin of direct water cooling tower where it gets cooled and collected in cold basin of cooling tower & goes into cold sump of RCPH through connecting pipe from where the water is sent to SBM equipments by pumping. The backwash water from Pressure filters (from all mills) is pumped to Treatment Plant situated in WRM-2 Waste water treatment plant. In the treatment plant water is passed through a thickener to remove the suspended particles. The clarified water from the thickener is taken to Scale pit . The slurry collected at the bottom of thickener is pumped by underflow slurry pumps to centrifuges. In the centrifuges the sludge gets separated from water. The sludge accumulated at the bottom of centrifuges is taken by dumpers to Storage area. The water separated in the centrifuges is sent to WRM-2 scale pit.

NOTE: - To make up the losses in system, make up water is taken from Raw Water Treatment Plant (RWTP) into system in cold sump & Scale pit.

PROCESS FLOW DIAGRAM OF SBM DIRECT COOLING WATER SYSTEM:



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,Legends:

i. The sign ⇨ indicates the compulsory points of chemical dosing. The sign ⇧ indicates the optional points of chemical dosage. The sign ⇨ indicates water testing sampling points. Howsoever party is free to choose any ***additional points*** of dosage for better effectiveness.

ii. The alphabets indicated inside the dosage point signs in the flow diagram denote the following chemicals:

A- Corrosion inhibitors
B- Antiscalents
C- Iron dispersant
D - Oil dispersant
E- Oxidizing biocide
F- Non Oxidizing biocide
G- Bio dispersant
H- Oil de-emulsifier
1- Makeup water addition point.

iii. Water testing sampling points.

I - All water parameters as per every day analysis, **II** – Oil & grease, **III** – Temperature.

16. DETAILS OF COOLING WATER SYSTEM (DIRECT)

16.1. System operating parameters:

S.No	Parameter	Units	Direct
1.	Recirculation rate	m^3/hr	Avg 2520
2.	Hold-up volume	m^3	3780
3.	Make up rate	m^3/hr	(65-90) 78
4.	Source of makeup water		RWTP (Pump House-1 Outlet)
5.	Blow down rate	m^3/hr	Range: 0-25
6.	ΔT across cooling tower	^0C	15 (Max)
7.	Supply water temperature	^0C	34-36
8.	Return water temperature	^0C	45-49
9.	Major equipment/systems through which water is passing		1) Descaling & Scale flushing through flume 2) Rolls & Guides 3) Charging, discharging equipment of furnaces. 4) Roughing .Intermediate & finishing mills. 5) Control cooling of bars in low temp. rolling.. 6) Pinch rolls. 7) Side looper 8) Supply & return centrifugal pumps. 9) Scale pit & settling tank. 10) Pressure sand filters.

***** A variation on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

16.2. Equipment wise details:

The water which is to be treated will be passing through the following equipment whose details and metallurgy is given below.

16.2.1. Pumps details (Supply pumps to consumers):

S.No	Parameter	Direct
1.	No of pumps	05
2.	Working	03
3.	Stand by	02
4.	Type	Horizontal Centrifugal
5.	Make	Mather & Platt
6.	Capacity of each pump(m^3/hr)	840
7.	Discharge pressure (Kg/cm^2)	7.0
8.	Casing Metallurgy	2% Ni CI
9.	Impeller Metallurgy	Cast steel, CA6NM

16.2.2. Pipe line and valve details

Pipe line metallurgy : Carbon Steel.
Metallurgy of Valves : Cast Iron, Cast steel, Brass

16.2.3. Cooling towers details:

S.No	Parameters	Direct circuit
1.	Cooling tower No.	DCW C.T.
2.	Make	Paharpur CT
3.	Type	Cross flow
4.	No of Cells	04
5.	Frame work	RCC
6.	Filling	PVC on SS grids
7.	Total hold up volume (pump basin, cooling tower sump and system hold up) m3	3780
8.	Cooling Water circulation rate(m^3/hr)	Avg 2520
9.	Normal supply Temp ^oC	34
10.	Maximum supply Temp ^oC	36
11.	Normal average Return Temp ^oC	45
12.	Maximum average Return Temp ^oC	49
13.	Temp drop , ΔT in ^oC	15(max)
14.	Make up water rate, m^3/hr	78
15.	Blow down + Drift losses (m^3/hr)	Max 30

***** A variation on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

16.2.4. Filters details:

S.No	Parameters	Direct circuit
1.	Type	Pressure
2.	Total number of filters	08
3.	Working (In line)	06
4.	Stand by	01
5.	Under Back wash	01
6.	Capacity of each m^3/hr	450
7.	Filter inlet TSS (ppm)	100
8.	Filter outlet TSS (ppm)	<5

16.3. The makeup water is as follows:

Losses in the system viz., Evaporation, blow down, wind and process leaks are compensated with makeup water. The makeup water to the system is the water coming from Raw Water Treatment plant (RWTP). The makeup water analysis is generally in following range.

S.No	Parameter	Units	Make up water from RWTP
1.	pH	-	7.5-8.5
2.	Conductivity	Mho/cm	270-400
3.	Calcium Harness (as $CaCO_3$)	mg/l	40-70
4.	Magnesium Hardness (as $CaCO_3$)	mg/l	40-70
5.	Total Hardness (as $CaCO_3$)	mg/l	80-140
6.	P-Alkalinity (as $CaCO_3$)	mg/l	4-20
7.	T-Alkalinity (as $CaCO_3$)	mg/l	100-160
8.	Turbidity	NTU	10-30
9.	Total Dissolved solids	mg/l	150-250
10.	Chlorides as Cl_2	mg/l	20-40

While designing the treatment program, Party shall take in to consideration the seasonal variations in the makeup water quality from RWTP mainly, the turbidity level and the dust ingress into the system from the atmosphere. Make up water analysis for the last one year (month wise) is enclosed as Annexure-3.

17. PURPOSE OF COOLING WATER TREATMENT PROGRAMME

Chemical treatment is aimed for deposit free operation and control of corrosion and biomass. The problems likely to occur in the system are improper cooling of rolls due to chockage of nozzles leading to surface cracks on the rolls and indentation of the finished products resulting rejection due to scale formation/deposits/fouling/muck/suspended solids accumulation and slime formation & corrosion of pipeline & equipments coming in contact with water.

The Chemical Treatment programme should be designed in such a way

i. To provide acceptable day to day performance and at the same time having the capacity to function well in case of mishaps, leaks, airborne contamination etc. in recirculation water.

ii. To provide protection against corrosion, fouling by corrosion products, water borne deposits, silt, muck formation due to oil & grease suspended matter etc. and the recirculation water quality is to be kept within the limits.

iii. To provide protection against biological contaminations like algae growth, slime formation and anaerobic sludge formation in cooling towers and common sumps of pump house and the recirculating water quality is to be kept within the limits.

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17.1. Treatment Objectives: The cooling water treatment programme offered by the Party shall be effective and shall meet general and specific treatment objectives given below.

A. General objectives:

i) Corrosion control (to keep system's water carrying pipelines and equipment corrosion levels at desired rate).

ii) Scaling and fouling control.

iii) Deposition control (to avoid water borne deposition on system pipeline and equipment).

iv) Elimination/ minimization of deposit at Cooling tower nozzles & Drift eliminator in the cooling tower. Elimination /minimization of oil and grease muck formation in recirculation water.

v) Enhancement of oil and grease dispersion in recirculation water.

vi) De-emulsification of oil and grease (separation of oil and grease at scale pit & settling tanks)

vii) Effective iron dispersant to disperse the iron compounds which cause fouling

B. <u>System specific objectives:</u>

i) Critical equipments like Rotary shears. Roll coolers, furnace and side loop etc. are to be free from water borne deposits. Cooling Tower nozzles are also to be kept free from water borne deposits to the extent possible.

ii) Eliminate/ minimize the chockage in pressure filters media and nozzles.

17.2. <u>Parameters likely to be maintained during treatment in Recirculation water</u>

S.No	**Parameter**	**Unit**	**Direct circuit**	
			Normal range	**Maximum/control limit**
1	pH		7.5 -8.6	8.7
2	Conductivity	Mho/ cm	500-1200	1800
3	Calcium Hardness (as $CaCo_3$)	mg/l	70-250	360
4	Magnesium Hardness (as $CaCo_3$)	mg/l	50-150	230
5	Total Hardness (as $CaCo_3$)	mg/l	120 -400	590
6	P-Alkalinity (as $CaCo_3$)	mg/l	0-20	60
7	T-Alkalinity (as $CaCo_3$)	mg/l	100-250	300
8	Total Dissolved solids	mg/l	400-900	1200
9	Chlorides as Cl	mg/l	50-150	200
10	Total Iron as Fe	mg/l	1.5-3.0	4.0
11	Oil & grease	mg/l	0-5	5
12	TSS	mg/l	5-10	20

18. REQUIREMENTS OF PROPOSED COOLING WATER TREATMENT PROGRAMME:

18.1. General requirements of cooling water treatment package:

VSP requires Party to provide cooling water treatment package for chemicals supply, application of chemicals, monitoring and controlling the performance of the treatment programme of cooling water system of pump house of SBM. Party should guarantee that scaling, corrosion, biological growth Suspended solids and oil &grease will be minimized so that it will not pose any limitation to the process.

18.2. Control of Scaling, Corrosion and Fouling:

18.2.1. The formulations of the chemicals offered shall contain the following to take care of deposition, scaling, fouling and corrosion in the system.

a. Effective corrosion inhibitors to protect Mild Steel (MS).

b. Effective antiscalents to prevent the precipitation of alkaline earth salts (Calcium & Magnesium).

c. Effective Scale dispersants to retard the deposition of corrosion products, scale & other suspended material etc.

d. Antifoulants to retard the effects of inorganic foulants & prevent corrosion products.

e. The formulation shall be effective for all operating parameters as mentioned at relevant clause.

18.3. De-emulsifier & Oil Dispersants: Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

18.3.1. The formulations of the chemicals offered shall contain the following to take care of de-emulsification and dispersion of oil & grease present in the system.

a. Effective de-emulsifier to separate oil from water at scale pit.

b. Oil Dispersants: Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

18.4. Biological control:

The micro and macro organisms (bio mass) growth control is required for the circuit. For this, dosing of NaOCl, ClO_2 (oxidizing biocides) can be done continuously to maintain a positive free residual chlorine level in the supply header of the consumer. Any excess of chlorine should be avoided due to its harmful effects. Party shall offer their biocides and bio-dispersants to achieve the guaranteed biological norms, with specified biocides dosing recommended by the party. All statutory regulations in this connection shall be followed by the party. On site generation is allowed for ClO_2.

The Chemicals offered shall contain the following to take care of biological control in the system

a. Effective biocides to control algae growth on cooling tower cells and its related components like fan blades, CT nozzles etc and fouling.

b. Effective biocides to control slime formation.

c. Effective biocides to control Microbiological growth i.e. total viable count (TVC), Sulphate Reducing Bacteria (SRB) and Iron forming bacteria.

d. Effective biocides to control Microbiological induced corrosion (MIC).

e. Effective biocide activators / biocide supplements to improve the performance of the biocide.

f. Effective bio dispersants to prevent the accumulation of deposits of silt, and biological products.

Note: Only non foaming type biocides & biodispersents are to be used in treatment progamme.

18.5. Special emphasis is to be given to the following by the party while designing the treatment program for effective scaling, fouling, corrosion, oil, grease, and micro-biological control

a. Recirculation Water parameters to be maintained as specified at relevant clause.

b. High temperature in CW rotary shear, roll coolers etc. (Both on process and CW side).

c. Material of construction of pipes, equipments etc. coming in contact with recirculation water

d. Quality and quantity of make-up water.

e. Surrounding atmospheric environment of the cooling tower.

18.6. The chemicals offered for Scaling, Corrosion, oil, grease, and Biological control shall be effective for specified range of P^H and temperature.

18.7. The chemicals offered shall be non-corrosive and formulation should have surface-active agents for proper cleaning action on fouled surfaces.

18.8. The biocides & biodispersents should be compatible with Antiscalents / corrosion Inhibitors, de-emulsifiers, oil dispersants, coagulants, flocculants and all other chemicals/ formulations offered by the party.

18.9. Party may note that flow to coupon rack (corrosion) may fluctuate and the flow may even go to zero as per the requirement of the consumer. Hence party is advised to provide a local recirculation pump for maintaining required flow to coupon rack during such times which may take suction from cold sump.

19. JOB SCOPE OF TREATMENT PACKAGE FOR DIRECT WATER SYSTEM

19.1. Reports:

19.1.1. Daily Reports:

i. Party's representative will generate daily electronic reports of the previous day, which will include Analysis of make up and recirculation water streams covering the following parameters.

Sl.No	Parameter	Unit
1.	**Conductavity**	mho/cm
2.	**TDS**	mg/l

3.	**Total Iron**	mg/l
4.	**Total Hardness**	mg/l
5.	**Ca-Hardness**	mg/l
6.	**Mg-Hardness**	mg/l
7.	**P-alklanity**	mg/l
8.	**Total-alklanity**	mg/l
9.	**Chlorides**	mg/l
10.	**FRC**	mg/l
11.	**T-Phosphates**	mg/l
12.	**O-Phosphates**	mg/l
13.	**C.O.C with Ca**	----
14.	**C.O.C with Mg**	----
15.	**C.O.C with Cl**	----
16.	**C.O.C with TDS**	----
17.	**TSS of Filter outlet**	mg/l
18.	**Oil & Grease at Settling tank outlet**	mg/l
19.	**P^H at supply header**	
Note: Any parameter other than mentioned above (like Zinc, Azole etc.) should be analysed as per VSP's requirement.		

ii. Cooling Water Inlet, Outlet temperatures and make up water rate.

iii. Chemical Active Ingredient report for each circuit.

iv. Visual observation report of cooling tower for healthiness of the internal structures, leakages in the system.

v. Chemical stock accounting, Consumption and Penalties report of each circuit

vi. Cumulative Chemical Consumption of each circuit

vii. Daily report should also include abnormality like undesirable odor, color raise in makeup rate, action taken and results achieved etc.

19.1.2. Party's representative shall generate fortnightly electronic reports and shall contain the following.

a) TVC & SRB Results

19.1.3. Monthly Reports

Party's representative will generate monthly electronic reports of the previous month which shall also contain the following.

a) Corrosion rates

b) Microbiology readings

c) Cumulative chemical consumption and penalties report of circuit.

d) Action plan taken / planned to achieve the system parameters as given at relevant clause in case of non-performance only.

19.1.4. On monthly basis actual consumption of the chemicals deviations if any with reasons and explanations are to be reported.

19.1.5. Actions taken for any abnormal / emergency situations shall be reported by the party to EIC immediately.

19.1.6. The signed hard copies of the monthly/fortnightly/daily reports shall be submitted to Engineer-In charge immediately after generation of reports. The soft copies shall be sent to HOD (WMD).

20. GUARANTEE PERFORMANCE PARAMETERS:

With the above treatment - the party shall guarantee the following: -

20.1. Corrosion rate: This is measured as per IS 8188-1999 on monthly basis.

20.1.1. MS Corrosion Less than 5.00 mpy

20.2. Microbiology: This is measured as per IS 1622-1981 once in '15' days.

20.2.1. TVC count Less than 5, 00,000 col. / ml.

20.2.2. SRB 150 org/100ml.

20.3. Residual availability:

20.3.1. Presence of minimum residual of active ingredient of each quoted chemicals as per offer given by party.

20.3.2. For MS corrosion inhibitor -- Total phosphates content minimum 6ppm

--- Zn content minimum- 1.0 ppm

20.4. Oil & Grease: Should be less than 5 mg/l at settling tank out let.

20.5. STOCK LEVELS OF CHEMICALS:

20.5.1. Stock levels of chemicals as mentioned at relevant clause.

21. PENALITIES:

The performance evaluation of the system is done based on the Guarantee Performance Parameters. In case of any deviation from the Guarantee Performance parameters, the penalty rate shall be imposed in terms of percentage of chemical quantity dosed during the period performance parameters are evaluated.

Party shall note that the chemical treatment is being started in the system for the first time and a passivation /stabilization period of 15 days can be provided. The performance evaluations shall start after completion of 15 days passivation/stabilization. However, the payment for passivation chemicals / stabilization chemicals for 15 days shall be released along with the first month payment. In case of penalty imposition either on antiscalents/corrosion inhibitors or on bio-dispersants etc. in the first month, the same penalty rate is applicable to passivation / stabilization chemicals also. Party shall maintain the guarantee performance parameters throughout the period of treatment. Corrosion, Deposition rates, TVC & SRB counts will be carried out at QATD lab/ WMD labs of VSP. In case of any deviation from the guaranteed parameters mentioned above, penalty shall be levied as below.

21.1. Corrosion rate for MS:

One MS coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation.

21.1.1. For less than or equal to 5.0 mpy: Nil

21.1.2. For above 5.0 mpy and up to 6.0 mpy: Deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

21.1.3. For above 6.0 mpy and up to 7.0 mpy: Deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

21.1.4. Above 7.0 mpy. No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

21.2. <u>TVC & SRB counts:</u>

21.2.1. For TVC up to 500000 col/ml & SRB up to 150 org/100 ml-- No Penalty

21.2.2. For TVC above 500000 col/ml and up to 550000 col/ml & SRB above 150 org/100 ml and below 200 org/100 ml--Deduction of 20% of the Quantity of the biocides and relevant chemicals dosed during the period.

21.2.3. For TVC above 550000 col/ml and up to 600000 col/ml & SRB above 200 org/100 ml and below 250 org/100 ml.--- Deduction of 50% of the Quantity of the biocides and relevant chemicals dosed during the period.

21.2.4. For TVC above 600000 col/ml. & SRB above 250 org/100 ml -- No Payment to the Quantity of the biocides and relevant chemicals dosed during the period.

21.2.5. Penalty is applicable even if one of the parameters deviates from the norm. TVC & SRB count shall be measured once in '15 days' for performance evaluation.

Note: Total viable count (TVC) test conducted as Standard Plate Count (SPC) from IS 1622-1981.

21.3. <u>Oil & Grease:</u>

21.3.1. ≤ 5 mg/l------ No Penalty

21.3.2. 5 to 10 mg/l------- Deduction of 20% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

21.3.3. Above 10 and upto 15 mg/l------- Deduction of 50% of the Quantity of the oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

21.3.4. Above 15 mg/l ------ No payment to the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

21.4. <u>Penalty on residual availability of active ingredient in recirculation water</u>

If it is lower than the Lower Limit (LL) of concentration of each chemical quoted by party, penalty will be levied as given below.

21.4.1. Residual achieving lower limit (LL) in ppm – No penalty

21.4.2. Residual achieving <100-70% of LL in ppm : Deduction of 20% of the Quantity of relevant chemicals consumed during the period for the system.

21.4.3. Residual achieving <70-55% of LL in ppm : Deduction of 50% of the Quantity of relevant chemicals consumed during the period for the system.

21.4.4. Residual achieving <55% of LL in ppm. No Payment for relevant chemicals consumed during the period for the system.

21.5. <u>Stock of Chemicals:</u>

The stock accounting of all chemicals shall be done by the party at 5.00 P.M daily. In case on any day (except at the end of the treatment period) during the chemical treatment period, the stock level of any chemical / chemicals at site depletes to less than 30 days or mutually agreed stock levels, a penalty of 100% of one-day consumption of chemical / chemicals day shall be imposed on the party for that particular day till the stock levels reach the values as mentioned at relevant clause. VSP's decision is final in this regard.

<u>Example:</u> Stock at site will be accounted every day at the end of General shift and balance stock availability will be intimated to Engineer I/C. Stock out penalty applicability on a particular chemical will start from the day on which stock at site is less than 30 days stock. A penalty equivalent to one day chemical dosage (particular stock out chemical), will be imposed for each day of such stock out till the stock is replenished to 30 days stock.
For any continuous dosing chemical "A" at a recommended dosage of 1 Kg/day (as specified in offer) a stock of 30 Kg is to be maintained at site always. If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock.
In case of slug dosing chemical having a recommended dosage of 7 Kg for every 7 days (as specified in offer) a stock of 30 Kg is to be maintained at site always If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock. Similar is the case with fort nightly and monthly dosage chemicals.

21.6. In case simultaneous imposition of penalties is levied under the clauses 21.1 to 21.4 for the same duration, the penalties applicable shall be summed up. However, the sum of all penalties imposed for any particular chemical shall not exceed 100 %. The penalty imposed under stock of chemicals of clause 21.5 shall be in addition to the sum of penalties imposed under clauses 21.1 to 21.4.

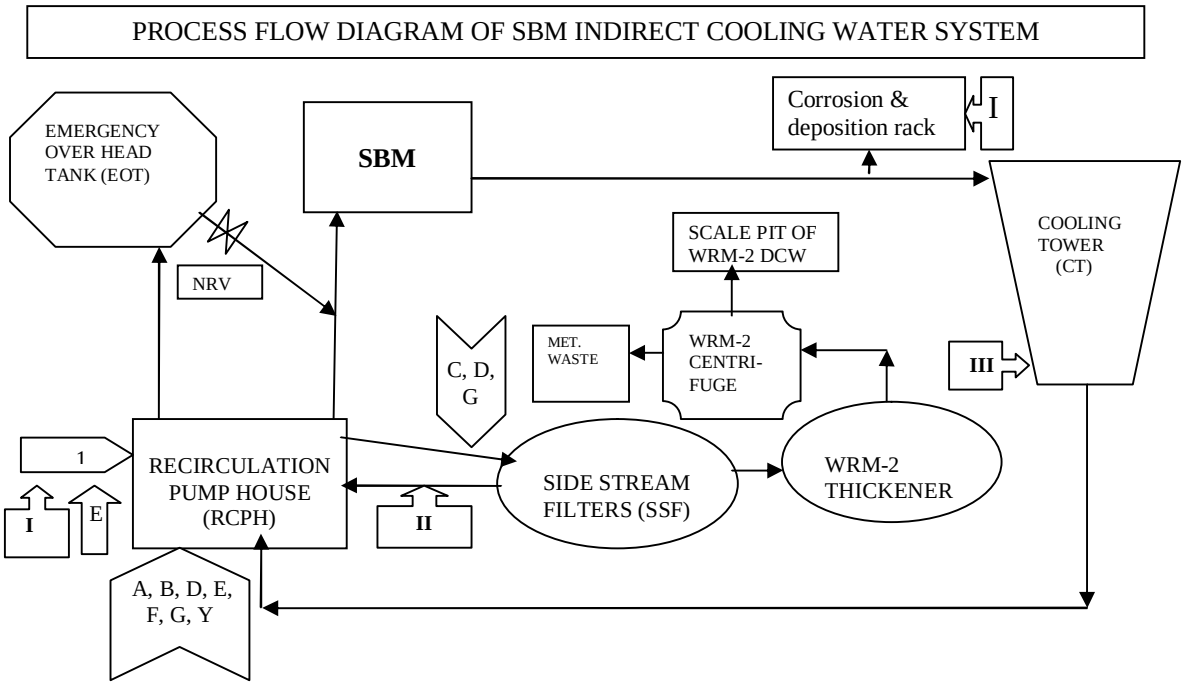
21.7. If the corrosion rate of MS maintained in 100% penalty range for 3 times either consecutively or intermittently during the treatment period, from 4th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for direct cooling water system of SBM till corrosion rate comes to below 100% penalty limit.

21.8. If the TVC or SRB maintained in 100% penalty range for 6 times continuously or intermittently during the treatment period, from 7th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for direct cooling water system of SBM till TVC or SRB comes to below 100% penalty limit.

PART-D

22. SPECIAL BAR MILL (SBM) INDIRECT COOLING WATER SYSTEM:

22.1. PROCESS FLOW DIAGRAM:



Legends:

(A) The nos. shown on top of arrows is indication of corresponding quality of water at the particular place.

(B) The sign ⇨ indicates the compulsory points of chemical dosing. The sign ⇧ indicates the optional points of chemical dosage. Howsoever party is free to choose any ***additional points*** of dosage for better effectiveness.
The sign ⇨ indicates water testing sampling points.

C) The alphabets indicated inside the dosage point signs in the flow diagram denote the following chemicals:

A- Corrosion inhibitors
B- Antiscalents
C- Filter backwash aid
D - Oil dispersant
E- Oxidizing biocide
F- Non Oxidizing biocide
G- Bio dispersant
Y- Yellow metal inhibitor

D) Water sampling point

I - All water parameters as per every day analysis ,**II** –Oil & grease, **III** – Temperature .

22.2. DESCRIPTION OF THE SYSTEM AND OVERALL PROCESS:

The recirculating water shall be pumped from the cold sump of cooling tower to Special Bar Mill (SBM)**.** After being used by the various consumers in Special Bar Mill (SBM) where water is not coming in direct contact with media it cools & used in equipments like furnace ,hydraulic & lube oil cooling equipments, electrical m/c cooling etc., the hot return water shall get discharged at the top of the cooling tower**.** The water then gets cooled in the cooling tower and is collected into the cooling tower basin**.** A concrete channel from the cooling tower basin connects the cold well from where the water is again sent for re-circulation by the respective pumps**.** A part of the water from the cold well is pumped and re-circulated back to the cold well through the Side Stream Pressure Filter (SSPF) for improvement of water quality**.**

23. DETAILS OF INDIRECT COOLING WATER SYSTEM:

23.1. System operating parameters:

S.No	Parameter	Units	Indirect
1.	Recirculation rate	m^3/hr	1300
2.	Hold-up volume	m^3	1575
3.	Make up rate	m^3/hr	25-45 (34 Avg)
4.	Source of makeup water		RWTP Outlet
5.	Blow down rate	m^3/hr	Range 0-20
6.	ΔT across cooling tower	^0C	10
7.	Cycles Of Concentration (COC)		Avg.: 2.5 Range: 1.5- 3.5
8.	Supply water temperature	^0C	34 to 36
9.	Return water temperature	^0C	44
10.	Major equipment through which water is passing		1) Walking beam furnace' internals. 2) Charging & discharging rolls of furnace. 3) Machine room and ventilation systems. 4) Oil & Hydraulic Cellars. 5) Supply centrifugal pumps. 6) Side stream sand filters. 7) Sensors & cameras .

***** A variation on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

23.2. Equipment wise details:

The water which is to be treated will be passing through the following equipment whose details and metallurgy is given below.

23.2.1. Pumps details(Supply pumps to consumers):

S.No	Parameter	Indirect circuit
1	No of pumps	04
2	Working	02

3	Stand by	02
4	Type	Horizontal Centrifugal
5	Make	Mather & Platt
6	Capacity of each pump(m^3/hr)	650
7	Discharge pressure (Kg/cm^2)	6.5
8	Casing Metallurgy	Cast Iron, IS 210 Gr 2
9	Impeller Metallurgy	Bronze
10	Shaft	SS to AISI 410/EN 19

23.2.2. Pipe line and valve details

Pipe line metallurgy : Carbon Steel.
Metallurgy of Valves : Cast Iron, Cast steel, Brass

23.2.3. Cooling towers details:

S.No	Parameters	Indirect circuit
1	Cooling tower No	ICW C.T.
2	Make	Paharpur CT
3	Type	Cross flow
4	No of Cells	03
5	Frame work	RCC
6	Filling	PVC on SS grids
7	Total hold up volume (pump basin, cooling tower sump and system hold up)	1575
8	Cooling Water normal circulation rate(m^3/hr)	1300
9	Temp drop , ΔT	10
10	Maximum supply Temp ^oC	36
11	Normal Return Temp ^oC	44
12	Maximum Return Temp ^oC	47
13	Make up water rate, m^3/hr	Max 70 (Avg 34)
14	Cycles of Concentration(COC)	1.5-3.5
15	Blow down m^3/hr	Max 20 Avg-10

23.2.4. Side Stream Filter (SSF) details:

S.No	Parameters	Indirect circuit
1	Type	Pressure

2	Total number of filters	02
3	Working (In line)	01
4	Stand by	01
5	Under Back wash	---
6	Capacity of each m^3/hr	65
7	% of total flow through SSF	05
8	Filter inlet TSS(ppm)	60 (Max)
9	Filter outlet TSS(ppm)	<5

23.3. <u>The makeup water is as follows:</u>

Losses in the system viz., Evaporation, blow down, wind and process leaks are compensated with makeup water. The makeup water to the cooling towers is the water coming from Raw Water Treatment plant (RWTP). The makeup water analysis is generally in following range.

S.No	Parameter	Units	Make up water from RWTP
1.	pH	-	7.5-8.5
2.	Conductivity	Mho/cm	270-400
3.	Calcium Harness (as $CaCO_3$)	mg/l	40-70
4.	Magnesium Hardness (as $CaCO_3$)	mg/l	40-70
5.	Total Hardness (as $CaCO_3$)	mg/l	80-140
6.	P-Alkalinity (as $CaCO_3$)	mg/l	4-20
7.	T-Alkalinity (as $CaCO_3$)	mg/l	100-160
8.	Turbidity	NTU	10-30
9.	Total Dissolved solids	mg/l	150-250
10.	Chlorides as Cl	mg/l	20-40

While designing the treatment program, Party shall take in to consideration the seasonal variations in the makeup water quality from RWTP mainly, the turbidity level and the dust ingress into the system from the atmosphere. Make up water analysis for the last one year (month wise) is enclosed as <u>Annexure-3.</u>

24. <u>PURPOSE OF COOLING WATER TREATMENT PROGRAMME OF INDIRECT COOLING WATER SYSTEM:</u>

Chemical treatment is aimed for deposit free operation, control of corrosion and biomass. The problems likely to occur in the system are improper cooling of Furnace skid, Hydralic & lub. Systems & Electrical equipments etc. leading to total failure of equipments resulting breakdowns due to corrosion/scale formation/deposits/fouling/muck/suspended solids accumulation and slime formation.

The Chemical Treatment programme should be designed in such a way

i. To provide acceptable day to day performance and at the same time having the capacity to function well in case of mishaps, leaks, airborne contamination, etc.

ii. To provide protection against fouling by corrosion products, water borne deposits, silt, suspended matter slime formation etc.

iii. To provide protection against biological contaminations like algal growth, slime formation and anaerobic sludge formation in cooling towers and common sumps of pump house.

24.1. Treatment Objectives: The cooling water treatment programme offered by the Party shall be effective and shall meet general and specific treatment objectives given below.

A. General objectives:

i. Corrosion control (to keep system pipeline and equipment corrosion levels at desired rate).

ii. Effective yellow metal Inhibitors to protect Cu/CuNi, brass, and other noble metallurgy from corrosion.

iii. Scaling and Fouling control.

iv. Deposition control (to avoid water borne deposition on system pipeline and equipment).

v. Elimination/ minimization of deposit at Cooling tower nozzles, Drift eliminator & wooden structure. Choking should not occur in the cooling tower drift eliminator.

vi. Elimination /minimization, dispersion of oil and grease in recirculation water.

vii. P^H control.

B. System specific objectives:

i. The Cycles of concentration (COC) w.r.t. Ca, Mg, Cl, Conductivity and TDS shall match within $\pm$ 10 %. If Chlorine compounds are added in to the system, the COC of chloride will not be considered for comparison. The system shall operate in the range of 1.5 to 3.5 and function satisfactorily up to 4.0 COC.

ii. Critical equipments like of Furnace skid, Hydraulic & lub. Systems & Electrical equipments etc. are to be free from water borne deposits & Cooling Tower nozzles are also to be free from water borne deposits.

iii. Microbiological induced corrosion (MIC) to be controlled.

iv. Eliminate/ minimize the choking in pressure filters media and nozzles.

v. Inhibit algae growth (bio mass) and ensure no visible algae growth in the system at cooling towers and sumps.

24.2. Parameters likely to be maintained during treatment in Recirculation water:

S.No	Parameter	Unit	Indirect circuit	
			Normal range	Maximum/control limit
1	pH		7.5 -8.5	8.6
2	Conductivity	Mho/ cm	300-1400	1600
3	Calcium Harness (as $CaCo_3$)	mg/l	60-300	360
4	Magnesium Hardness (as $CaCo_3$)	mg/l	40-200	230
5	Total Hardness (as $CaCo_3$)	mg/l	100 -450	530
6	P-Alkalinity (as $CaCo_3$)	mg/l	0-20	60
7	M-Alkalinity (as $CaCo_3$)	mg/l	50-250	300

8	Total Dissolved solids	mg/l	190-900	1050
9	Chlorides as Cl	mg/l	20-140	160
10	Total Iron as Fe	mg/l	1.5-3.0	4.0
11	Oil & grease	mg/l	0-5	5
12	TSS	mg/l	<5	10
13	Turbidity	NTU	20-40	50
14	Cycles of Concentration	-------	1.5-3.5	4

25. REQUIREMENTS OF PROPOSED COOLING WATER TREATMENT PROGRAMME:

25.1. General requirements of cooling water treatment package:

VSP requires Party to provide cooling water treatment package for chemicals supply, application of chemicals, monitoring and controlling the performance of the treatment programme of cooling water system of pump house-Special Bar Mill (SBM) (expansion). Party should guarantee that scaling, corrosion and biological growth will be minimized so that it will not pose any limitation to the process.

25.2. Control of Scaling Corrosion and Fouling:

25.2.1. The formulations of the chemicals offered shall contain the following to take care of deposition, scaling, fouling and corrosion in the system.

a. Effective corrosion inhibitors to protect Mild Steel (MS).

b. Effective yellow metal Inhibitors to protect Cu/Ni, brass and other noble metallurgy from corrosion.

c. Effective antiscalents to prevent the precipitation of alkaline earth salts (Calcium &Magnesium).

d. Effective Scale dispersants to retard the deposition of corrosion products & other suspended material etc.

e. Antifoulant to retard the effects of inorganic foulants & prevent corrosion products.

f. The formulation shall be effective for all operating parameters as mentioned at relevant clause in the specification.

25.3. Biological control:

The micro and macro organisms (bio mass) growth control is required for the circuit. For this, dosing of NaOCl, ClO_2 can be done continuously to maintain a positive free residual chlorine level in the supply header of the consumer. Party shall offer their biocides and bio-dispersants to achieve the guaranteed biological norms, with specified biocides dosing recommended by the party. All statutory regulations in this connection shall be followed by the party. On site generation is allowed for ClO_2.

The Chemicals offered shall contain the following to take care of biological control in the system

a. Effective biocides to control algae growth on cooling tower cells and its related components like fan blade, CT nozzles, etc and fouling.

b. Effective biocides to control slime formation.

c. Effective biocides to control Microbiological growth i.e. total viable count (TVC), Sulphate Reducing Bacteria (SRB) and Iron forming bacteria.

d. Effective biocides to control Microbiological induced corrosion (MIC).

e. Effective biocide activators / biocide supplements to improve the performance of the biocide.

f. Effective bio dispersants to prevent the accumulation of deposits of silt, and biological products.

Note: Only non foaming type biocides & biodispersents are to be used in treatment progamme.

25.4. **Oil Dispersants:** Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

25.5. **Special emphasis is to be given to the following by the party while designing the treatment program for effective control of scaling, corrosion, fouling, oil and grease and micro-biology**

a. Recirculation Water parameters likely to be maintained as specified at clause 24.2.
b. High temperatures attained both on process and CW side.
c. Material of construction of pipes, equipments etc. coming in contact with recirculation water
d. Quality and quantity of make up water and
e. Surrounding atmospheric environment of the cooling tower.

25.6. The chemicals offered for Scaling, Corrosion, oil dispersion and Biological control shall be effective for specified range of pH and temperature.

25.7. The chemicals offered shall be non-corrosive and formulations offered should have surface-active agents for proper cleaning action on fouled surfaces.

25.8. The biocides & biodispersents should be compatible with Antiscalents / corrosion inhibitors, oil dispersants and all other chemicals/ formulations offered by the party.

25.9. To control PH sulphuric acid/HCl will be supplied by VSP at free of cost. Storage, Safe handling and application of sulphuric acid will be in party's scope which includes supply of suitable sulphuric acid/HCl dosing pumps on returnable basis.

25.10. At present there is no provision for acid dosing facilities including storage tank. Party has to make their own arrangement for storage of acid and dosing facilities, if required.

25.11. COC to be maintained in the recirculation water as given at relevant clause.

26. JOB SCOPE OF TREATMENT PACKAGE FOR INDIRECT SYSTEM

26.1. Reports:

26.1.1. Daily Reports:

i. Party's representative will generate daily electronic reports of the previous day in the format enclosed at Annexure-7, which will include Analysis of makeup and recirculation water streams covering the following parameters.

Sl.No	Parameter	Unit
1.	**Conductavity**	μmho/cm
2.	**TDS**	mg/l
3.	**Total Iron as Fe**	mg/l
4.	**Turbidity**	mg/l
5.	**TSS**	mg/l
6.	**Total Hardness**	mg/l
7.	**Ca-Hardness**	mg/l
8.	**Mg-Hardness**	mg/l
9.	**P-alklanity**	mg/l
10	**T-alklanity**	mg/l
11	**Chlorides**	mg/l
12	**FRC**	mg/l
13	**T-Phosphates**	mg/l
14	**O-Phosphates**	mg/l
15	**Azole**	
16	**C.O.C with Ca**	----
17	**C.O.C with Mg**	----
18	**C.O.C with Cl**	----
19	**C.O.C with TDS**	----
20	**Oil & Grease**	mg/l
21	**p H**	
Note: Any parameter other than mentioned above (like Zinc, Azole etc. should be analysed as per VSP's requirement.		

ii. Cooling Water Inlet, Outlet temperatures and make up water rate

iii. Chemical Active Ingredient report for each circuit.

iv. Visual observation report of cooling tower for healthiness of the internal structures, leakages in the system.

v. Chemical stock accounting, Consumption and Penalties report of each circuit

vi. Cumulative Chemical Consumption and Penalties report of each circuit

vii. Daily report should also include abnormality like undesirable odor, color raise in makeup rate, action taken and results achieved etc.

26.1.2. Fortnightly Reports: (once in 15 days)

Party's representative shall generate fortnightly electronic reports and shall contain the following

a) Cooling tower algae report

b) TVC & SRB Results

c) Biocides consumption details.

26.1.3. Monthly Reports

Party's representative will generate monthly electronic reports of the previous month in the format enclosed at Annexure-9 which shall contain the following.

a) Corrosion rates

b) Microbiology readings

c) Cumulative chemical consumption and penalties report of circuit.

d) Action plan taken / planned to achieve the system parameters as per the relevant clause in case of non- performance only.

26.1.4. On monthly basis actual consumption of the chemicals deviations if any with reasons and explanations will be reported.

26.1.5. Actions taken for any abnormal / emergency situations shall be reported by the party to EIC immediately.

26.1.6. The signed hard copies of the monthly/fortnightly/daily reports shall be submitted to Engineer-In charge immediately after generation of reports. The soft copies shall be sent to HOD (WMD).

27. GUARANTEE PERFORMANCE PARAMETERS:

With the above treatment - the party shall guarantee the following:

27.1. **CORROSION RATE:** This is measured as per IS 8188-1999 on monthly basis.

27.1.1. MS Corrosion Less than 3.00 mpy

27.1.2. Ad. Brass Less than 0.20 mpy

27.2. **Microbiology:** This is measured as per IS 1622-1981 once in '15' days.

27.2.1. TVC count : Less than 5, 00,000 col. / ml.

27.2.2. SRB : 150 org/100ml.

27.3. **Residual availability:**

27.3.1. Presence of minimum residual of active ingredient of each quoted chemicals as per offer given by party.

27.3.2. For MS corrosion inhibitor --Total phosphate content minimum 6ppm and Zn content minimum 1.0 ppm.

27.3.3. For Yellow metal corrosion inhibitor-- Azoles minimum 1ppm

27.4. **Oil & Grease:** Should be less than 5 mg/l at side stream filter out let water.

27.5. $\underline{P^H}$: P^H at supply header should be controlled with in the range as mentioned at clause 24.2.

27.6. STOCK LEVELS OF CHEMICALS: Stock levels of chemicals as mentioned at relevant clause.

28. PENALITIES:

The performance evaluation of the system is done based on the Guarantee Performance Parameters. In case of any deviation from the Guarantee Performance parameters, the penalty rate shall be imposed in terms of percentage of chemical quantity dosed during the period performance parameters are evaluated.

Party shall note that the chemical treatment is being started in the system for the first time and a passivation /stabilization period of 15 days can be provided. The performance evaluations shall start after completion of 15 days passivation/stabilization. However, the payment for passivation chemicals / stabilization chemicals for 15 days shall be released along with the first month payment. In case of penalty imposition either on antiscalents/corrosion inhibitors or on bio-dispersants in the first month, the same penalty rate is applicable to passivation / stabilization chemicals also. Party shall maintain the guarantee performance parameters throughout the period of treatment. Corrosion, Deposition rates, TVC & SRB counts will be carried out at QATD lab/ WMD labs of VSP. In case of any deviation from the guaranteed parameters mentioned above, penalty shall be levied as below.

28.1. Corrosion rate for MS:

One MS coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation

28.1.1. For less than or equal to 3.0 mpy - No penalty.

28.1.2. For above 3.0 mpy and up to 4.0 mpy- Deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

28.1.3. For above 4.0 mpy- and up to 5.0 mpy – Deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

28.1.4. Above 5.0 mpy: - No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

28.2. Corrosion rate for Ad. Brass:

One Ad Brass coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation

28.2.1. Less than or equal to 0.20 mpy: No penalty.

28.2.2. Above 0.20 mpy and up to 0.35 mpy –deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

28.2.3. Above 0.35 mpy and up to 0.50 mpy – deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

28.2.4. Above 0.50 mpy – No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

28.3. TVC & SRB counts:

28.3.1. For TVC up to 500000 col/ml & SRB up to 150 counts/100 ml-- No Penalty

28.3.2. For TVC above 500000 col/ml and up to 550000 col/ml & SRB above 150 org/100 ml and below 200 org/100 ml--Deduction of 20% of the Quantity of the biocides and relevant chemicals dosed during the period.

28.3.3. For TVC above 550000 col/ml and up to 600000 col/ml & SRB above 200 org/100 ml and below 250 org/100 ml. Deduction of 50% of the Quantity of the biocides and relevant chemicals dosed during the period.

28.3.4. For TVC above 600000 col/ml. & SRB above 250 org/100 ml --No Payment to the Quantity of the biocides and relevant chemicals dosed during the period.

28.3.5. Penalty is applicable even if one of the parameters (TVC or SRB) deviates from the norm. TVC & SRB count shall be measured once in '15 days' for performance evaluation.

28.4. <u>Oil & Grease:</u>

28.4.1. ≤ 5 mg/l------ No Penalty

28.4.2. 5 to 10 mg/l------- Deduction of 20% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

28.4.3. Above 10 and up to 15 mg/l------- Deduction of 50% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

28.4.4. Above 15 mg/l ------ No payment to the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

28.5. <u>Penalty on residual availability of active ingredient in recirculation water(for indirect cooling water):</u>

If it is lower than the Lower Limit (LL) of concentration of each chemical quoted by party, penalty will be levied as given below.

28.5.1. Residual achieving lower limit (LL) in ppm – No penalty

28.5.2. Residual achieving <100-70% of LL in ppm : Deduction of 20% of the Quantity of relevant chemicals consumed during the period for the system.

28.5.3. Residual achieving <70-55% of LL in ppm : Deduction of 50% of the Quantity of relevant chemicals consumed during the period for the system.

28.5.4. Residual achieving <55% of LL in ppm.: No Payment for relevant chemicals consumed during the period for the system.

28.6. <u>Penalty on P^H of Recirculation Water:</u>

Party has to operate the recirculation water within range as mentioned in clause 24.2 normal range i.e. 7.5 to 8.5 pH. If the pH crosses this limit, party has to restore it to the normal range with in 8 hrs.

28.6.1. For pH less than 7.5: Deduction of 10% of the Quantity of all chemicals for indirect system consumed (except oil dispersants) during the period.

28.6.2. For pH above 8.5: Deduction of 10% of the Quantity of all chemicals for indirect system consumed (except oil dispersants) during the period.

28.7. <u>Stock of Chemicals:</u>

The stock accounting of all chemicals shall be done by the party at 5.00 P.M daily. In case on any day (except at the end of the treatment period) during the chemical treatment period, the stock level of any chemical / chemicals at site depletes to less than 30 days or mutually agreed stock levels, a penalty of 100% of one-day consumption of chemical / chemicals shall be imposed on the party for that particular day till the stock levels reach the values as mentioned at relevant clause. VSP's decision is final in this regard.

Example: Stock at site will be accounted every day at the end of General shift and balance stock availability will be intimated to Engineer I/C. Stock out penalty applicability on a particular chemical will start from the day on which stock at site is less than 30 days stock. A penalty equivalent to one day chemical dosage (particular stock out chemical), will be imposed for each day of such stock out till the stock is replenished to 30 days stock.
For any continuous dosing chemical "A" at a recommended dosage of 1 Kg/day (as specified in offer) a stock of 30 Kg is to be maintained at site always. If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock.
In case of slug dosing chemical having a recommended dosage of 7 Kg for every 7 days (as specified in offer) a stock of 30 Kg is to be maintained at site always If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock. Similar is the case with fort nightly and monthly dosage chemicals.

28.8. In case simultaneous imposition of penalties is levied under the clauses 28.1 to 28.6 for the same duration, the penalties applicable shall be summed up. However, the sum of all penalties imposed for any particular chemical shall not exceed 100 %. The penalty imposed under stock of chemicals of clause 28.7 shall be in addition to the sum of penalties imposed under clauses 28.1 to 28.6.

28.9. If the corrosion rate of MS or Ad Brass for indirect system maintained in 100% penalty range for 3 times either consecutively or intermittently during the treatment period, from 4th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for indirect cooling water system of SBM till corrosion rate comes to below 100% penalty limit.

28.10. If the TVC or SRB maintained in 100% penalty range for 6 times either consecutively or intermittently during the treatment period, from 7th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for indirect cooling water system of SBM till TVC or SRB comes to below 100% penalty limit.

PART-E

29. DIRECT COOLING WATER SYSTEM OF STM:

The direct cooling water is mainly supplied to following consumers:-

Sl. No.	Consumer	Purpose
1	a) De-scalers b) Scale flume flushing	To flush back the scales generated during rolling process back to scale pit through scale flume.
2	a) Roll Cooling. b) Charging and discharging equipment of furnaces, water trough. c)Roughing and Intermediate Mills.& finishing mill d) Rotary shear	The water is being used for direct contact Cooling of equipments.

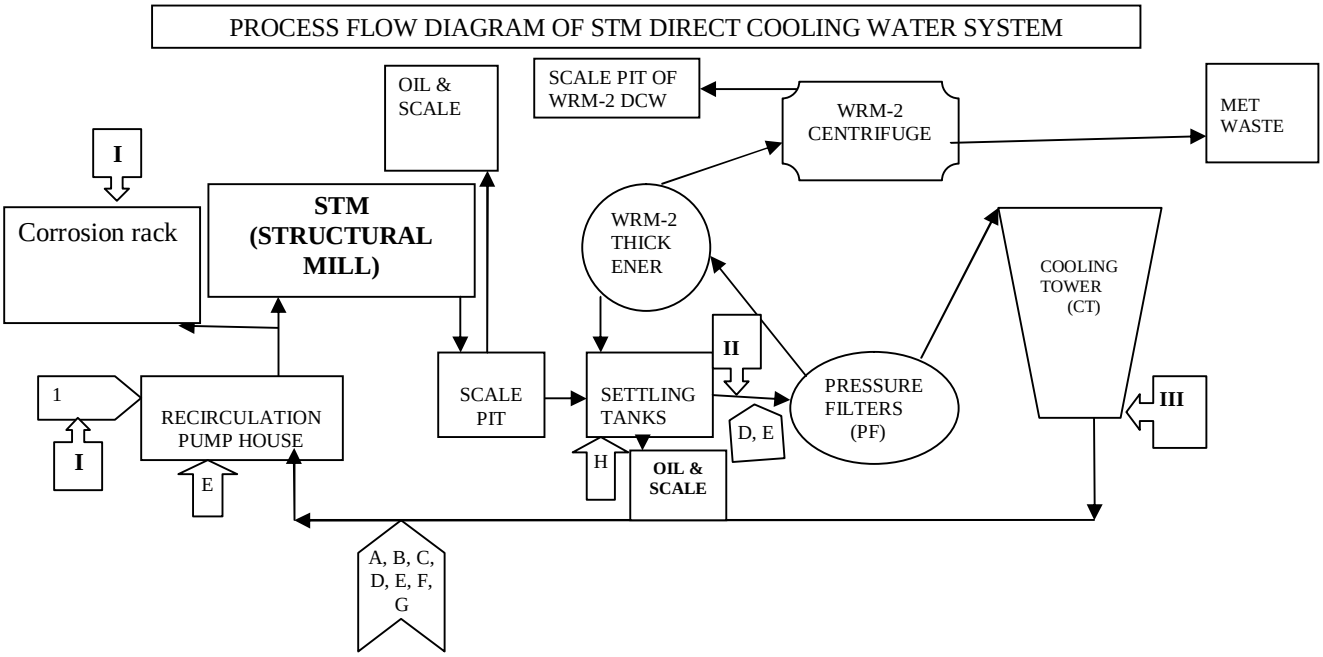
The hot return water contaminated with scale and oil from the Structural Mill (STM) through an open flume enter the scale pit where heavier scale will be settled. From the scale pit, settled scale is taken out with grab crane. The Oil Skimmer is provided to take out floating oil from water surface.

From the scale pit, the water is pumped to Settling tanks where further settling of particles takes place. At settling tank, moving scrapper mechanism & oil skimmers are also present for further removal of oil. The settled scale is taken out with grab crane.

After settling & scrapping, the water is pumped to Pressure filters where further removal of particles takes place. After passing through Pressure filters, the water goes to hot basin of direct water cooling tower where it gets cooled.& collected in cold basin of cooling tower & goes into cold sump of RCPH through connecting pipe from where the water is sent to STM equipments by pumping. The backwash water from Pressure filters (from all mills) is pumped to Treatment Plant situated in WRM-2 Waste water treatment plant. In the treatment plant water is passed through a thickener to remove the suspended particles. The clarified water from the thickener is taken to Settling Tank. The slurry collected at the bottom of thickener is pumped by underflow slurry pumps to centrifuges. In the centrifuges the sludge gets separated from water. The sludge accumulated at the bottom of centrifuges is taken by dumpers to Storage area. The water separated in the centrifuges is sent to WRM-2 scale pit.

NOTE: - To make up the losses in system, make up water is taken from Raw Water Treatment Plant (RWTP) into system in cold sump & Scale pit.

PROCESS FLOW DIAGRAM OF STM DIRECT COOLING WATER:



,**Legends:**

i. The sign ⇨ indicates the compulsory points of chemical dosing. The sign ⇧ indicates the optional points of chemical dosage. The sign ⇨ indicates water testing sampling points. Howsoever party is free to choose any ***additional points*** of dosage for better effectiveness.

ii. The alphabets indicated inside the dosage point signs in the flow diagram denote the following chemicals:

A- Corrosion inhibitors
B- Antiscalents
C- Iron dispersant
D - Oil dispersant
E- Oxidizing biocide
F- Non Oxidizing biocide
G- Bio dispersant
H- Oil de-emulsifier
1- Makeup water addition point.

iii. Water testing sampling points.

I - All water parameters as per every day analysis, **II** – Oil & grease, **III** – Temperature.

30. DETAILS OF COOLING WATER SYSTEM (DIRECT)

30.1. System operating parameters:

S.No	Parameter	Units	Direct

1.	Recirculation rate	m^3/hr	Avg 1320
2.	Hold-up volume	m^3	3420
3.	Make up rate	m^3/hr	20-45 (Avg 43)
4.	Source of makeup water		RWTP (Pump House-1 Outlet)
5.	Blow down rate	m^3/hr	Range: 0-20 (Avg 18)
6.	ΔT across cooling tower	^0C	16 (Max)
7.	Supply water temperature	^0C	34-36
8.	Return water temperature	^0C	45-50
9.	Major equipment/systems through which water is passing.		1)Scale flume 2) Rolls 3) Charging, discharging equipment of furnaces. 4) Roughing .Intermediate & finishing mills. 5) Water boxes for metal conditioning. 6) Pinch rolls. 7) Side looper & breakout box. 8) Supply & return centrifugal pumps. 9) Scale pit & settling tank. 9) Pressure sand filters.

***** A variation on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

30.2. Equipment wise details:

The water which is to be treated will be passing through the following equipment whose details and metallurgy is given below.

30.2.1. Pumps details (Supply pumps to consumers):

S.No	Parameter	Direct
1.	No of pumps	04
2.	Working	02
3.	Stand by	02
4.	Type	Horizontal Centrifugal
5.	Make	Best & Crompton Engg. Ltd (BEACON Pumps)
6.	Capacity of each pump(m^3/hr)	660
7.	Discharge pressure (Kg/cm^2)	8.0
8.	Casing Metallurgy	CS. ASTM A 216 Gr WCB
9.	Impeller Metallurgy	SS. ASTM A 743 CA6NM with 260-280 BHN

30.2.2. Pipe line and valve details

Pipe line metallurgy : Carbon Steel.

Metallurgy of Valves : Cast Iron, Cast steel, Brass

30.2.3. <u>Cooling towers details:</u>

S.No	Parameters	Direct circuit
1.	Cooling tower No.	DCW C.T.
2.	Make	Sriram Hammon
3.	Type	Cross flow
4.	No of Cells	03
5.	Frame work	RCC
6.	Filling	PVC on SS grids
7.	Cooling Water circulation rate(m^3/hr)	Avg 1320
8.	Normal supply Temp ^oC	34
9.	Maximum supply Temp ^oC	35
10.	Normal average Return Temp ^oC	45
11.	Maximum average Return Temp ^oC	50
12.	Temp drop , ΔT in ^oC	16 (max)
13.	Make up water rate, m^3/hr	20-45 (Avg 43)
14.	Blow down + Drift losses (m^3/hr)	Range 0-20 Avg (10)

***** A variation on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

30.2.4. <u>Filters details:</u>

S.No	Parameters	Direct circuit
1.	Type	Pressure
2.	Total number of filters	05
3.	Working (In line)	03
4.	Stand by	01
5.	Under Back wash	01
6.	Capacity of each m^3/hr	440
7.	Filter inlet TSS (ppm)	75
8.	Filter outlet TSS (ppm)	<5

30.3. <u>The makeup water is as follows:</u>

Losses in the system viz., Evaporation, blow down, wind and process leaks are compensated with makeup water. The makeup water to the system is the water coming from Raw Water Treatment plant (RWTP). The makeup water analysis is generally in following range.

S.No	Parameter	Units	Make up water from RWTP
1.	pH	-	7.5-8.5
2.	Conductivity	Mho/cm	270-400
3.	Calcium Harness (as $CaCO_3$)	mg/l	40-70
4.	Magnesium Hardness (as $CaCO_3$)	mg/l	40-70
5.	Total Hardness (as $CaCO_3$)	mg/l	80-140
6.	P-Alkalinity (as $CaCO_3$)	mg/l	4-20
7.	T-Alkalinity (as $CaCO_3$)	mg/l	100-160
8.	Turbidity	NTU	10-30
9.	Total Dissolved solids	mg/l	150-250
10.	Chlorides as Cl_2	mg/l	20-40

While designing the treatment program, Party shall take in to consideration the seasonal variations in the makeup water quality from RWTP mainly, the turbidity level and the dust ingress into the system from the atmosphere. Make up water analysis for the last one year (month wise) is enclosed as <u>Annexure-3.</u>

31. <u>PURPOSE OF COOLING WATER TREATMENT PROGRAMME</u>

Chemical treatment is aimed for deposit free operation and control of corrosion and biomass. The problems likely to occur in the system are improper cooling of rolls due to chockage of nozzles leading to surface cracks on the rolls and indentation of the finished products resulting rejection due to scale formation/deposits/fouling/muck/suspended solids accumulation and slime formation & corrosion of pipeline & equipments coming in contact with water.

The Chemical Treatment programme should be designed in such a way

i. To provide acceptable day to day performance and at the same time having the capacity to function well in case of mishaps, leaks, airborne contamination etc. in recirculation water.

ii. To provide protection against corrosion, fouling by corrosion products, water borne deposits, silt, muck formation due to oil & grease suspended matter etc. and the recirculation water quality is to be kept within the limits.

iii. To provide protection against biological contaminations like algae growth, slime formation and anaerobic sludge formation in cooling towers and common sumps of pump house and the recirculating water quality is to be kept within the limits.

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31.1. <u>Treatment Objectives</u>: The cooling water treatment programme offered by the Party shall be effective and shall meet general and specific treatment objectives given below.

A. <u>General objectives:</u>

i) Corrosion control (to keep system's water carrying pipelines and equipment corrosion levels at desired rate).

ii) Scaling and fouling control.

iii) Deposition control (to avoid water borne deposition on system pipeline and equipment).

iv) Elimination/ minimization of deposit at Cooling tower nozzles & Drift eliminator in the cooling tower. Elimination /minimization of oil and grease muck formation in recirculation water.

v) Enhancement of oil and grease dispersion in recirculation water.

vi) De-emulsification of oil and grease (separation of oil and grease at scale pit & settling tanks)

vii) Effective iron dispersant to disperse the iron compounds which cause fouling

B. System specific objectives:

i) Critical equipments like Rotary shears. Roll coolers, furnace etc. are to be free from water borne deposits. Cooling Tower nozzles are also to be kept free from water borne deposits to the extent possible.

ii) Eliminate/ minimize the chockage in pressure filters media and nozzles.

31.2. Parameters likely to be maintained during treatment in Recirculation water

The following Parameters are likely to be maintained in the Recirculation water.

S.No	Parameter	Unit	Direct circuit	
			Normal range	Maximum/control limit
1	pH		7.5 -8.6	8.7
2	Conductivity	Mho/ cm	500-1200	1800
3	Calcium Hardness (as $CaCo_3$)	mg/l	70-250	360
4	Magnesium Hardness (as $CaCo_3$)	mg/l	50-150	230
5	Total Hardness (as $CaCo_3$)	mg/l	120 -400	590
6	P-Alkalinity (as $CaCo_3$)	mg/l	0-20	60
7	T-Alkalinity (as $CaCo_3$)	mg/l	100-250	300
8	Total Dissolved solids	mg/l	400-900	1200
9	Chlorides as Cl	mg/l	50-150	200
10	Total Iron as Fe	mg/l	1.5-3.0	4.0
11	Oil & grease	mg/l	0-5	5
12	TSS	mg/l	5-10	20

32. REQUIREMENTS OF PROPOSED COOLING WATER TREATMENT PROGRAMME:

32.1. General requirements of cooling water treatment package:

VSP requires Party to provide cooling water treatment package for chemicals supply, application of chemicals, monitoring and controlling the performance of the treatment programme of cooling water system of pump house of STM. Party should guarantee that scaling, corrosion, biological growth Suspended solids and oil & grease will be minimized so that it will not pose any limitation to the process.

32.2. Control of Scaling, Corrosion and Fouling:

32.2.1. The formulations of the chemicals offered shall contain the following to take care of deposition, scaling, fouling and corrosion in the system.

a. Effective corrosion inhibitors to protect Mild Steel (MS).

b. Effective antiscalents to prevent the precipitation of alkaline earth salts (Calcium & Magnesium).

c. Effective Scale dispersants to retard the deposition of corrosion products, scale & other suspended material etc.

d. Antifoulants to retard the effects of inorganic foulants & prevent corrosion products.

e. The formulation shall be effective for all operating parameters as mentioned at relevant clause.

32.3. De-emulsifier & Oil Dispersants: Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

32.3.1. The formulations of the chemicals offered shall contain the following to take care of de-emulsification and dispersion of oil & grease present in the system.

a. Effective de-emulsifier to separate oil from water at scale pit.

b. Oil Dispersants: Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

32.4. Biological control:

The micro and macro organisms (bio mass) growth control is required for the circuit. For this, dosing of NaOCl, ClO_2 (oxidizing biocides) can be done continuously to maintain a positive free residual chlorine level in the supply header of the consumer. Any excess of chlorine should be avoided due to its harmful effects. Party shall offer their biocides and bio-dispersants to achieve the guaranteed biological norms, with specified biocides dosing recommended by the party. All statutory regulations in this connection shall be followed by the party. On site generation is allowed for ClO_2.

The Chemicals offered shall contain the following to take care of biological control in the system

a. Effective biocides to control algae growth on cooling tower cells and its related components like fan blade, CT nozzles, etc and fouling.

b. Effective biocides to control slime formation.

c. Effective biocides to control Microbiological growth i.e. total viable count (TVC), Sulphate Reducing Bacteria (SRB) and Iron forming bacteria.

d. Effective biocides to control Microbiological induced corrosion (MIC).

e. Effective biocide activators / biocide supplements to improve the performance of the biocide.

f. Effective bio dispersants to prevent the accumulation of deposits of silt, and biological products.

Note: Only non foaming type biocides & biodispersents are to be used in treatment progamme.

32.5. Special emphasis is to be given to the following by the party while designing the treatment program for effective scaling, fouling, corrosion, oil, grease, and micro-biological control

a. Recirculation Water parameters to be maintained as specified at relevant clause.

b. High temperature in CW rotary shear, roll coolers etc. (Both on process and CW side).

c. Material of construction of pipes, equipments etc. coming in contact with recirculation water

d. Quality and quantity of make-up water.

e. Surrounding atmospheric environment of the cooling tower.

32.6. The chemicals offered for Scaling, Corrosion, oil, grease, and Biological control shall be effective for specified range of P^H and temperature.

32.7. The chemicals offered shall be non-corrosive and formulation should have surface-active agents for proper cleaning action on fouled surfaces.

32.8. The biocides & biodispersents should be compatible with Antiscalents / corrosion Inhibitors, de-emulsifiers, oil dispersants, coagulants, flocculants and all other chemicals/ formulations offered by the party.

32.9. Party may note that flow to coupon rack (corrosion) may fluctuate and the flow may even go to zero as per the requirement of the consumer. Hence party is advised to provide a local recirculation pump for maintaining required flow to coupon rack during such times which may take suction from cold sump.

33. JOB SCOPE OF TREATMENT PACKAGE FOR DIRECT WATER SYSTEM

33.1. Reports:

33.1.1. Daily Reports:

i. Party's representative will generate daily electronic reports of the previous day, which will include Analysis of make up and recirculation water streams covering the following parameters.

Sl.No	Parameter	Unit
1.	**Conductavity**	mho/cm

2.	**TDS**	mg/l
3.	**Total Iron**	mg/l
4.	**Total Hardness**	mg/l
5.	**Ca-Hardness**	mg/l
6.	**Mg-Hardness**	mg/l
7.	**P-alklanity**	mg/l
8.	**Total-alklanity**	mg/l
9.	**Chlorides**	mg/l
10.	**FRC**	mg/l
11.	**T-Phosphates**	mg/l
12.	**O-Phosphates**	mg/l
13.	**C.O.C with Ca**	----
14.	**C.O.C with Mg**	----
15.	**C.O.C with Cl**	----
16.	**C.O.C with TDS**	----
17.	**TSS of Filter outlet**	mg/l
18.	**Oil & Grease at Settling tank outlet**	mg/l
19.	**P^H at supply header**	
Note: Any parameter other than mentioned above (like Zinc, Azole etc.) should be analysed as per VSP's requirement.		

ii. Cooling Water Inlet, Outlet temperatures and make up water rate.

iii. Chemical Active Ingredient report for each circuit.

iv. Visual observation report of cooling tower for healthiness of the internal structures, leakages in the system.

v. Chemical stock accounting, Consumption and Penalties report of each circuit

vi. Cumulative Chemical Consumption of each circuit

vii. Daily report should also include abnormality like undesirable odor, color raise in makeup rate, action taken and results achieved etc.

33.1.2. Fort nightly reports: Party's representative shall generate fortnightly electronic reports in and shall contain the following.

a) TVC & SRB Results

33.1.3. Monthly Reports

Party's representative will generate monthly electronic reports of the previous month which shall also contain the following.

a) Corrosion rates

b) Microbiology readings

c) Cumulative chemical consumption and penalties report of circuit.

d) Action plan taken / planned to achieve the system parameters as given at relevant clause in case of non-performance only.

33.1.4. On monthly basis actual consumption of the chemicals deviations if any with reasons and explanations are to be reported.

33.1.5. Actions taken for any abnormal / emergency situations shall be reported by the party to EIC immediately.

33.1.6. The signed hard copies of the monthly/fortnightly/daily reports shall be submitted to Engineer-In charge immediately after generation of reports. The soft copies shall be sent to HOD (WMD).

34. GUARANTEE PERFORMANCE PARAMETERS:

With the above treatment – the party shall guarantee the following: -

34.1. Corrosion rate: This is measured as per IS 8188-1999 on monthly basis.

34.1.1. MS Corrosion Less than 5.00 mpy

34.2. Microbiology: This is measured as per IS 1622-1981 once in '15' days.

34.2.1. TVC count Less than 5, 00,000 col. / ml.

34.2.2. SRB 150 org/100ml.

34.3. Residual availability:

34.3.1. Presence of minimum residual of active ingredient of each quoted chemicals as per offer given by party.

34.3.2. For MS corrosion inhibitor – Total phosphates content minimum 6ppm --- Zn content minimum- 1.0 ppm

34.4. Oil & Grease: Should be less than 5 mg/l at settling tank out let.

34.5. STOCK LEVELS OF CHEMICALS:

34.5.1. Stock levels of chemicals as mentioned at relevant clause.

35. PENALITIES:

The performance evaluation of the system is done based on the Guarantee Performance Parameters. In case of any deviation from the Guarantee Performance parameters, the penalty rate shall be imposed in terms of percentage of chemical quantity dosed during the period performance parameters are evaluated.

Party shall note that the chemical treatment is being started in the system for the first time and a passivation /stabilization period of 15 days can be provided. The performance evaluations shall start after completion of 15 days passivation/stabilization. However, the payment for passivation chemicals / stabilization chemicals for 15 days shall be released along with the first month payment. In case of penalty imposition either on antiscalents/corrosion inhibitors or on bio-dispersants etc. in the first month, the same penalty rate is applicable to passivation / stabilization chemicals also. Party shall maintain the guarantee performance parameters throughout the period of treatment. Corrosion, Deposition rates, TVC & SRB counts will be carried out at QATD lab/ WMD labs of VSP. In case of any deviation from the guaranteed parameters mentioned above, penalty shall be levied as below.

35.1. Corrosion rate for MS:

One MS coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation.

35.1.1. For less than or equal to 5.0 mpy: Nil

35.1.2. For above 5.0 mpy and up to 6.0 mpy: Deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

35.1.3. For above 6.0 mpy and up to 7.0 mpy: Deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

35.1.4. Above 7.0 mpy. No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

35.2. <u>TVC & SRB counts:</u>

35.2.1. For TVC up to 500000 col/ml & SRB up to 150 org/100 ml–No Penalty

35.2.2. For TVC above 500000 col/ml and up to 550000 col/ml & SRB above 150 org/100 ml and below 200 org/100 ml–Deduction of 20% of the Quantity of the biocides and relevant chemicals dosed during the period.

35.2.3. For TVC above 550000 col/ml and up to 600000 col/ml & SRB above 200 org/100 ml and below 250 org/100 ml.--- Deduction of 50% of the Quantity of the biocides and relevant chemicals dosed during the period.

35.2.4. For TVC above 600000 col/ml. & SRB above 250 org/100 ml – No Payment to the Quantity of the biocides and relevant chemicals dosed during the period.

35.2.5. Penalty is applicable even if one of the parameters deviates from the norm. TVC & SRB count shall be measured once in '15 days' for performance evaluation.

Note: Total viable count (TVC) test conducted as Standard Plate Count (SPC) from IS 1622-1981.

35.3. <u>Oil & Grease:</u>

35.3.1. ≤ 5 mg/l------ No Penalty

35.3.2. 5 to 10 mg/l------- Deduction of 20% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

35.3.3. Above 10 and upto 15 mg/l------- Deduction of 50% of the Quantity of the oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

35.3.4. Above 15 mg/l ------ No payment to the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

35.4. <u>Penalty on residual availability of active ingredient in recirculation water</u>

If it is lower than the Lower Limit (LL) of concentration of each chemical quoted by party, penalty will be levied as given below.

35.4.1. Residual achieving lower limit (LL) in ppm – No penalty

35.4.2. Residual achieving <100-70% of LL in ppm : Deduction of 20% of the Quantity of relevant chemicals consumed during the period for the system.

35.4.3. Residual achieving <70-55% of LL in ppm : Deduction of 50% of the Quantity of relevant chemicals consumed during the period for the system.

35.4.4. Residual achieving <55% of LL in ppm. No Payment for relevant chemicals consumed during the period for the system.

35.5. <u>Stock of Chemicals:</u>

The stock accounting of all chemicals shall be done by the party at 5.00 P.M daily. In case on any day (except at the end of the treatment period) during the chemical treatment period, the stock level of any chemical / chemicals at site depletes to less than 30 days or mutually agreed stock levels, a penalty of 100% of one-day consumption of chemical / chemicals day shall be imposed on the party for that particular day till the stock levels reach the values as mentioned at relevant clause. VSP's decision is final in this regard.

<u>Example:</u> Stock at site will be accounted every day at the end of General shift and balance stock availability will be intimated to Engineer I/C. Stock out penalty applicability on a particular chemical will start from the day on which stock at site is less than 30 days stock. A penalty equivalent to one day chemical dosage (particular stock out chemical), will be imposed for each day of such stock out till the stock is replenished to 30 days stock.
For any continuous dosing chemical "A" at a recommended dosage of 1 Kg/day (as specified in offer) a stock of 30 Kg is to be maintained at site always. If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock.
In case of slug dosing chemical having a recommended dosage of 7 Kg for every 7 days (as specified in offer) a stock of 30 Kg is to be maintained at site always If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock. Similar is the case with fort nightly and monthly dosage chemicals.

35.6. In case simultaneous imposition of penalties is levied under the clauses 35.1 to 35.4 for the same duration, the penalties applicable shall be summed up. However, the sum of all penalties imposed for any particular chemical shall not exceed 100 %. The penalty imposed under stock of chemicals of clause 35.5 shall be in addition to the sum of penalties imposed under clauses 35.1 to 35.4.

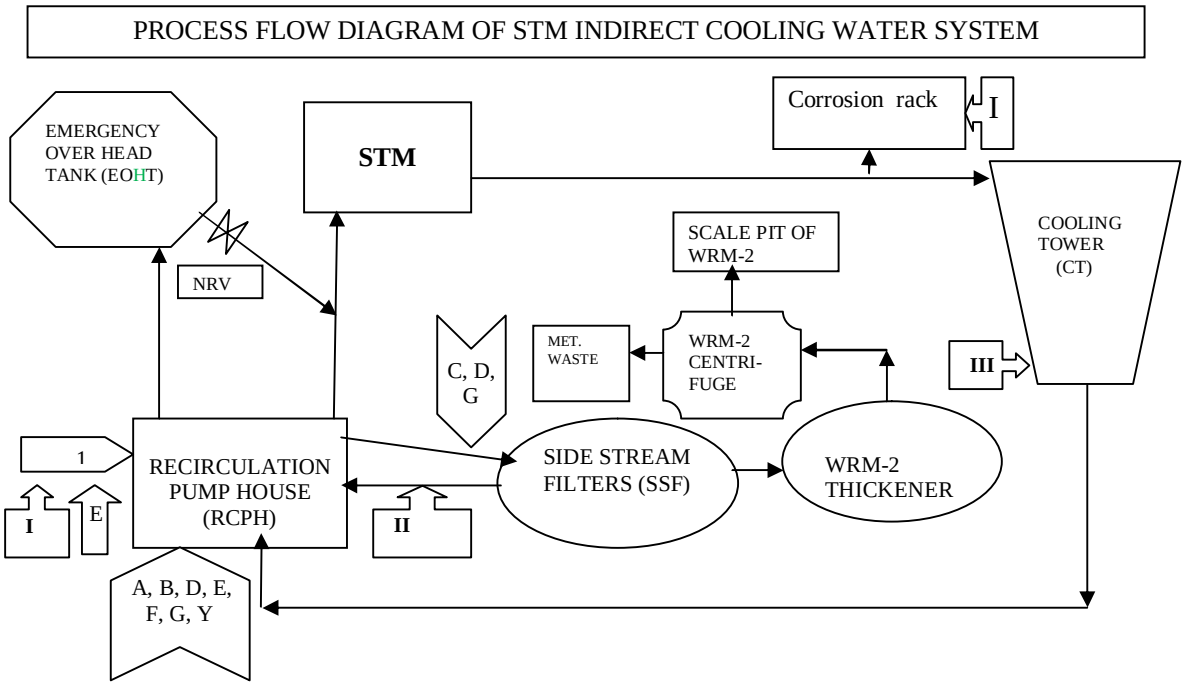
35.7. If the corrosion rate of MS maintained in 100% penalty range for 3 times either consecutively or intermittently during the treatment period, from 4^{th} time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for direct cooling water system of STM till corrosion rate comes to below 100% penalty limit.

35.8. If the TVC or SRB maintained in 100% penalty range for 6 times continuously or intermittently during the treatment period, from 7^{th} time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for direct cooling water system of STM till TVC or SRB comes to below 100% penalty limit.

PART-F

36. STRUCTURAL MILL (STM) INDIRECT COOLING WATER SYSTEM:

36.1. PROCESS FLOW DIAGRAM:



Legends:

(A)The nos. shown on top of arrows is indication of corresponding quality of water at the particular place.

(B) The sign ⇨ indicates the compulsory points of chemical dosing. The sign ⇧ indicates the optional points of chemical dosage. Howsoever party is free to choose any ***additional points*** of dosage for better effectiveness.

The sign ⇨ indicates water testing sampling points.

C) The alphabets indicated inside the dosage point signs in the flow diagram denote the following chemicals:

A- Corrosion inhibitors
B- Antiscalents
C- Filter backwash aid
D – Oil dispersant
E- Oxidizing biocide
F- Non Oxidizing biocide
G- Bio dispersant
Y- Yellow metal inhibitor

D) Water sampling point

I - All water parameters as per every day analysis ,**II** – Oil & grease, **III** – Temperature .

36.2. DESCRIPTION OF THE SYSTEM AND OVERALL PROCESS:

The recirculating water shall be pumped from the cold sump of cooling tower to Structural Mill (STM)**.** After being used by the various consumers in Structural Mill (STM) where water is not coming in direct contact with media it cools & used in equipments like furnace ,hydraulic & lube oil cooling equipments, electrical m/c cooling etc., the hot return water shall get discharged at the top of the cooling tower**.** The water then gets cooled in the cooling tower and is collected into the cooling tower basin**.** A pipe from the cooling tower basin connects the cold well from where the water is again sent for re-circulation by the respective pumps**.** A part of the water from the cold well is pumped and re-circulated back to the cold well through the Side Stream Pressure Filter (SSPF) for improvement of water quality**.**

37. DETAILS OF INDIRECT COOLING WATER SYSTEM:

37.1. System operating parameters:

S.No	Parameter	Units	Indirect
1.	Recirculation rate	m^3/hr	1650
2.	Hold-up volume	m^3	2250
3.	Make up rate	m^3/hr	30-50 (Avg 40)
4.	Source of makeup water		River stream (RWTP Outlet)
5.	Blow down rate	m^3/hr	Range 0-20 (Avg 10)
6.	ΔT across cooling tower	^{0}C	11
7.	Cycles Of Concentration (COC)		Avg 2.5 Range: 1.5- 3.5
8.	Supply water temperature	^{0}C	34 to 36
9.	Return water temperature	^{0}C	45
10.	Major equipment through which water is passing???		1) Walking beam furnaces. 2) Descalers 3) Machine room and ventilation systems. 4) Oil & Hydraulic Cellars. 5) Supply centrifugal pumps. 6) Sidestream sand filters. 7)Emergency Over head tank .

***** A variation of on the average value can be there. Accordingly party can adjust the dosing during day to day operations. However for arriving at (calculating) final chemical quantities average value can be taken.

37.2. Equipment wise details:

The water which is to be treated will be passing through the following equipment whose details and metallurgy is given below.

37.2.1. Pumps details(Supply pumps to consumers):

S.No	Parameter	Indirect circuit
1	No of pumps	04
2	Working	02
3	Stand by	02

4	Type	Horizontal Centrifugal
5	Make	Best & Crompton Engg. Ltd (BEACON Pumps)
6	Capacity of each pump(m^3/hr)	825
7	Discharge pressure (Kg/cm^2)	7.7
8	Casing Metallurgy	CI. IS210 Gr FG 260
9	Impeller Metallurgy	SS. ASTM A 743 CF8M

37.2.2. <u>Pipe line and valve details</u>

Pipe line metallurgy : Carbon Steel.
Metallurgy of Valves : Cast Iron, Cast steel, Brass

37.2.3. <u>Cooling towers details:</u>

S.No	Parameters	Indirect circuit
1	Cooling tower No	ICW C.T.
2	Make	Sriram Hammon
3	Type	Cross flow
4	No of Cells	03
5	Frame work	RCC
6	Filling	PVC on SS grids
7	Total hold up volume (pump basin, cooling tower sump and system hold up)	2250
8	Cooling Water normal circulation rate(m^3/hr)	1650
9	Temp drop , ΔT	11
10	Maximum supply Temp ^oC	35
11	Normal Return Temp ^oC	45
12	Maximum Return Temp ^oC	47
13	Make up water rate, m^3/hr	30-50 (Avg 40)
14	Cycles of Concentration(COC)	1.5-3.5
15	Blow down m^3/hr	Range 0-20 Avg -10

37.2.4. <u>Side Stream Filter (SSF) details:</u>

S.No	Parameters	Indirect circuit
1	Type	Pressure
2	Total number of filters	02
3	Working (In line)	01

4	Stand by	01
5	Under Back wash	---
6	Capacity of each m^3/hr	150
7	% of total flow through SSF	05
8	Filter inlet TSS(ppm)	50 (Max)
9	Filter outlet TSS(ppm)	5

37.3. <u>The makeup water is as follows:</u>

Losses in the system viz., Evaporation, blow down, wind and process leaks are compensated with makeup water. The makeup water to the cooling towers is the water coming from Raw Water Treatment plant (RWTP). The makeup water analysis is generally in following range.

S.No	Parameter	Units	Make up water from RWTP
1.	pH	-	7.5-8.5
2.	Conductivity	Mho/cm	270-400
3.	Calcium Harness (as $CaCO_3$)	mg/l	40-70
4.	Magnesium Hardness (as $CaCO_3$)	mg/l	40-70
5.	Total Hardness (as $CaCO_3$)	mg/l	80-140
6.	P-Alkalinity (as $CaCO_3$)	mg/l	0-60
7.	T-Alkalinity (as $CaCO_3$)	mg/l	100-160
8.	Turbidity	NTU	10-30
9.	Total Dissolved solids	mg/l	150-250
10.	Chlorides as Cl	mg/l	20-40

While designing the treatment program, Party shall take in to consideration the seasonal variations in the makeup water quality from RWTP mainly, the turbidity level and the dust ingress into the system from the atmosphere. Make up water analysis for the last one year (month wise) is enclosed as <u>Annexure-3.</u>

38. <u>PURPOSE OF COOLING WATER TREATMENT PROGRAMME OF INDIRECT COOLING WATER SYSTEM:</u>

Chemical treatment is aimed for deposit free operation, control of corrosion and biomass. The problems likely to occur in the system are improper cooling of Furnace skid, Hydralic & lub. Systems & Electrical equipments etc. leading to total failure of equipments resulting breakdowns due to corrosion/scale formation/deposits/fouling/muck/suspended solids accumulation and slime formation.

The Chemical Treatment programme should be designed in such a way

i. To provide acceptable day to day performance and at the same time having the capacity to function well in case of mishaps, leaks, airborne contamination, etc.

ii. To provide protection against fouling by corrosion products, water borne deposits, silt, suspended matter slime formation etc.

iii. To provide protection against biological contaminations like algal growth, slime formation and anaerobic sludge formation in cooling towers and common sumps of pump house.

38.1. <u>Treatment Objectives:</u> The cooling water treatment programme offered by the Party shall be effective and shall meet general and specific treatment objectives given below.

A. <u>General objectives:</u>

i. Corrosion control (to keep system pipeline and equipment corrosion levels at desired rate).

ii. Effective yellow metal Inhibitors to protect Cu/CuNi, brass, and other noble metallurgy from corrosion.

iii. Scaling and Fouling control.

iv. Deposition control (to avoid water borne deposition on system pipeline and equipment).

v. Elimination/ minimization of deposit at Cooling tower nozzles, Drift eliminator & wooden structure. Choking should not occur in the cooling tower drift eliminator.

vi. Elimination /minimization, dispersion of oil and grease in recirculation water.

vii. P^H control.

B. <u>System specific objectives:</u>

i. The Cycles of concentration (COC) w.r.t. Ca, Mg, Cl, Conductivity and TDS shall match within $\pm$ 10 %. If Chlorine compounds are added in to the system, the COC of chloride will not be considered for comparison. The system shall operate in the range of 1.5 to 3.5 and function satisfactorily up to 4 COC.

ii. Critical equipments like of Furnace skid, Hydraulic & lub. Systems & Electrical equipments etc. are to be free from water borne deposits & Cooling Tower nozzles are also to be free from water borne deposits.

iii. Microbiological induced corrosion (MIC) to be controlled.

iv. Eliminate/ minimize the chocking in pressure filters media and nozzles.

v. Inhibit algae growth (bio mass) and ensure no visible algae growth in the system at cooling towers and sumps.

38.2. <u>Parameters likely to be maintained during treatment in Recirculation water:</u>

The following Parameters are likely to be maintained in the Recirculation water.

S.No	Parameter	Unit	Indirect circuit	
			Normal range	Maximum/control

				limit
1	pH		7.5 -8.5	8.6
2	Conductivity	Mho/ cm	300-1400	1600
3	Calcium Harness (as $CaCo_3$)	mg/l	60-300	360
4	Magnesium Hardness (as $CaCo_3$)	mg/l	40-200	230
5	Total Hardness (as $CaCo_3$)	mg/l	100 -450	530
6	P-Alkalinity (as $CaCo_3$)	mg/l	0-20	60
7	M-Alkalinity (as $CaCo_3$)	mg/l	50-250	300
8	Total Dissolved solids	mg/l	190-900	1050
9	Chlorides as Cl	mg/l	20-140	160
10	Total Iron as Fe	mg/l	1.5-3.0	4.0
11	Oil & grease	mg/l	0-5	5
12	TSS	mg/l	<5	10
13	Turbidity	NTU	20-40	50
14	Cycles of Concentration	-------	1.5-3.5	4

39. REQUIREMENTS OF PROPOSED COOLING WATER TREATMENT PROGRAMME:

39.1. General requirements of cooling water treatment package:

VSP requires Party to provide cooling water treatment package for chemicals supply, application of chemicals, monitoring and controlling the performance of the treatment programme of cooling water system of pump house-Structural Mill (STM)(expansion). Party should guarantee that scaling, corrosion and biological growth will be minimized so that it will not pose any limitation to the process.

39.2. Control of Scaling Corrosion and Fouling:

39.2.1. The formulations of the chemicals offered shall contain the following to take care of deposition, scaling, fouling and corrosion in the system.

a. Effective corrosion inhibitors to protect Mild Steel (MS).

b. Effective yellow metal Inhibitors to protect Cu/Ni, brass and other noble metallurgy from corrosion.

c. Effective antiscalents to prevent the precipitation of alkaline earth salts (Calcium &Magnesium).

d. Effective Scale dispersants to retard the deposition of corrosion products & other suspended material etc.

e. Antifoulant to retard the effects of inorganic foulants & prevent corrosion products.

f. The formulation shall be effective for all operating parameters as mentioned at relevant clause in the specification.

39.3. <u>Biological control:</u>

The micro and macro organisms (bio mass) growth control is required for the circuit. For this, dosing of NaOCl, ClO_2 can be done continuously to maintain a positive free residual chlorine level in the supply header of the consumer. Party shall offer their biocides and bio-dispersants to achieve the guaranteed biological norms, with specified biocides dosing recommended by the party. All statutory regulations in this connection shall be followed by the party. On site generation is allowed for ClO_2.

The Chemicals offered shall contain the following to take care of biological control in the system

a. Effective biocides to control algae growth on cooling tower cells and its related components like fan blade, CT nozzles, etc and fouling.

b. Effective biocides to control slime formation.

c. Effective biocides to control Microbiological growth i.e. total viable count (TVC), Sulphate Reducing Bacteria (SRB) and Iron forming bacteria.

d. Effective biocides to control Microbiological induced corrosion (MIC).

e. Effective biocide activators / biocide supplements to improve the performance of the biocide.

f. Effective bio dispersants to prevent the accumulation of deposits of silt, and biological products.

Note: Only non foaming type biocides & biodispersents are to be used in treatment progamme.

39.4. <u>Oil Dispersants:</u> Effective oil dispersant to prevent the muck formation of hydrocarbon compounds in the pipelines & equipments.

39.5. Special emphasis is to be given to the following by the party while designing the treatment program for effective control of scaling, corrosion, fouling, oil and grease and micro-biology

f. Recirculation Water parameters likely to be maintained as specified at clause 38.2.
g. High temperatures attained both on process and CW side.
h. Material of construction of pipes, equipments etc. coming in contact with recirculation water
i. Quality and quantity of make up water and
j. Surrounding atmospheric environment of the cooling tower.

39.6. The chemicals offered for Scaling, Corrosion, oil dispersion and Biological control shall be effective for specified range of pH and temperature.

39.7. The chemicals offered shall be non-corrosive and formulations offered should have surface-active agents for proper cleaning action on fouled surfaces.

39.8. The biocides & biodispersents should be compatible with Antiscalents / corrosion inhibitors, oil dispersants and all other chemicals/ formulations offered by the party.

39.9. To control PH sulphuric acid/HCl will be supplied by VSP at free of cost. Storage, Safe handling and application of sulphuric acid will be in party's scope which includes supply of suitable sulphuric acid/HCl dosing pumps on returnable basis.

39.10. At present there is no provision for acid dosing facilities including storage tank. Party has to make their own arrangement for storage of acid and dosing facilities, if required.

39.11. COC to be maintained in the recirculation water as given at relevant clause.

40. JOB SCOPE OF TREATMENT PACKAGE FOR INDIRECT SYSTEM

40.1. Reports:

40.1.1. Daily Reports:

i. Party's representative will generate daily electronic reports of the previous day, which will include Analysis of makeup and recirculation water streams covering the following parameters.

Sl.No	Parameter	Unit
1.	**Conductavity**	µmho/cm
2.	**TDS**	mg/l
3.	**Total Iron as Fe**	mg/l
4.	**Turbidity**	mg/l
5.	**TSS**	mg/l
6.	**Total Hardness**	mg/l
7.	**Ca-Hardness**	mg/l
8.	**Mg-Hardness**	mg/l
9.	**P-alklanity**	mg/l
10.	**T-alklanity**	mg/l
11.	**Chlorides**	mg/l
12.	**FRC**	mg/l
13.	**T-Phosphates**	mg/l
14.	**O-Phosphates**	mg/l
15.	**Azole**	mg/l
16.	**C.O.C with Ca**	----
17.	**C.O.C with Mg**	----
18.	**C.O.C with Cl**	----
19.	**C.O.C with TDS**	----
20.	**Oil & Grease**	mg/l
21.	**p H**	
Note: Any parameter other than mentioned above (like Zinc, Azole etc. should be analysed as per VSP's requirement.		

ii. Cooling Water Inlet, Outlet temperatures and make up water rate

iii. Chemical Active Ingredient report for each circuit.

iv. Visual observation report of cooling tower for healthiness of the internal structures, leakages in the system.

v. Chemical stock accounting, Consumption and Penalties report of each circuit

vi. Cumulative Chemical Consumption and Penalties report of each circuit

vii. Daily report should also include abnormality like undesirable odor, color raise in makeup rate, action taken and results achieved etc.

40.1.2. Fortnightly Reports: (once in 15 days)

Party's representative shall generate fortnightly electronic reports and shall contain the following

a) Cooling tower algae report

b) TVC & SRB Results

c) Biocides consumption details.

40.1.3. Monthly Reports

Party's representative will generate monthly electronic reports of the previous month which shall contain the following.

a) Corrosion rates

b) Microbiology readings

c) Cumulative chemical consumption and penalties report of circuit.

d) Action plan taken / planned to achieve the system parameters as per the relevant clause in case of non- performance only.

40.1.4. On monthly basis actual consumption of the chemicals deviations if any with reasons and explanations will be reported.

40.1.5. Actions taken for any abnormal / emergency situations shall be reported by the party to EIC immediately.

40.1.6. The signed hard copies of the monthly/fortnightly/daily reports shall be submitted to Engineer-In charge immediately after generation of reports. The soft copies shall be sent to HOD (WMD).

41. GUARANTEE PERFORMANCE PARAMETERS:

With the above treatment - the party shall guarantee the following:

41.1. CORROSION RATE: This is measured as per IS 8188-1999 on monthly basis.

41.1.1. MS Corrosion Less than 3.00 mpy

41.1.2. Ad. Brass Less than 0.20 mpy

41.2. Microbiology: This is measured as per IS 1622-1981 once in '15' days.

41.2.1. TVC count : Less than 5, 00,000 col. / ml.

41.2.2. SRB : 150 org/100ml.

41.3. Residual availability:

41.3.1. Presence of minimum residual of active ingredient of each quoted chemicals as per offer given by party.

41.3.2. For MS corrosion inhibitor --Total phosphate content minimum 6ppm and Zn content minimum 1.0 ppm.

41.3.3. For Yellow metal corrosion inhibitor-- Azoles minimum 1ppm

41.4. **Oil & Grease:** Should be less than 5 mg/l at side stream filter out let water.

41.5. **P^H:** P^H at supply header should be controlled with in the range as mentioned at clause 38.2.

41.6. **STOCK LEVELS OF CHEMICALS:** Stock levels of chemicals as mentioned at relevant clause.

42. PENALITIES:

The performance evaluation of the system is done based on the Guarantee Performance Parameters. In case of any deviation from the Guarantee Performance parameters, the penalty rate shall be imposed in terms of percentage of chemical quantity dosed during the period performance parameters are evaluated.

Party shall note that the chemical treatment is being started in the system for the first time and a passivation /stabilization period of 15 days can be provided. The performance evaluations shall start after completion of 15 days passivation/stabilization. However, the payment for passivation chemicals / stabilization chemicals for 15 days shall be released along with the first month payment. In case of penalty imposition either on antiscalents/corrosion inhibitors or on bio-dispersants in the first month, the same penalty rate is applicable to passivation / stabilization chemicals also. Party shall maintain the guarantee performance parameters throughout the period of treatment. Corrosion, Deposition rates, TVC & SRB counts will be carried out at QATD lab/ WMD labs of VSP. In case of any deviation from the guaranteed parameters mentioned above, penalty shall be levied as below.

42.1. Corrosion rate for MS:

One MS coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal point and considered for performance evaluation

42.1.1. For less than or equal to 3.0 mpy - No penalty.

42.1.2. For above 3.0 mpy and up to 4.0 mpy- Deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

42.1.3. For above 4.0 mpy- and up to 5.0 mpy – Deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

42.1.4. Above 5.0 mpy: - No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

42.2. Corrosion rate for Ad. Brass:

One Ad Brass coupon will be installed in the system and the corrosion rate as measured will be rounded off to first four decimal points and considered for performance evaluation

42.2.1. Less than or equal to 0.20 mpy: No penalty.

42.2.2. Above 0.20 mpy and up to 0.35 mpy –deduction of 20% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

42.2.3. Above 0.35 mpy and up to 0.50 mpy – deduction of 50% of the Quantity of Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

42.2.4. Above 0.50 mpy – No payment for Antiscalents, corrosion inhibitors and relevant chemicals dosed during the period.

42.3. <u>TVC & SRB counts:</u>

42.3.1. For TVC up to 500000 col/ml & SRB up to 150 counts/100 ml-- No Penalty

42.3.2. For TVC above 500000 col/ml and up to 550000 col/ml & SRB above 150 org/100 ml and below 200 org/100 ml--Deduction of 20% of the Quantity of the biocides and relevant chemicals dosed during the period.

42.3.3. For TVC above 550000 col/ml and up to 600000 col/ml & SRB above 200 org/100 ml and below 250 org/100 ml. Deduction of 50% of the Quantity of the biocides and relevant chemicals dosed during the period.

42.3.4. For TVC above 600000 col/ml. & SRB above 250 org/100 ml --No Payment to the Quantity of the biocides and relevant chemicals dosed during the period.

42.3.5. Penalty is applicable even if one of the parameters (TVC or SRB) deviates from the norm. TVC & SRB count shall be measured once in '15 days' for performance evaluation.

Note: Total viable count (TVC) test conducted as Standard Plate Count (SPC) from IS 1622-1981

42.4. <u>Oil & Grease:</u>

42.4.1. ≤ 5 mg/l------ No Penalty

42.4.2. 5 to 10 mg/l------- Deduction of 20% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

42.4.3. Above 10 and up to 15 mg/l------- Deduction of 50% of the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

42.4.4. Above 15 mg/l ------ No payment to the Quantity of the Oil-demulsifying, oil dispersants and relevant chemicals dosed during the period.

42.5. <u>Penalty on residual availability of active ingredient in recirculation water(for indirect cooling water):</u>

If it is lower than the Lower Limit (LL) of concentration of each chemical quoted by party, penalty will be levied as given below.

42.5.1. Residual achieving lower limit (LL) in ppm – No penalty

42.5.2. Residual achieving <100-70% of LL in ppm : Deduction of 20% of the Quantity of relevant chemicals consumed during the period for the system.

42.5.3. Residual achieving <70-55% of LL in ppm : Deduction of 50% of the Quantity of relevant chemicals consumed during the period for the system.

42.5.4. Residual achieving <55% of LL in ppm.: No Payment for relevant chemicals consumed during the period for the system.

42.6. Penalty on P^H of Recirculation Water:

Party has to operate the recirculation water within range as mentioned in clause 38.2 normal range i.e. 7.5 to 8.5 pH. If the pH crosses this limit, party has to restore it to the normal range with in 8 hrs.

42.6.1. For pH less than 7.5: Deduction of 10% of the Quantity of all chemicals for indirect system consumed (except oil dispersants) during the period.

42.6.2. For pH above 8.5: Deduction of 10% of the Quantity of all chemicals for indirect system consumed (except oil dispersants) during the period.

42.7. Stock of Chemicals:

The stock accounting of all chemicals shall be done by the party at 5.00 P.M daily. In case on any day (except at the end of the treatment period) during the chemical treatment period, the stock level of any chemical / chemicals at site depletes to less than 30 days or mutually agreed stock levels, a penalty of 100% of one-day consumption of chemical / chemicals shall be imposed on the party for that particular day till the stock levels reach the values as mentioned at relevant clause. VSP's decision is final in this regard.

Example: Stock at site will be accounted every day at the end of General shift and balance stock availability will be intimated to Engineer I/C. Stock out penalty applicability on a particular chemical will start from the day on which stock at site is less than 30 days stock. A penalty equivalent to one day chemical dosage (particular stock out chemical), will be imposed for each day of such stock out till the stock is replenished to 30 days stock.
For any continuous dosing chemical "A" at a recommended dosage of 1 Kg/day (as specified in offer) a stock of 30 Kg is to be maintained at site always. If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock.
In case of slug dosing chemical having a recommended dosage of 7 Kg for every 7 days (as specified in offer) a stock of 30 Kg is to be maintained at site always If the stock is found less than 30 Kg on stock accounting a penalty equivalent to 1 kg will be imposed for each day of less than 30 kg stock. Similar is the case with fort nightly and monthly dosage chemicals.

42.8. In case simultaneous imposition of penalties is levied under the clauses 42.1 to 42.6 for the same duration, the penalties applicable shall be summed up. However, the sum of all penalties imposed for any particular chemical shall not exceed 100 %. The penalty imposed under stock of chemicals of clause 42.7 shall be in addition to the sum of penalties imposed under clauses 42.1 to 42.6.

42.9. If the corrosion rate of MS or Ad Brass for indirect system maintained in 100% penalty range for 3 times either consecutively or intermittently during the treatment period, from 4th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for indirect cooling water system of STM till corrosion rate comes to below 100% penalty limit.

42.10. If the TVC or SRB maintained in 100% penalty range for 6 times either consecutively or intermittently during the treatment period, from 7th time on wards penalty will be imposed on all chemicals (Both Corrosion, microbiology control chemicals) for indirect cooling water system of STM till TVC or SRB comes to below 100% penalty limit.

43. General terms and conditions for all Parts of the above specification:

43.1. Payment terms:

Party claim for payment on monthly basis shall be processed on receipt of Invoice by Engineer In charge with due calculation of penalties from the party along with following relevant documents. Party should provide detailed calculation of penalties and it should take due care in calculation of penalties and is responsible for claiming the correct eligible quantities for payment. After submission of bill if any discrepancy is found bill will summarily be returned and a new bill with corrected quantities is to be submitted by the party. Payment will be released as per relevant clause in PO from the date of approval of bill by WMD. Format for invoice is to be collected from engineer in charge at the time of start of treatment.

43.2. Documents related to technical requirement

1. Chemicals consumption reports for the period of performance evaluation.
2. Corrosion reports of MS, Brass for the period of performance evaluation.
3. Microbiology reports (TVC, SRB) for the period of performance evaluation.
4. Daily water analysis reports.
5. Daily reports of active ingredient analysis (If applicable)
6. Cooling tower algae growth report for the period of performance evaluation (If applicable).
7. GARN copies of Material Invoices supplied during that period.

43.3. Documents related to fulfillment of statutory requirement

1. Wage sheets of contract labor for the period of performance evaluation.
2. Copy of ESI payment, remittance challan/slip.

3. Copy of PF remittance challan/slip.
4. Copy of insurance policy of contract labor (for an amount of 5 lakhs) with 1st bill

43.4. The party shall visit the site, study in detail and understand the system before offering the treatment programme. The party may collect samples of water for their study at their R&D centre, if required.

43.5. The list of chemicals is mentioned at Annexure-2. The list is only indicative. Chemical list covers the possible chemicals appropriate to the system by their generic nature. Parties are free to offer their choice of chemical combination, which need not cover necessarily the entire list. However, it is expected that number of chemicals does not exceed the number given in the list. However, the quantities offered shall be effective for recirculation rate and hold up volume as mentioned in the relevant clause for variations up to 10%.

43.6. No shutdown is possible in the system. If Party feels the necessity of Passivation / pre-cleaning, it has to make all necessary arrangements to execute the same online with approval from the Engineer- in-charge (EIC).

43.7. <u>SYSTEMS, STANDARDS AND STATUTORY REGULATIONS:</u>

a. Party has to comply with the requirements of existing VSP Standard systems like EMS-14001, QMS-9001, OHSAS-18001and 5S for ensuring the safe handling, storage of all chemicals.

b. Party has to comply with the various acts, rules and regulations stipulated by State govt. of AP & Govt. of India.

c. Material Safety Data Sheet (MSDS) and Biodegradability certificate for all the chemicals offered shall be provided before starting the treatment and MSDS to be displayed at site prominently.

d. Safety instructions for handling the chemicals/Fire hazards including the application /usage of Fire extinguishers etc. shall be displayed clearly in the chemical handling area.

e. Precautions shall be taken to avoid spillage of chemicals.

f. Party shall ensure to maintain “EMERGENCY PREPAREDNESS & WASTE DISPOSAL PROCEDURES for the chemicals etc. as per the existing OHSAS/EMS procedures of VSP in consultation with EIC

g. Party shall train their personnel in environmental aspects & safe handling of the chemicals at the start of the treatment and provide required Personal Protection Equipments (PPE's) to their personnel/workers.

h. While taking back empty carboys, party must ensure that carboy’s lids, cups, seals etc. are fully cleared and taken back in compliance with VSP’s procedures.

i. Chemicals containers shall be stacked neatly in the designated area at site, with separate stacking of empty and full containers.

j. The chemicals quoted by the Party shall be easily biodegradable. Party shall extend specific confirmation in this regard in the offer. Party shall provide

certification/confirmation for biodegradability of the chemicals offered before starting the treatment. The chemicals quoted by the Party should not fall under banned category as per APPCB & CPCB.

43.8. The chemicals quoted by the Party shall not show any signs of deterioration at least for a period of 90 days after the date of receipt of materials at site.

43.9. Party shall submit product profile/description of each chemical including the % of active ingredient & Shelf life of chemical in the offer.

43.10. Treatment shall be effective in the specified range of pH and temperature ($50^{o}C$ of Recirculation water).

43.11. COC to be maintained in recirculation water is given at relevant clause.

43.12. Treatment programme should be capable of sustained performance under the prevailing operating conditions as well as momentary disturbed conditions like dust ingress into the system etc.

43.13. Party has to give the details of daily monitoring criteria for the active ingredient of their each chemical quoted, failing which the offer will not be considered. Tenderer has to quote the minimum residual level of active ingredient of their chemical like phosphate, zinc, yellow metal inhibitor, organic compounds, free residual chlorine (FRC) etc. on daily basis to be measured in the recirculation water system.

43.14. Any chemical/ chemicals supplied by the party shall be compatible with the system and also with other chemicals supplied by the party and VSP.

43.15.<u>Supply of Chemicals</u>

a. Chemicals shall be supplied in sealed HDPE carboys, containers (returnable)/ tankers/ and shall be properly labeled with the details of the Chemicals such as Chemical name, Supplier name, batch number, Gross weight, net weight, tare weight, Expiry date and name of the VSP site for its application. Every batch of chemicals should have test certificates. The packing & forwarding charges if any are to be included in the basic price. Weighment will be done at VSP weighbridge. For the purpose of material accounting VSP's weighbridge weighment or weight indicated in party's invoice whichever is less shall be taken.

b. Material shall be delivered to the VSP stores. Transportation of chemical(s) from VSP store to dosing site will be in the scope of supplier without any extra cost to VSP. No inspection is required at stores as the material formulation is proprietary in nature.

c. Supply of chemicals (expect ClO_2 and chemicals whose shelf life is less than '45' days) is to be regulated in such a way that '30' days stock is always available at site.

d. Stock levels of ClO_2 and chemicals whose shelf life is less than '45' days shall be decided mutually by VSP and Party.

e. Extra chemicals other than quoted/ Additional quantities of quoted chemicals and their dosing to achieve and maintain systems guarantee parameters is permitted without any commercial implications to VSP. In such cases, party shall give details of extra consumption to WMD and properly account for the same at site. While bringing in such chemicals, party shall ensure proper entry at the plant security gates. The free supply chemicals can be directly delivered to the site without routing through stores. No GARN will be raised against this material.

f. Party is totally responsible for handling of chemicals, storage, dosing and maintenance of the connected system throughout the treatment period. The party shall maintain stock of

these chemicals at site with clear and simple operating instructions for tackling emergency situation.

g. Party shall submit 'Test Certificates' of all the chemicals supplied for the chemical treatment programme as per the format enclosed at Annexure-10

43.16. Laboratory facilities provided by the party:

43.16.1. Party shall set up a laboratory facility with the following provisions for daily monitoring.

a. Spectro-Photometer (DOUBLE BEAM), Turbidity meter & filtration kit for determination of turbidity, suspended solids, phosphates, iron, active ingredient of supplied chemical etc.

b. Standard titration equipments with standard reagents.

c. Digital P^H meter, TDS & conductivity measurement devices.

d. Instruments and apparatus required for carrying out routine & non- routine water, chemical and biological analyses.

e. All consumables/reagents including necessary apparatus.

Note: Facilities should be provided to check all the required parameters of the system (like sulphates, sodium, silica etc.) including active ingredient as per site requirement.

43.16.2. The above facilities shall be arranged by the party on returnable basis during the entire period of treatment without charging additional cost to VSP. Laboratory space and utilities like water, power will be provided by WMD.

43.16.3. Party shall provide operating manual for laboratory analysis activities. It should also contain chemical analysis procedure for positive identification of the chemicals as supplied and also residuals in Recirculation water.

43.16.4. In the case of chemicals whose shelf life is less than '45' days, stock levels (like Hypo) to be maintained at site shall be mutually decided by VSP and party.

43.17. Performance Monitoring Tools :

43.17.1. For monitoring the Performance, the party should provide and maintain the following monitoring tools throughout the period of treatment program.

A. Test corrosion coupon rack (4 No's), of 1"pipe dia. as per IS: 8188-1999, for measuring corrosion rates in the system. The coupons shall be provided by VSP and the coupons will be inspected for measuring the corrosion rates as per IS: 8188-1999 procedures. Corrosion rate of the coupon will be taken for payment purpose.

B. Electronic metering pumps for dosing the each formulation with measuring facilities. No manual / Gravity dosing is allowed. In case of breakdown of a pump it has to be rectified or replaced with a new metering pump with in '24' hrs. To achieve this party shall ensure the stand-by pumps as per requirement.

C. Temperature measuring instruments preferably non-contact type.

D. Instantaneous corrosion meter as per site requirement during emergencies

43.17.2. The party shall provide and maintain the above facilities during the entire period of treatment without any commercial implications to VSP. Party has to take back the above monitoring tools after the completion of treatment.

43.18.Monitoring services:

43.18.1. Cooling water treatment program should be carefully chosen and implemented to achieve un-interrupted operation, long life of rolls and minimum obstruction to heat transfer from CW side. Successful treatment of cooling water depends upon maintaining proper concentration of chemicals in the recirculation water, and promptly taking the necessary steps to counter the adverse effects of upsets, leaks etc.

43.19.WATER SAMPLING AND ANALYSIS:

A. Water samples are to be collected daily and analyzed by the party as per the details given below. The results of the analysis are to be reported as per relevant clause.

B. Testing methods / procedures for the active ingredient in the treated water must be submitted by tenderer from IS, ASTM, APHA.

C. In case the chemicals are not covered by any standard, the party should submit the analysis procedure to be followed to Engineer in charge (EIC) for approval. QATD laboratory will periodically check the system's parameters as and when required by the pump house in-charge. In case of any dispute, the report of QATD lab shall be taken as final & binding.

Frequency of sampling and analysis:

S.No	Parameter	Frequency
1.	Makeup water analysis	Once in a day
2.	Recirculation water analysis	Once in a day
3.	CT inlet and outlet temp.^{o}C	Twice in a day
4.	Supply water to consumer temp.^{o}C	Twice in a day
5.	Active ingredient analysis of all chemicals	Once in a day
6.	Filters Water quality at outlet	Once in a day
Note: In addition to the above, the party shall collect the water samples and handover to VSP for testing/analysis as and when the necessity arises. EIC shall decide the necessity of sampling depending on the system disturbance or any other exigencies arising.		

43.20. Daily visual inspection shall be carried out for monitoring health of CW system and inspection of equipments related to recirculating water for any abnormality. Leakages from any coolers or system pipelines must be reported in the daily service report

43.21. Regular once/day monitoring of CW inlet/outlet temp to Cooling towers, Blow down rate, make up rate.

43.22. Party will have to regularly monitor and report as a part of monitoring corrosion rates, fouling tendency and inlet/outlet temperatures at a frequency of '30'days through identified equipments related to recirculating water at consumer end using field thermometer/ non contact type pyrometer. Cooling water flow rate is to be measured & reported at a frequency of twice / year using non contact type flow meter.

43.23. If required Test spool piece will be provided in the system at suitable location by VSP to monitor the corrosion and deposition tendency during the treatment programme. The spool piece shall be observed for deposition & corrosion at the end of every '3' months of treatment in operation (DCW&ICW).

43.24. Once in 3 months party's senior technical expert (other than site supervisor) should visit the system for technical review and further improvement of system.

43.25. Party shall inspect as and when intimated by EIC, all opened equipments (related to recirculating water) at the consumer end and also at the pump house end. Party shall also take photographs, collect scale/deposit samples, analyze samples with in 48 hrs of inspection at its own laboratory and submit the report within 72 hrs of inspection for further reference. The permission for photography shall be arranged by EIC. All these costs shall be borne by the party.

43.26. As and when the cycles of concentration w.r.t.Ca, Mg, Cl, conductivity and TDS are not matching within +/- 10%, the party shall investigate thoroughly and shall take necessary corrective actions

43.27. <u>Abnormality detection and Response</u>

43.27.1. As and when party is not able to meet technical specification/ guarantee parameters/any other abnormality observed (based on monthly evaluation), immediately party should depute a senior technical expert (other than site in charge) and the senior technical expert shall stay at VSP till the system is normalized to the satisfaction of VSP.

43.27.2. If the corrosion rate, deposition rate, microbiological levels (as measured by monthly/fortnightly/daily tests) exceeds guarantee limits as given at relevant clause, party's senior technical expert should bring instantaneous corrosion meter (for upset in corrosion rate), dip slides (for upset in microbiological tests) and adjust the dosage of quoted chemicals/dosing of extra chemicals other than quoted to maintain the corrosion rate/microbiological readings within the guarantee limits. Dosing of additional quantities of quoted chemicals/dosing of extra chemicals other than quoted is to be continued/regulated (every day Continuous dosing is required) further without any price implication to VSP till the end of treatment programme to maintain the guarantee performance parameters.

43.28. <u>Party's Scope:</u>

Party's scope of work, supply and services is detailed in the various clauses of the specification. The summary of the party's scope of work is given below.

a. Design of suitable cooling water treatment programme to meet the system requirements and technical specifications.

b. Supply and application of chemicals for passivation, normal operation.

c. Storage, Handling and dosing of sulphuric acid /HCl (including supply of dosing pumps) if needed.

d. Taking care of all the safety requirements and housekeeping while dosing the chemicals as per the relevant clause in the specification.

e. Dosing of dewatering polyelectrolyte.

f. To provide monitoring tools as per the relevant clause in the specification.

g. Supervision by Party's supervisor/ application engineer minimum qualification of B.Sc with Chemistry/ diploma in chemical engineering.

h. Daily, fortnightly and monthly Reports as per the relevant clause in the specification.

i. Deploying sufficient number of work men as per site requirement.

j. Establishing Party's lab facility for testing, analysis etc which is common for PART-A, B,C & D.

k. Fulfilling the Statutory requirements.

l. Submission of bill and results with all required documents on monthly basis as per the relevant clause in the specification.

43.29. <u>VSP's Scope:</u>

VSP's scope and responsibilities are detailed in the various clauses of the specification. The summary of the VSP's scope of work is given below. VSP will provide the following at free of cost.

a. Providing laboratory space for the party to establish its lab.

b. All Utilities like Power, water for the party's metering pumps and lab will be provided.

c. VSP shall provide corrosion coupons.

d. Testing of corrosion will be done by VSP.

e. Testing of water samples for microbiology will be done by VSP.

f. Supplying of Sulphuric / HCl Acid to control pH if required.

43.30. The test corrosion shall be installed in the respective coupon racks on the same day. The installation of corrosion coupon shall be as per IS: 8188-1999 procedures. The test corrosion coupon analysis shall be done as per IS: 8188-1999 procedures at QATD lab/ WMD lab of VSP

43.31. The test corrosion and deposition coupons shall be exposed for a period of 31 to 35 days normally and for a period of 31- 40 days in exceptional cases. The exposure period of last coupon may be extended to '59' days maximum at the end of the treatment programme. The test corrosion coupons shall be removed on the same day from respective coupon racks for coupon analysis.

43.32. TVS & SRB analysis of recirculation water shall be carried out at QATD /VSP lab at a frequency of '15' days.

43.33. For reasons attributable to VSP, i.e. any major deviation in operating parameters, system disturbances due to operational constraints etc, if the system performance is not within the limits

specified, in such cases, treatment will be evaluated after giving due consideration to the constraints. VSP's decision is final in this regard.

43.34. THE PARTY MUST FILL THE ANNEXURE-1 PROPERLY AND SUBMIT ALONG WITH THE TECHNICAL BIDS.

43.35. THE PARTY SHALL CONSIDER THE APPLICATION PART (PART-G) COMMON TO PART-A,B,C,D,E and F.

43.36. PARTIES SHALL SUBMIT THE TECHNICAL AND PRICE BIDS SEPERATELY. THE PRICE BID SHOULD CLEARLY INDICATE THE PRICE OF CHEMICALS AND THE APPLICATION PART OF EACH CHEMICAL SEPERATELY. HOWEVER THE L1 PARTY SHALL BE DECIDED ON THE SUM OF THE PRICE QUOTED FOR THE CHEMICALS OF DIRECT & INDIRECT WATER SYSTEMS OF WRM-2 (PART-A&B), SBM (PART-C&D) and STM (PART-E&F) AND APPLICATION PART (PART-G).

43.37. The party shall note that the formats for daily report, fortnightly report, monthly report etc. may undergo minor changes and after such party shall submit in the revised formats.

43.38. Bidder shall furnish details of the treatment programme including the following:-

A. Description of programme.

B. Chemicals used giving name, code name and function i.e. passivating agent, anti-scalent, dispersant and any other specific chemicals along with active ingredient, concentration and percentage.

C. Dosing rates, monthly consumption as well as yearly consumption of chemicals.

D. The treatment program for each system should be separately indicated for (1) precleaning and passivation, (2) Normal treatment; Party has to give complete procedure and time required for pre cleaning and passivation.

43.39. The treatment program is for the period of one year the exact date of starting the treatment will be intimated at the time of technical discussions/ order placement. Total 365 days excluding the passivation period of 15 days. 15 days of passivation chemicals are to be given separately which is not connected with regular dosing of 365 days.

43.40. Party shall quote all the quantities in kilograms (kgs) only.

43.41. Prices quoted by the party should be exclusive of packing charge as the carboys/ containers are returnable. The party has to collect the carboys/ containers from the site and take them out from the VSP premises. Necessary gate passes will be issued by EIC.

43.42. The party shall specify clearly in the cases where application contract will be subletted. In such cases the firm on whom it is to be awarded shall be explicitly specified with address and details of PF code, ESI etc in the techno commercial bid. Else their subsequent request for subletting of application contract will not be entertained

43.43. Offers without the relevant details and confirmations will be treated as incomplete and will be liable for rejection.

43.44. VSP reserves the right to cancel the full or the part order at any point of time in case it is found that the formulation offered by them is not meeting the specification and not giving the required guaranteed performance as specified in the tender. If the successful tenderer becomes defaulter in execution of the order, the order shall be diverted at his risk and cost on other firm as per the procedures in vogue. To this end, party shall provide bank guarantee for an amount equivalent to 10% of total value which includes both supply and application. Bank Guarantee will be released along with the final payment which requires CLC Clearance etc.

WRM-2 , SBM, STM RECIRCULATION WATER SYSTEMS
CHEMICAL QUANTITIES SHEET FOR 365 DAYS + 15 days passivation

NAME OF THE AGENCY:

CHEMICAL TREATMENT PROGRAMME PERIOD = 365 days + 15 days passivation

WRM-2 Pump House (Direct cooling water system)
Water Recirculation rate for continuous dosed chemicals = 3270 cu.m/hr.
Hold up water volume for slug dose chemicals = 6300 cu.m.
Makeup Rate = 85-125 (Avg 105) cu.m/hr.
Blow down rate = 0-20 cu.m/hr.
Temp drop across cooling tower = 13 deg. C Max

WRM-2 Pump House (Indirect cooling water system)
Water Recirculation rate for continuous dosed chemicals = 2002 cu.m/hr.
Hold up water volume for slug dose chemicals = 1950 cu.m.
Makeup Rate = 50-70 (Avg 60) cu.m/hr.
Blow down rate = 0-20 cu.m/hr.
Temp drop across cooling tower = 10-13 deg. C Max
COC = 1.5-3.5 (Avg 2.5)

SBM Pump House (Direct cooling water system)
Water Recirculation rate for continuous dosed chemicals = 2520 cu.m/hr.
Hold up water volume for slug dose chemicals = 3780 cu.m.
Makeup Rate = 65-90 cu.m/hr. (Avg 78)
Blow down rate = 0-25 cu.m/hr.
Temp drop across cooling tower = 15 deg. C (Max)

SBM Pump House (Indirect cooling water system)
Water Recirculation rate for continuous dosed chemicals = 1300 cu.m/hr.
Hold up water volume for slug dose chemicals = 1575 cu.m.
Makeup Rate = 25-45 cu.m/hr. (34 Avg)
Blow down rate = 0-20 cu.m/hr.
Temp drop across cooling tower = 10 deg. C Max
COC = 1.5-3.5 (Avg 2.5)

STM Pump House (Direct cooling water system)
Water Recirculation rate for continuous dosed chemicals = 1320 cu.m/hr.
Hold up water volume for slug dose chemicals = 3420 cu.m.
Makeup Rate = 20-45 (Avg 43) cu.m/hr.
Blow down rate = 0-20 (Avg 18) cu.m/hr.
Temp drop across cooling tower = 16 deg. C (Max)

STM Pump House (Indirect cooling water system)
Water Recirculation rate for continuous dosed chemicals = 1650 cu.m/hr.
Hold up water volume for slug dose chemicals = 2250 cu.m.
Makeup Rate = 30-50 (Avg 40) cu.m/hr.
Blow down rate = 0-20 (Avg 10) cu.m/hr.
Temp drop across cooling tower = 11 deg. C Max
COC = 1.5- 3.5 (Avg 2.5)

I) CHEMICAL QUANTITIES SHEET OF WRM-2 PH DIRECT WATER SYSTEM FOR 365 DAYS

TABLE- A : Continuous dosing chemicals: MS Corrosion inhibtors , Antiscalents, Iron dispersant, Scale Dispersants, Oxidising biocides, Oil dispersant, Dewatering Polyelectrolyte, Poly Electrolyte

1	2	3	4	5	6	7	8	9

S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 365 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = a * b* 24 /1000	d = c * 365		
			3270					
			3270					
			3270					
		De Watering Poly electrolyte	40					
		Poly electrolyte	350					

TABLE-B: SLUG DOSED CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up water volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	Dosage frequency (once in no of days)	No of doses for 365 days	Chemical Qty for 365 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=365/d)	(f=cXe)
			6300					
			6300					
			6300					
			6300					

TABLE- C : Continuous dosing Passivation chemicals: MS Corrosion inhibtors , Antiscalents, Iron dispersant, Scale Dispersants, Oxidising biocides, Oil dispersant, Dewatering Polyelectrolyte, Poly electrolyte (for initial 15 days in addition to the regular chemical dosing for 365 days)

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 15 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = (a * b* 24 /1000)	d = c * 15		
			3270					
			3270					
		De Watering Poly electrolyte	40					
		Poly electrolyte	350					

TABLE-D: SLUG DOSED PASSIVATION CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up volume (m^3)	Chemical Dosage	Chemical Qty/Dose	* Dosage frequency	No of doses for	Chemical Qty for 15

				concentration (ppm)		(once in no of days)	15 days	days
			(a)	(b)	C=(a X b/1000)	(d)	(e=15/d)	(f=cXe)
			6300					
			6300					
			6300					
			6300					

II) CHEMICAL QUANTITIES SHEET OF WRM-2 PH INDIRECT WATER SYSTEM FOR 365 DAYS

TABLE- E : Continuous dosing chemicals: MS , Yellow Metal Corrosion inhibtors, Antiscalents , Scale Dispersants, Oil dispersants, Oxidising biocides, Filter backwash Aid.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 365 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = a * b* 24 /1000	d = c * 365		
			2002					
			2002					
			2002					

TABLE-F: SLUG DOSED CHEMICALS - Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up water volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	Dosage frequency (once in no of days)	No of doses for 365 days	Chemical Qty for 365 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=365/d)	(f=cXe)
			1950					
			1950					
			1950					
			1950					

TABLE- G : Continuous dosing Passivation chemicals: MS ,Yellow Metal Corrosion inhibtors , Antiscalents , Scale Dispersants, Oil dispersants, Oxidising biocides, Filter backwash Aid (for initial 15 days in addition to the regular chemical dosing for 365 days)

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 15 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = (a * b* 24 /1000)	d = c * 15		
			2002					
			2002					
			2002					

TABLE-H: SLUG DOSED PASSIVATION CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	* Dosage frequency (once in no of days)	No of doses for 15 days	Chemical Qty for 15 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=15/d)	(f=cXe)
			1950					
			1950					
			1950					
			1950					

III) CHEMICAL QUANTITIES SHEET OF SBM PH DIRECT WATER SYSTEM FOR 365 DAYS

TABLE- I : Continuous dosing chemicals: MS Corrosion inhibtors , Antiscalents, Iron dispersant, Scale Dispersants, Oxidising biocides, Oil dispersant.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 365 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = a * b* 24 /1000	d = c * 365		
			2520					
			2520					
			2520					

TABLE-J: SLUG DOSED CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up water volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	Dosage frequency (once in no of days)	No of doses for 365 days	Chemical Qty for 365 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=365/d)	(f=cXe)
			3780					
			3780					

TABLE- K : Continuous dosing Passivation chemicals: MS Corrosion inhibtors, Antiscalents, Iron dispersants,Scale Dispersants, Oil dispersants, Oxidising biocides (for initial 15 days in addition to the regular chemical dosing for 365 days)

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage	Chemical Dosage rate	Chemical Qty for 15	Name of the Active	Lower limit of

				concentration in ppm	kgs/ day	days (kgs)	Ingredient	Active Ingredient (ppm)
			(a)	(b)	C = (a * b* 24 /1000)	d = c * 15		
			2520					
			2520					

TABLE-L: SLUG DOSED PASSIVATION CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	* Dosage frequency (once in no of days)	No of doses for 15 days	Chemical Qty for 15 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=15/d)	(f=cXe)
			3780					
			3780					

IV) CHEMICAL QUANTITIES SHEET OF SBM PH INDIRECT WATER SYSTEM FOR 365 DAYS

TABLE- M : Continuous dosing chemicals: MS , Yellow Metal Corrosion inhibtors, Antiscalents , Scale Dispersants, Oil dispersants, Oxidising biocides, Filter backwash Aid.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 365 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = a * b* 24 /1000	d = c * 365		
			1300					
			1300					
			1300					

TABLE-N: SLUG DOSED CHEMICALS - Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up water volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	Dosage frequency (once in no of days)	No of doses for 365 days	Chemical Qty for 365 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=365/d)	(f=cXe)
			1575					
			1575					
			1575					
			1575					

TABLE- O : Continuous dosing Passivation chemicals: MS , Yellow Metal Corrosion inhibtors , Antiscalents , Scale Dispersants, Oil dispersants, Oxidising biocides, Filter backwash Aid (for initial 15 days in addition to the regular chemical dosing for 365 days)

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 15 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = (a * b* 24 /1000)	d = c * 15		
			1300					
			1300					
			1300					

TABLE-P: SLUG DOSED PASSIVATION CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	* Dosage frequency (once in no of days)	No of doses for 15 days	Chemical Qty for 15 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=15/d)	(f=cXe)
			1575					
			1575					
			1575					
			1575					

V) CHEMICAL QUANTITIES SHEET OF STM PH DIRECT WATER SYSTEM FOR 365 DAYS

TABLE- Q : Continuous dosing chemicals: MS Corrosion inhibtors , Antiscalents, Iron dispersant, Scale Dispersants, Oxidising biocides, Oil dispersant.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 365 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = a * b* 24 /1000	d = c * 365		
			1320					
			1320					
			1320					

TABLE-R: SLUG DOSED CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up water volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	Dosage frequency (once in no of days)	No of doses for 365 days	Chemical Qty for 365 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=365/d)	(f=cXe)
			3420					
			3420					
			3420					
			3420					

TABLE- S : Continuous dosing Passivation chemicals: MS Corrosion inhibtors, Antiscalents, Iron dispersants,Scale Dispersants, Oil dispersants, Oxidising biocides (for initial 15 days in addition to the regular chemical dosing for 365 days)

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 15 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = (a * b* 24 /1000)	d = c * 15		
			1320					
			1320					
			1320					

TABLE-T: SLUG DOSED PASSIVATION CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	* Dosage frequency (once in no of days)	No of doses for 15 days	Chemical Qty for 15 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=15/d)	(f=cXe)
			3420					
			3420					
			3420					
			3420					

VI) CHEMICAL QUANTITIES SHEET OF STM PH INDIRECT WATER SYSTEM FOR 365 DAYS

TABLE-U : Continuous dosing chemicals: MS , Yellow Metal Corrosion inhibtors, Antiscalents , Scale Dispersants, Oil dispersants, Oxidising biocides, Filter backwash Aid.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 365 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = a * b* 24 /1000	d = c * 365		
			1650					
			1650					
			1650					

TABLE-V: SLUG DOSED CHEMICALS - Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up water volume (m^3)	Chemical Dosage concentration (ppm)	Chemical Qty/Dose	Dosage frequency (once in no of days)	No of doses for 365 days	Chemical Qty for 365 days
			(a)	(b)	C=(a X b/1000)	(d)	(e=365/d)	(f=cXe)
			2250					
			2250					
			2250					
			2250					

TABLE- W : Continuous dosing Passivation chemicals: MS , Brass Corrosion inhibtors , Antiscalents , Scale Dispersants, Oil dispersants, Oxidising biocides, Filter backwash Aid (for initial 15 days in addition to the regular chemical dosing for 365 days)

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Recirculation rate (m^3/hr)	Chemical Dosage concentration in ppm	Chemical Dosage rate kgs/ day	Chemical Qty for 15 days (kgs)	Name of the Active Ingredient	Lower limit of Active Ingredient (ppm)
			(a)	(b)	C = (a * b* 24 /1000)	d = c * 15		
			1650					
			1650					
			1650					

TABLE-X: SLUG DOSED PASSIVATION CHEMICALS: Non Oxidising Biocides, Biodispersants.

1	2	3	4	5	6	7	8	9
S No	CHEMICAL	PURPOSE	Hold up volume (m^3)	Chemical Dosage	Chemical Qty/Dose	* Dosage frequency	No of doses for	Chemical Qty for 15

				concentration (ppm)		(once in no of days)	15 days	days
			(a)	(b)	C=(a X b/1000)	(d)	(e=15/d)	(f=cXe)
			2250					
			2250					
			2250					
			2250					

TABLE-Q : Final quantities of the chemicals for the treatment programme

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
S.No	CHEMICAL	Qty indicated in Column 7 of table A	Qty indicated in Column 9 of table B	Qty indicated in Column 7 of table C	Qty indicated in Column 9 of table D	Qty indicated in Column 7 of table E	Qty indicated in Column 9 of table F	Qty indicated in Column 7 of table G	Qty indicated in Column 9 of table H	Qty indicated in Column 7 of table I	Qty indicated in Column 9 of table J	Qty indicated in Column 7 of table K	Qty indicated in Column 9 of table L	Qty indicated in Column 7 of table M	Qty indicated in Column 9 of table N	Qty indicated in Column 7 of table O	Qty indicated in Column 9 of table P	Qty indicated in Column 7 of table Q	Qty indicated in Column 9 of table R	Qty indicated in Column 7 of table S	Qty indicated in Column 9 of table T	Qty indicated in Column 7 of table U	Qty indicated in Column 9 of table V	Qty indicated in Column 7 of table W	Qty indicated in Column 9 of table X	Final Qty of Chemical (Kgs)
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)	(l=a+b+c+d+e+f+g+h+i+j+k+l+m+n+o+p)

OTHERS : PLEASE FILL THE RELEVENT TABLE AS PER THE REQUIREMENT

WE AGREE TO THE FOLLOWING TERMS & CONDITIONS CONDITIONS FOR CHEMICAL TREATMENT PROGRAMME.

1.Guarantees, Penalties, General and other clauses of technical specification.

2. All the fields of the above tables are filled . Irrelavent fields are be indicated as "NA"

3 . All final quantities are rounded off to the next higher integer.

4. All the chemical calculations regarding quantities, dosage rate, dosage frequency, No. of days of treatment etc furnished by us are thoroughly checked and found to be in order.

5. Chemicals required for system cleaning/ precleaning are included in the Passivation chemicals i.e. in **Table C,D,G,H,K,L,O,P** ,S,T,W,X

6. The final quantities stated at **column 27 of Table-Y** are binding. No change in final quantities mentioned will be allowed for the purpose of evaluation of tender.

7. In the event of order placement by VSP for the final quantities mentioned at **TABLE-Y**, any short fall in the final quantities (arising out of errors in the calculations in all the above tables) will be supplied additionally with out any financial implication to VSP for ensuring the proper treatment.

8. In case the quoted final quantity of any chemical is more than the required quantity dosing shall be done as per the dosage rate specified in the respective table and payment will be made at actuals.

AUTHORISED SIGNATORY

ANNEXURE - II

PART A&B: WRM-2 (Wire Rod Mill-2) PUMP HOUSE (ROLLING MILLS ZONE)

The chemicals are to be supplied against full or part of the following Material codes based on the party's treatment programme:

1)	***	****	****	Scale dispersant for WRM-2
2)	***	****	****	M.S corrosion inhibitor for WRM-2
3)	***	****	****	Yellow metal corrosion inhibitor for WRM-2
4)	***	****	****	Antiscalent for WRM-2
5)	***	****	****	Non oxidizing biocide for WRM-2
6)	***	****	****	Oxidizing biocide basic for WRM-2
7)	***	****	****	Oxidizing biocide activator for WRM-2
8)	***	****	****	Biodespersant for WRM-2
9)	***	****	****	Oil dispersant for WRM-2
10)	***	****	****	Non oxidizing biocide basic for WRM-2
11)	***	****	****	Iron dispersant for WRM-2
12)	***	****	****	De-watering Polyelectrolyte for WRM-2
13)	***	****	****	Polyelectrolyte for WRM-2
14)	***	****	****	Filter Back Wash Aid for STM
15)	***	****	****	Oil De-emulsifier for STM

PART C&D: SBM (Special Bar Mill) PUMP HOUSE (ROLLING MILLS ZONE)

The chemicals are to be supplied against full or part of the following Material codes based on the party's treatment programme:

1)	***	****	****	Scale dispersant for SBM
2)	***	****	****	M.S corrosion inhibitor for SBM
3)	***	****	****	Yellow metal corrosion inhibitor for SBM
4)	***	****	****	Antiscalent for SBM
5)	***	****	****	Non oxidizing biocide for SBM
6)	***	****	****	Oxidizing biocide basic for SBM
7)	***	****	****	Oxidizing biocide activator for SBM
8)	***	****	****	Biodespersant for SBM
9)	***	****	****	Oil dispersant for SBM
10)	***	****	****	Non oxidizing biocide basic for SBM
11)	***	****	****	Iron dispersant for SBM
12)	***	****	****	Filter Back Wash Aid for SBM
13)	***	****	****	Oil De-emulsifier for SBM

PART E&F: STM (Structural Mill) PUMP HOUSE (ROLLING MILLS ZONE)

The chemicals are to be supplied against full or part of the following Material codes based on the party's treatment programme:

1)	***	****	****	Scale dispersant for STM
2)	***	****	****	M.S corrosion inhibiter for STM
3)	***	****	****	Yellow metal corrosion inhibitor for STM
4)	***	****	****	Antiscalent for STM
5)	***	****	****	Non oxidizing biocide for STM
6)	***	****	****	Oxidizing biocide basic for STM
7)	***	****	****	Oxidizing biocide activator for STM
8)	***	****	****	Biodespersant for STM
9)	***	****	****	Oil dispersant for STM
10)	***	****	****	Non oxidizing biocide basic for STM
11)	***	****	****	Iron dispersant for STM
12)	***	****	****	Filter Back Wash Aid for STM
13)	***	****	****	Oil De-emulsifier for STM

MAKE UP WATER ANALYSIS

Annexure-3

Monthly wise Min,MAX & Average from:June-2015 to April- 2016

Month	Value	PH	Conductivity (µmho/cm)	Turb (NTU)	Alkalinity (ppm)		Chlorides (ppm)	Sulphates	Hardness (ppm)		
					P	T			Ca	Mg	Total
Jun-15	MIN	7.7	265	7.1	4.0	90	21	19.4	52	30	90
	MAX	8.2	299	37.0	4.0	120	25	50.6	64	46	106
	AVG	8.0	280	15.5	4.0	110	22	25.1	59	41	100
Jul-15	MIN	7.7	273	11.3	0.0	98	19	12.3	52	24	84
	MAX	8.2	315	30.0	0.0	126	25	60.0	66	44	110
	AVG	7.9	290	18.5	0.0	111	23	26.7	60	39	99
Aug-15	MIN	7.5	272	8.4	2.0	98	22	8.4	60	30	90
	MAX	8.3	306	61.1	2.0	120	27	36.6	70	44	110
	AVG	7.8	290	17.3	2.0	111	25	22.0	63	40	102
Sep-15	MIN	7.5	284	9.1	0	96	22	16.6	54	32	100
	MAX	8.0	314	24.1	0	138	30	29.2	80	54	120
	AVG	7.8	295	15.6	0	115	26	24.5	63	43	106
Oct-15	MIN	7.7	306	6.4	0	112	23	15.6	60	34	100
	MAX	8.2	353	24.1	0	140	28	30	70	56	124
	AVG	7.9	327	12.8	0	127	26	23.4	65	44	109
Nov-15	MIN	7.3	332	2.1	0	118	23	13.9	62	40	102
	MAX	8.1	363	20.2	0	144	28	24	76	64	140
	AVG	7.9	349	7.9	0	135	25	20.0	67	46	113
Dec-15	MIN	7.6	344	5.3	0	136	24	15.0	66	40	110
	MAX	8.0	392	39.0	0	254	29	27.0	90	64	146
	AVG	7.8	371	16.0	0	150	27	19.8	74	52	126
Jan-16	MIN	7.4	360	9.7	0	130	25	20.8	58	34	104
	MAX	7.8	396	19.5	0	168	36	41.2	98	64	144
	AVG	7.7	384	14.1	0	145	29	29.9	78	53	131
Feb-16	MIN	7.2	352.0	5.9	0.0	122	27	23.4	61	34	110
	MAX	7.8	398.0	108.0	0.0	148	34	42.0	92	68	146
	AVG	7.6	379.1	14.5	0.0	133	30	34.2	76	52	128
Mar-16	MIN	7.4	320	1.9	0.0	106	22	18.0	60	40	110
	MAX	8.2	359	15.5	0.0	132	31	39.2	84	68	144
	AVG	7.7	337	9.1	0.0	120	27	30.1	70	52	121
Apr-16	MIN	7.5	323	6.2	0.0	104	28	13.4	58	40	104
	MAX	8.1	355	33.3	0.0	144	35	37.0	76	64	134
	AVG	7.9	337	13.0	0.0	129	32	26.3	67	49	116

PART – G

APPLICATION CONTRACT

I) Scope of Work:

Transportation from VSP stores, loading, unloading, stacking at site, cleaning, formation and dosing of chemicals quoted and supplied by the party .The scope includes monitoring, sampling, testing and submission of test reports.

II) Quantity : To be given by party.

III) Unit Price : To be mentioned by party for each chemicals.

IV) Total Ordering Price: Total Application charges and taxes and duties applicable to be mentioned by party. It is mandatory for the parties to quote application charge separately for each chemicals& the various taxes and duties are also to be mentioned.

V) Quality of job :

Supplier shall post qualified personnel suitable for the above jobs. Party representative/Application engineer shall be well Qualified and experienced. He should be science graduate and must have at least 3 years of experience in the field of cooling water treatment. And he should be conversant in using laboratory equipment and chemical analysis procedures. The complete responsibility for the quality of work rests with supplier

VI) PAYMENT TERMS :

100% Application charges is payable on the chemicals recommended in the performance certificate. As mentioned in PART-A to F the performance will be based on meeting the guarantee parameters and deduction of penalty if any calculated during performance evaluation for the period.

As submission of 10 % of Bank Guarantee against both supply & application of chemicals is already envisaged – no other components like Security Deposit, deposition towards labour component for Final settlement etc will be deducted from the regular bills. Total Bank Guarantee will be released after CLC clearance and along with the final payment within 15 days.

Application charge along with Service Tax etc will be released within 15 days from the date of submission of Application by the party to Engineer Incharge (Required documents like payment towards PF, ESI, monthly wage sheet and satisfactory Performance Certificate to be submitted by party).

VII) ENGINEER IN CHARGE :

DGM (M) / WMD of RM Zone incharge is the Engineer Incharge for execution of contract.

VIII) SUPPLIER SCOPE :

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a) The Party representative/Application engineer is responsible for initial commissioning and stabilization of treatment package followed by regular monitoring, performing required analysis and initiate actions based on test results, as well as dosing the chemicals in the system and checking possible leakages in the system & reporting to the concerned In charge. He should be familiar with objectives of chemical treatment.

b) Party representative /Application engineer should make routine spot checks, preferably once in a day, for Chemical levels, monitor and control growth of micro-organisms, anticipate any difficulties that may be developing, and submit a periodic status report to the concerned Incharge.

c) Party representative /Application engineer should be equipped with online facilities like e-mail account (for sending daily electronic reports), mobile phone for being in contact with VSP and with their main office for any required technical backup is absolutely essential. It is not acceptable that site staffs depend on monthly or fortnightly spot checks by VSP/WMD/service representatives.

d) Party has to engage sufficient number of work men for carrying out following jobs

   A. Loading & Un-loading of Chemicals.
   B. Stacking & storage of chemicals.
   C. Preparation of chemicals for dosing.
   D. Cleaning of cooling towers & Nozzles.
   E. Water Sample collection.
   F. Grass cutting of walk way to cooling towers and dosing points.
   G. Maintaining overall house keeping in chemical storage and handling area.
   H. Inspection for water leakages.

e) Any other services required as per the scope of work shall be done by the party without any extra cost to VSP.

f) **Technical support:** Periodic visit by senior technical representatives, say once in a quarter or as and when required by Pump house incharge, for a joint review of the treatment program. This will help in arriving at the level of efficiency and effectiveness achieved, mid course corrections, when required, and in extreme case, to decide about continuation of the program. This report will be given to respective pump house in-charge, consumer dept in-charge and WMD HOD.

g) Party is required to fulfill the conditions laid down by Safety Engg Department of VSP for carrying out the job. Before starting the work Safety clearance from Safety Engg Department has to be obtained and certificate is to be submitted. All the work men engaged in the application should possess valid safety certificate issued from Safety Engg Department of VSP.

h) Supplier has to fulfill the conditions and statutory obligations of contract Labour cell of VSP. The deployment of manpower (skilled and unskilled workers) beyond the norms for working hours is prohibited.

i) As the application involves manpower for dosing of chemicals, loading, unloading works, cleaning, monitoring etc., party has to take care of fulfilling all the statutory requirements of Govt. of india / Govt of AP/Factories act etc. During the quotation itself, party has to submit the details of PF CODE, ESI CODE, LABOUR LICENCE etc.

j) **The party shall specify clearly in the cases where application contract will be subletted. In such cases the firm on whom it is to be awarded shall be explicitly specified with address and details of PF code, ESI etc in the techno commercial bid. Else their subsequent request for subletting of application contract will not be entertained.** Any such consent shall not relieve the supplier from any obligation, duty or responsibilities under the contract.

k) PARTY HAS TO COMPLY VARIOUS STATUTORY CONDITIONS AND HAS TO FOLLOW THE TERMS AND CONDITIONDS (WHICH MAY CHANGE FROM TIME TO TIME) AS GIVEN BELOW.

Terms and Conditions

'Employer' means Rashtriya Ispat Nigam Limited (RINL), Visakhapatnam Steel Plant / VSP, Administrative building, Visakhapatnam - 530 031 A.P. and includes Employer's Personal representative or successors or assignees.

'Engineer' means an engineer appointed from time to time by the employer and shall include the Chief Engineer of the employer.

Contractor/Agency means person or persons, firms or Company whose tender has been accepted by the employer and who has entered into contract with the employer and includes the contractor's heirs: executors, administrators, legal representatives, personal representatives, successors and permitted assignees.

1. Immediately on receipt of Work Order/LOI, the successful tenderer shall obtain and submit the following documents to the representative of RINL/VSP (in the present case Engineer Incharge DGM(T)/WMD) with a copy to Zonal Personnel Executive (ZPE) i.e. Zonal Contract Labour Cell before commencement of contract.

   a) Copy of the Labour Licence issued by appropriate government i.e. presently Asst Labour Commissioner (Central), Govt. of India, Ministry of Labour, Visakhapatnam. In case of Marketing Dept or any other department situated outside Visakhapatnam, they may obtain the Labour Licence from the nearest above mentioned Labour Department at their respective place or agencies particulars shall be modified suitably in the Labour Department of Appropriate Government at the place of Registered Office, Visakhapatnam.
   b) The tenderer shall submit a copy of their Provident Fund Registration Certificate issued by Provident Fund Organisation, Government of India indicating their Provident Fund code number and a certificate from the Regional Provident Fund (RPF) authorities confirming that the Provident Fund account is under operation and also giving the details of the deposits credited to their RPF account during the last one year. In case the same is not available, they shall submit a letter of undertaking to submit the same before commencement of contract.

   c) The tenderer shall submit a copy of their Employees' State Insurance Registration Certificate indicating their Employees' State Insurance code number under Employees' State Insurance Act, 1948. In case the same is not available, they shall submit a letter of undertaking to submit the same before commencement of contract. In case, the Employees' State Insurance Act, 1948 is not applicable by any reason to any employee of the contractor, the Employees' Compensation Act, 1923 is applicable for such employee engaged by the Contractor. In such case the contractor is required to submit insurance policy under the Employees' Compensation Act, 1923 before commencement of contract.

   d) Insurance policy covering ex-gratia payment of ₹.5,00,000/- (Rupees five lakhs only) per head for deaths arising out of accidents on duty to the contract labour engaged by him. As and when death takes place arising out of accidents on duty, the contractor is required to pay the above mentioned exgratia amount within 30 days to the legal heir of the deceased from the date of death takes place. This insurance is in addition to the statutory insurances under the provisions of the Employees State Insurance Act, 1948 / Employees' Compensation Act, 1923, Public Liability Insurance Policy (Third Party insurance) or any other insurance taken by the contractor or any other agency to cover the workmen. The Agency shall update the said insurance policy from time to time as per RINL/VSP rules.

   e) Copy of the insurance policy for the third party insurance (Public Liability Insurance Policy) for ₹.50,000/- (Rupees fifty thousand only). The Agency shall update the said insurance policy from time to time as per RINL/VSP rules.
   f) Safety clearance from the Safety Engineering Department of RINL/VSP.

   Further the following may be ensured.

2. LABOUR LICENCE :

The agency shall obtain necessary License issued by the appropriate Government under the Contract Labour (Regulations and Abolition) Act, 1970 and rules framed there under (including amendments thereof) within the time limit allowed by the appropriate Government (presently the contractor shall obtain licence from Asst. Labour Commissioner (Central), Visakhapatnam, Ministry of Labour, Government of India) and shall obtain and produce copy of such License before commencement of contract. On his failing to do so, the contract shall automatically come to an end immediately on the expiry of such time limit and earnest money / security deposit shall stand forfeited.

3. LABOUR RULES :

In respect of all contract labour directly or indirectly employed on the works, the Agency shall comply with all legislations and rules of State and / or Central Government or other local authority as the case may be including those governing the protection of health, sanitary arrangements, wages, welfare and safety applicable for Labour employed. The Contract Labour

(Regulation and Abolition) Act 1970 and rules framed there under by the appropriate Government, The Minimum Wages Act, 1948, Payment of Wages Act, 1936, Employees' Provident Funds and Miscellaneous Provisions Act, 1952, Employees' State Insurance Act, 1948 / Employees' Compensation Act 1923, Payment of Bonus Act, 1965, Payment of Gratuity Act, 1972, Factories Act, 1948, Industrial Disputes Act, 1947, Child Labour (Prohibition and Regulation) Act, 1986 and Maternity Benefit Act, 1961 and Andhra Pradesh Labour Welfare Fund Act, 1987 and other statutes and amendments thereof and other statutory obligations with regards to fair wages, welfare amenities and safety measures, maintenance of registers etc. will be deemed to be the part of the contract. On failure to do so, the contract shall automatically come to an end immediately on the expiry of such limit and earnest money / security deposit shall stand forfeited.

04. As security for fulfillment of the obligations, the agency will be deemed to have authorized the RINL / VSP to set off any claims under various Acts and Rules in force from time to time, against the bills payable to him and also to withhold the payments due to him till such time as the requirements of laws are complied with or to adjust payments to be made to and / or on account of the employees of the agency from the amounts payable to him.

05. The agency shall have to maintain the following registers in the forms, as prescribed under various statutes / Rules framed there under and show such registers to the concerned officer in charge of RINL /VSP or his nominee as and when called for :-

S.NO.	NAME OF THE REGISTER	FORM No. as per C.L (R&A) Central Rules, 1971
1	MUSTER ROLL	XVI
2	REGISTER OF WAGES	XVII
3	REGISTER OF DEDUCTIONS FOR DAMAGE OR LOSS	XX
4	REGISTER OF OVER-TIME	XXIII
5	REGISTER OF FINES	XXI
6	REGISTER OF ADVANCES	XXII
7	WAGE SLIP	XIX
8	REGISTER OF WORKMEN EMPLOYED BY CONTRACTOR	XIII
9	EMPLOYMENT CARD	XIV
10	SERVICE CERTIFICATE	XV

06. The agency shall furnish to RINL / VSP a copy of the half-yearly returns in the Form XXIV prescribed under the Contract Labour (R & A) Act, 1970 and rules framed thereunder by the appropriate Government (presently Asst. Labour Commissioner (Central), Visakhapatnam, Ministry of Labour, Government of India). Further the agency shall furnish the details such as name and address of the contractor, period of contract, nature of work, Work Order number and date, Department/Zone, maximum number of workers employed, Number of days worked and Number of man-days worked for every calendar year to RINL/VSP at the end of the calendar year / on completion of the work.

07. PAYMENT OF MINIMUM WAGES : Wages paid to the workmen by the Agency should not be less than the rates notified by the appropriate Government (presently Regional Labour Commissioner (Central), Ministry of Labour, Government of India) published in the Gazette / as communicated by them to RINL/VSP from time to time with regard to the minimum wages applicable to the respective category of workmen and ad-hoc amount @ of ₹.11-54 ps. per day per contract worker on actual attendance subject to a maximum of Rs.300/- (Rupees three hundred only) per month. Wages with ad-hoc amount to the workmen should be paid on or before the 7th of the subsequent month after the last day of wage-period. If 7th falls on a holiday or weekly off day, the payment should be made one day prior to that. The agency shall submit a certificate to RINL/VSP within a week after disbursement of wages, details showing quittance and wage period. If it is found that workers are not paid wages and others, if any regularly, the contract is liable to be terminated.

Payment of Provident Fund for the month, both the employer's (in this case-contractor/agency) and employee's (in this case-workman employed by the contractor) contributions should be deposited in any branch of State Bank of India in the permanent Provident Fund code numbers of the contractor or in RINL/VSP sub-code number, if permitted and challan obtained on or before the 15th of the subsequent month as per Employees' Provident Funds and Miscellaneous Provisions Act, 1952 and forwarded to the Representative of RINL/VSP/Engineer." Further, Payment of Employees' State Insurance Fund for the month, both the employer's (in this case-contractor/agency) and employee's (in this case-workman employed by the contractor) contributions should be deposited in the designated State Bank of India by Employees' State Insurance Corporation for this purpose in the permanent Employees State Insurance code number of the contractor or in RINL/VSP sub-code number, if permitted and challan obtained on or before the 21st of the subsequent month as per the Employees' State Insurance Act, 1948 and forwarded to the Representative of RINL/VSP/Engineer."

08. The tenderer shall consider the ad-hoc payment ₹.11.54 Ps. per working day per contract labour on actual day of attendance subject to a maximum of ₹.300/- (Rupees three hundred only) per month to those contract labour working with the contractors on prorate basis payable to the contract labour while quoting the rates.

09. In case of failure of the Agency to comply with any of the above, the following action will be taken by VSP :

LAPSE	ACTION BY VSP
1. Payment of wages at rates less than those notified under the minimum wages notification.	An amount equivalent to the differential amount between wages to be paid under Minimum wages notification of the Govt. applicable for the period less actual wages paid shall be recovered from the bills of the contractor as certified by the Representative of RINL/VSP/Engineer.
2. Non-payment of wages.	An amount equivalent to wages payable by the contractor applicable for the relevant period shall be recovered from the bills of the contractor as certified by the Representative of RINL/VSP/Engineer.
3. Non-payment of PF.	Recovery of PF amount and an amount equivalent to maximum penalty and interest livable by Regional Provident Fund Commissioner for the delayed period under the provisions of Employees' Provident Funds and Miscellaneous Provisions Act, 1952 and Rules framed thereunder for delayed remittance of Provident Fund contributions (both the employee's and employer's (in this case Contractor's) contributions and administrative charges), shall be recovered from the bills of the contractor as certified by Representative of RINL/VSP/Engineer.
4. Delayed payment of PF	An amount equivalent to maximum penalty and interest livable by Regional Provident Fund Commissioner for the delayed period under the provisions of Employees' Provident Funds and Miscellaneous Provisions Act, 1952 and Rules framed there under for delayed remittance of Provident Fund contributions (both the employee's and employer's (in this case Contractor's) contributions and administrative charges), shall be recovered from the bills of the contractor as certified by Representative of RINL/VSP/Engineer.
5.Non-payment of ESI	Recovery of ESI contributions amount and an amount equivalent to maximum penalty livable by Employees' State Insurance Corporation Authorities for the delayed period under the provisions of Employees' State Insurance Act, 1948 and Rules framed there under for delayed remittance of Employees' State Insurance contributions (both the employee's and employer's (in this case contractor's) contributions), shall be recovered from the bills of the contractor as certified by the Representative of RINL/VSP/Engineer.
6. Delayed payment of ESI	An amount equivalent to maximum penalty and interest livable by Employees' State Insurance Corporation Authorities for the delayed period under the provisions of Employees' State Insurance Act, 1948 and Rules framed thereunder for delayed remittance of Employees' State Insurance contributions (both the employee's and employer's (in this case contractor's) contributions), shall be recovered from the bills of the contractor as certified by the Representative of RINL/VSP/Engineer.
7. Non-payment of ad-hoc amount of ₹.300/- per month.	An amount equivalent to actual payable towards ad-hoc amount to the workmen engaged for relevant period shall be recovered from the bills as certified by the Representative of RINL/VSP/Engineer.

a) The recovered amount under clauses 1,2,3,4,5,6 and 7 will be refunded along with subsequent Running Account Bill/final bill on certification by as certified by Representative of RINL/VSP/Engineer that the contractor has since complied with the provisions of payment of wages, Provident Fund and Employees' State Insurance contributions etc.

b) In the case of completed works, the recovered amount under clause No.4 & 6 above will be refunded to the contractor along with final bill of the subject work on submission of no due/no claim certificate from the concerned Zonal Contract Labour Cell of RINL/VSP that the contractor has since made with the payments under the provisions of Employees' Provident Funds and Miscellaneous provisions Act, 1952 and Employees' State Insurance Act, 1948.

10. The Agency shall make regular and prompt payments of wages to their workers engaged in the work and in no case shall the payment be delayed more than 7 days, following the period for which the wages are due. If it is found that workers are not paid wages and others, if any, regularly, the contract is liable to be terminated.

11. In case of revision of RINL/VSP approved wage rate, consequent to the revision in the minimum wages (either in Basic Wage or Living Allowances) as notified by the appropriate government (presently Regional Labour Commissioner (Central), Hyderabad, Government of India, Ministry of Labour), escalation amount to the contract shall be payable as per the following formula:

V = L x W x (X – Xo)/ Xo

Where :

V = Escalation payable

L = Labour content as percentage of the work is 100 %

W = Gross value of work done on the basis of contract rates for the period for which variation is applicable

X = Revised weighted average of RINL / VSP approved wage rates of Unskilled Worker, Semi-skilled Worker and Skilled Worker based on the Minimum Wages as notified by the Regional Labour Commissioner (Central), Hyderabad, for the period under consideration for the contract on the basis of actual man days present by different categories of contract labour during the billing period.

X0 = Weighted average of existing RINL / VSP approved wage rates of Unskilled Worker, Semi-skilled Worker and Skilled Worker considered in the Estimate which is indicated in the Quote Sheet - Form 'G' / BOQ of the Tender Document on the basis of actual man-days present by different categories of contract labour during the billing period.

Computation of X and Xo :

X = (a*USR + b*SSR + c*SKR) / (a + b + c)

Xo = (a*USRo + b*SSRo + c*SKRo) / (a + b + c)

Where

a = man-days present by USW during the billing period

b = man-days present by SSW during the billing period

c = man-days present by SKW during the billing period

USR = Revised RINL / VSP approved wage rate for USW at the time of billing

SSR = Revised RINL / VSP approved wage rate for SSW at the time of billing

SKR = Revised RINL / VSP approved wage rate for SKW at the time of billing

USRo = RINL/VSP approved wage rate for USW indicated in the Quote Sheet (Form G) / BOQ of Tender Document

SSRo = RINL/VSP approved wage rate for SSW indicated in the Quote Sheet (Form G) / BOQ of Tender Document

SKRo = RINL/VSP approved wage rate for SKW indicated in the Quote Sheet (Form G) / BOQ of Tender Document

Note: The revised RINL/VSP approved estimated Wage Rates of USW, SSW and SKW effective from 01.10.2015 are ₹.485.75 ps., ₹.546.05 ps., ₹.634.15 ps. Respectively.

12. The contractor has to follow all the statutory provisions that are applicable to Contract Labour and also to pay terminal benefits (full and final benefits) i.e., notice pay, retrenchment compensation (Service Pay), un-availed Leave with Wages and Bonus as per the payment of Bonus Act, 1965. The impact of revision in wages, on final benefits i.e. Notice pay, Retrenchment compensation, un-availed leave with wages and Bonus during the operation period of the contract should form part of escalation calculations, since the benefits are to be paid on prevailing rate of last month pay. The agency has to pay all the above payments and submit proof of such payments. Zonal Personnel Executive (Zonal Contract Labour Cell) shall give clearance on submission of required valid / correct and complete documents for such clearance. On producing such proof and clearance from the concerned Zonal Contract Labour Cell, the final bill of the contractor will be released, on 30th day from the date of submission of required valid / correct and complete documents in all respects.

The following deductions per workmen deployed category-wise shall be made from the bills / amounts due to the contractor as applicable for the work done and such deducted amounts shall be released as follows :

S.No.	*Component*	*Recovery amount per Labour per every WORKING DAY (in Rupees)*			*To be released when*
		UN-SKILLED	*SEMI-SKILLED*	*SKILLED*	
01	***Notice pay***	₹ 25.23	₹ 28.57	₹ 33.47	After the Contractor makes payment to the workmen in the presence of ***Engineer I/c and CLC representatives.*** A certificate to this effect is to be enclosed with pre-final bill. (***to be paid with pre-***

02	***Retrenchment compensation***	12.61	14.29	16.73	***final bill***)
03	***Leave with wages***	15.52	17.58	20.59	
Sub-total		53.36	60.44	70.79	
04	***Bonus***	11.55	11.55	11.55	After the Contractor makes payment to the workmen in the presence of ***Engineer I/c and CLC representatives.*** A certificate to this effect is to be enclosed with RA bill / pre-final bill. (***to be paid with RA bill / pre-final bill as and when paid by the Contractor***)
Grand total (To be paid to the Labourer)		**64.91**	**71.99**	**82.34**	
10% toward profit and overheads of Contractor		**6.49**	**7.20**	**8.23**	
Total recovery amount		**71.40**	**79.19**	**90.57**	

NOTE

i *The above recovery rates are effective from 01.10.2015. In case of any statutory revision in minimum wages payable to contract workmen as notified by the Regional Labour Commissioner (Central), Hyderabad, Government of India, Ministry of Labour from time to time, the above recovery amounts for workmen category-wise will be revised by RINL / VSP and will be notified accordingly.*

ii *Payment against the above components is to be made to the workmen based on effective wages of last drawn pay.*

13. The agency will be required to furnish to the RINL/VSP the following particulars regarding the payments to be made by him to his workers, immediately after the commencement of the work in question;

a) Wage period
b) Place of disbursement of wages
c) Payment and date of disbursement of wages.

14. Notices showing the rates of wages, hours of work, wage periods, dates of payment of wages, names and addresses of the Inspectors having jurisdiction, and date of payment of unpaid wages, shall be displayed in English and Hindi and in the local language understood by the majority of the workers in conspicuous places at the establishment and the work-site by the contractor. The notices shall be correctly maintained in a clean and legible condition. A copy of the notice shall be sent to the Inspector under the Contract Labour (R&A) Act, 1970 and rules framed there under by the appropriate Government from time to time (Presently Asst. Labour Commissioner, Visakhapatnam, Government of India, Ministry of Labour). All payments shall be made on working days at the work place and during working hours, as provided in the rules framed under the said Act.

15. The agency shall undertake and be responsible for providing canteen facilities for the workers employed by him in compliance with Chapter - V of the Contract Labour (Regulation & Abolition) Act, 1970 and Contract Labour (Regulation & Abolition) Central Rules, 1971 and also provide First Aid Box, equipment with contents, as prescribed under the Rules framed under the Contract Labour (Regulation & Abolition) Act, 1970 and Contract Labour (Regulation & Abolition) Central Rules, 1971 at every location where labour is employed by him. Wherever the contractor execute works in the state of Andhra Pradesh and a state other than Andhra Pradesh, the contractor shall register himself with the appropriate Government, concerned Labour Department under the Contract Labour (Regulation & Abolition) Act, 1970 and the Contract Labour (Regulation & Abolition) Central Rules and comply with all the provisions of various statutes governing the service conditions of the contract labour in that State.

16. The agency shall not allow the use or sale of ardent spirits or other intoxicating beverages in the working area or in any of the buildings, premises occupied by him in connection with the work in question.

17. The Agency should clearly understand and comply with the Factories Act 1948 and relieve the **FEMALE WORKERS** from their work site within the restricted working hours prescribed therein under section 66 (b).

The agency shall ensure that the working hours for female workers, if any, employed by him shall be regulated as per the requirements of the statute and that no female worker is engaged for work at the work place except between 6.00 AM to 7.00 PM on any working day.

18. No child will be allowed in the premises.

19. The agency shall further ensure that proper discipline and decorum is maintained by the workers / employees engaged by him, in the area of work.

20. If any loss arises due to theft, pilferage or damage of articles which have happened during the work, the agency will be responsible and cost of articles and quantum of damages as assessed by RINL / VSP will be recovered from him. The agency shall, if necessary, provide adequate security against such incidents at their own cost.

21. The agency should register themselves with the Regional Provident Fund Commissioner and will be required to follow the provisions of the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 failing which payments due to them will be withheld.

The contractor should deposit Employees' Provident Fund contributions (employee's + employer's (in this case contractor) contributions) on or before 15th of the subsequent month of the wage period in their independent Employees' Provident Fund code number or in RINL/VSP Provident Fund sub-code number, if permitted as per the provisions of the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 and thereafter amended from time to time, failing which payments due to them will be withheld. The contractor should submit the Provident Funds remittance copy of challans containing the work order number along with list of workers with contribution details to the representative of RINL/VSP and Zonal Personnel Executive every month.

22. The contractor should submit returns to Regional Provident Fund Commissioner under the provisions of the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 and rules framed there under from time to time and copy of the same shall furnish to RINL/VSP representative and Zonal Personnel Executive. The contractor should maintain the records such as attendance, wage registers, contribution registers, etc as per the provisions of the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 and rules framed thereunder from time to time.

23. The Agency shall ensure strict compliance with the provisions of the Employee's Provident Funds and Miscellaneous Provisions Act, 1952 and the schemes framed there under from time to time in so far as they are applicable to their establishment and agencies engaged by them. The contractor is also required to indemnify the employer against any loss or claim or penalties or damages whatsoever resulting out of non-compliance on the part of the contractor with the provisions of the aforesaid act and the schemes framed there under from time to time.

24. **Employees' State Insurance Act:** The successful agency should follow the procedure that shall be implemented in order to comply with the provisions of the Employees' State Insurance Act, 1948 and submit a copy of the Employees' State Insurance registration certificate indicating their Employees' State Insurance code number. The contractor should give all the particulars of workmen including Employees' State Insurance number(s) engaged by them before commencement of work and changes during the course of work shall be intimated by the contractor to the representative of RINL/VSP along with insurance code number where necessary.

The contractor should deposit Employees' State Insurance Fund contributions (employee's + employer's (in this case contractor) contributions) on or before 21st of the subsequent month of the wage period in their independent Employees' State Insurance code number or in RINL/VSP ESI sub-code number, if permitted as per the provisions of the Employees' State Insurance Act, 1948 and thereafter amended from time to time, failing which payments due to them will be withheld. The contractor should submit the remittance copy of challans containing the work order number along with list of workers with contribution details to the representative of RINL/VSP and Zonal Personnel Executive every month. The contractor should submit Return of contributions to Employees' State Insurance Corporation authorities under the provisions of the Employees' State Insurance Act, 1948 and rules framed there under from time to time and copy of the same shall furnish to RINL/VSP representative and Zonal Personnel Executive. The contractor should maintain the records such as attendance, wage registers, contribution registers, etc as per the Employees' State Insurance Act, 1948.

25. The Agency shall at all times indemnify the Employer against all claims for compensation under the provisions of the Employees' State Insurance Act, 1948 / Employees' Compensation Act, 1923, as amended from time to time or any other law for the time being in force by or in respect of, any workmen employed by the Contractor in carrying out the contract and against all costs and expenses or penalties incurred by the employer in connection there with and (without prejudice to any other means of recovery) the employer shall be entitled to deduct from any money due or to become due to the Contractor (whether under the contract or any other contract) all moneys paid or payable by the employer by way of Compensation aforesaid or for costs or expenses in connection with claims thereto and the contractor shall abide by the decision of the employer as to the sum payable by the Contractor under the provisions of this clause.

26. Reporting of accidents to the employer and other local authorities concerned pertains to labour: The contractor shall be responsible for the safety of all employees and / or workmen employed or engaged by him on and in connection with the work and shall report to the employer and other local statutory authorities concerned, all cases of serious accidents howsoever caused and wherever occurring on the works and shall make adequate arrangements for rendering immediately all possible aid to the victims of the accidents.

27. Where any accident causing disablement or death occurs, the agency shall be liable for such injury or death caused as a result of such accident either within or outside the working place in the course of work. The agency shall be responsible for such contingencies and will make good all claims for compensation claimed by his labour or staff or under Employees' State Insurance Act, 1948 / Employees' Compensation Act, 1923 / Tribunal and other relevant laws of the land as the case may be. He shall also indemnify the RINL/VSP and pay all such sums as may be awarded in respect of claims for compensation arising out of or consequent to any accident to any staff or Labour working under him pursuant to the provisions of the Employees'

State Insurance Act, 1948 / Employees' Compensation Act, 1923 or any subsequent modifications or amendments to the Act thereof. All costs incurred by the RINL / VSP in connection with any such claims should be made good by the agency and the RINL / VSP reserves the right to pay in the first instance such amount of compensation as is payable under the said Act or any other Act / rules and recover the amount so paid from the agency's bills, security deposit or other ways.

28. ADDITIONAL INSURANCE COVERAGE :

The agency shall take insurance policy for payment of an ex-gratia amount of ₹.5,00,000/- (Rupees five lakhs only) per head for deaths arising out of accidents on duty to the contract labour engaged by him. As and when death takes place arising out of accidents on duty, the contractor is required to pay the exgratia amount within 30 days to the legal heir of the deceased from the date of death takes place arising out of accidents on duty. This insurance is in addition to the statutory insurances under Employees State Insurance Act, 1948 / Employees' Compensation Act, 1923, Public Liability Insurance Policy (Third Party insurance) or any other insurance taken by the contractor or any other agency to cover the workmen. The Agency shall update the said insurance policy from time to time on par with contract labour employed by RINL/VSP through contractor.

29. Insurance: The Agency shall maintain and shall require his Sub-Contractors to maintain in full force and effect, from Insurance Companies in India acceptable to Representative of RINL/VSP/Engineer, from the time of execution of his Agreement:

a) All such insurances as are required by law for the purpose of the Contract at the cost of Contractor.

b) All such insurances required in respect of equipment purchased out of advance received from Employer at the cost of Contractor.

c) Any additional insurance required specifically by the Employer/Engineer at the cost of Employer.

Agency shall ensure that the insurer shall furnish to the Representative of RINL/VSP/Engineer and Employer with evidence of such insurance copy of the issued policy and any amendments thereto and prompt notification of any cancellation or termination thereof. Should Contractor default in paying any premium when due, Representative of RINL/VSP/Engineer or Employer, without prejudice to other remedies set forth in this Agreement shall be at liberty to pay such premium and recover the same from the Contractor.

Any such insurance requirements are hereby established as the minimum policies and coverage which Contractor must secure and keep in force. Contractor shall at all times be free to obtain additional or increased coverage at Contractor's sole expense.

The provisions contained within this Article are not intended and do not impair or in any manner limit the liabilities or obligation assumed by Contractor as may be set forth more fully elsewhere in this Agreement.

30. Damages to persons & property : The contractor shall (except if and so far as the Contract otherwise provides) indemnify and keep indemnified the employer against all losses and claims for injuries or damages to any person or property whatsoever (including surface or other damages to land or trees or crops being on the site suffered by tenants or occupiers) which may arise out of or in consequence of the construction and maintenance of the works and against all claims, demands, proceedings damages, costs, charges and expenses whatsoever in respect thereof or in relation to, provided always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to indemnify the employer against any compensation of damages for or with :

a) The permanent use or occupation or land by the works or any part thereof (save in respect of damages to crops as aforesaid)

b) The right of the Employer to construct the works or any part thereof on over, under, in or through any land.

c) Interference whether temporary or permanent resulting in any right or-light, air way or other assessment or quasi assessment which is the unavoidable result of the construction of the works in accordance with the contract.

d) Injuries or damages to person or property resulting from any act or neglect done or committed during the currency of the contract by the Employer, his agents, servants-other contractors (not being employed by the contractor) or for in respect of any claim demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

31. Third party Insurance : Before commencing the execution of the works the Contractor (but without limiting his obligations and responsibilities) shall insure against any damage, loss or injury which may occur to any property (including that of the Employer) or to any Person (including any employee of the Employer) by or arising out of the execution of the works or temporary works or in the carrying out of the contract otherwise than due to the matters referred to in the Provision of Clause 30 hereof.

32. Minimum amount of third party Insurance : Such insurance shall be effected with an insurer and in terms, approved by the Employer and for an amount not less the amount of ₹.50,000/- (Rupees fifty thousand only) and the Contractor shall whenever required, produce to the Representative of RINL/VSP/Engineer the valid policy or policies of insurance and the receipts for payment of the current premium. The Agency shall update the said insurance policy as per the instructions of the employer from time to time.

33. Accident or injury to Workmen: The employer shall not be liable for or in respect of any damages or compensation payable at Law in respect of or in consequence of any accident or injury to any workman or other person in the employment of the Contractor any sub-contractor save and except an accident or injury resulting from any act or default of the Employer, his agents or servants and the Contractor shall indemnify and keep indemnified the employer against all such damages and compensation (save and except as aforesaid) and against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect or in relation thereto.

34. Compliance with Statute, Regulations etc: The Agency shall conform in all respects with the provision of any such Statute, Ordinance, or Law as aforesaid and the rules, regulations or bye-laws of any local or other duly constituted authority which may be applicable to the works or to any Temporary Works and with such rules and regulations of public bodies as aforesaid and shall keep the employer indemnified against all penalties and liability of every kind for breach of any such statue, Ordinance, law, Rule, Regulation or Bye-Law.

35. Supply of Plant Materials and Labour: Except where otherwise specified by the contractor shall at his own expense supply and provide all the constructional plant materials both for temporary and for permanent works. Labour (including the supervision thereof) transport to or from site and in and about the works and other things of every kind required for the construction, completion and maintenance of the works.

36. Age limit of Labour: The age limit for employment of labour shall be in strict accordance with the existing Labour Rules & Regulations.

37. Observance by subcontractors: The contractor/agency shall also be responsible for the observance of the aforesaid provisions by sub-contractors employed by him in the execution of the contract, if any. Such sub-contractors shall be authorised by the employer.

38. The contractor/agency shall follow the provisions of Factories Act, 1948 and all rules made there under from time to time as applicable and shall indemnify the employer against all claims of compensations under the provisions of the act in respect of workmen employed by the contractor in carrying out the work against all costs, expenses and penalties that may be incurred by the employer in connection therewith.

39. SAFETY :

a) The contractor/agency and his workers must strictly take all safety precautions and shall supply to his workers dependable safety appliances like hand gloves, safety boots, safety belt, safety helmets, duster cloth, dust mask/nostril filter etc.

b) The contractor/agency shall take adequate safety precaution to prevent accidents at site. The contractor shall also ensure that his employees observe the statutory safety rules and regulations and also those laid down by the employer from time to time and promptly submit report of accident and state the measures taken by him to prevent their recurrence and also keep the employer indemnified of all claims arising out of such accidents.

c) No Workmen shall be engaged on the work without proper safety induction and without using required Personal Protection Equipment. Use of safety helmet and shoe is must excepting in painting works where shoe will not be used.

d) All the safety appliances required for safe working as decided by Safety Engineering Department/Contract operating department of RINL/VSP shall be provided by the contractor to his workmen.

e) Clearance to start the job will be obtained by the contractor in form 'A&B' before start of work. The forms may be obtained from the dept. concerned.

f) Works at height cannot be started without clearance from Zonal Safety Officer. The workers engaged for work at height shall possess height pass from Safety Engineering Department. The names of workmen working at height or in hazardous areas will be written on the body of form "B".

g) Contravention of any safety regulation of VSP in vogue from time to time will result into work stoppage, levying penalties and ultimately in contract termination.

40. LABOUR DEPLOYMENT :

A) The contractor/agency shall deploy his labour as per requirement and as instructed by the Representative of RINL/VSP/Engineer. It may be necessary to carryout the work round the clock based on requirement and shutdown provided. The contractor's rate shall cover such eventualities.

B) Only trained, experienced, safety inducted workers acceptable to the Representative of RINL/VSP/Engineer shall be engaged on this work, work shall be executed as per specifications to the satisfaction of the Representative of RINL/VSP/Engineer.

41. The contractor/agency, his supervisors and workmen shall observe entry and exit timings strictly.

42. After completion of work activity, the site has to be cleared of all debris, construction material and the like.

43. The successful tenderer shall start the work immediately after obtaining gate passes and safety induction training and clearance from the Representative of RINL/VSP/Employer.

*** * ***

NOTE: Wherever the contractor execute works in a state other than Andhra Pradesh, the concerned Department shall register with the concerned Labour Department of appropriate Government in that particular state (presently Asst. Labour Commissioner (Central), Government of India, Ministry of Labour) as a principal employer in order to issue Form of Certificate by Principal Employer (Form-V) to enable the contractor to obtain licence under the Contract Labour (Regulation & Abolition) Act, 1970 and the Contract Labour (Regulation & Abolition) Central Rules 1971 and comply with all the provisions of various statutes governing the service conditions of the contract labour in that concerned State or the contractors' particulars shall be amended at registered office, Visakhapatnam by the concerned department with labour department of approrpirate Government (presently with Asst Labour Commissioner (Central), Ministry of Labour, Government of India, Visakhapatnam) through Central Contract Labour Cell. The terms and conditions may be modified accordingly after obtaining the approval of competent authority.

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ANNEXURE.IV

Price Bid Format:

ITT No.6.13.607/WMD/0580 DT. 28/07/2016

Party Name

S.No	Item Description	Qty Accounting Unit(Kg)	Basic Price (in figures)	Basic Price (in words)	P&F Charges, if any	Excise Duty, if applicable	Excise Assessable Value	CST / VAT, if applicable	Freight & Insurance, if any	Application Charges, if any	Service Tax on Appl. Charge, if any
1	Item No.1										
2	Item No.2										
3	Item No.3										
4	Item No.4										
5	Item No.5										
6	Item No.6										

The above format should be submitted blanking all the prices along with the Techno-Comml. Bid, whichever column is applicable should be indicated as "Appl." and whichever column is not applicable should be indicated as "Not Appl.". Also the respective percentage whether extra or included for the various taxes and duties should be mentioned.

Note: Except the above details, any other condition / information if any, given in the format shall not be considered for evaluation. Specify APVAT and TIN No. if supplies are from Andhra Pradesh

Station :

Date :

SIGNATURE OF THE TENDERER / THEIR

AUTHORISED REPRESENTATIVE WITH SEAL

ANNEXURE.V

PROFORMA OF BANK GUARANTEE FOR PERFORMANCE GUARANTEE BOND

(To be submitted on Non-judicial stamp paper of value of Indian Rupees one Hundred drawn on the name of the issuing Bank)

TO BE ESTABLISHED THROUGH ANY OF THE NATIONALISED BANKS (WHETHER SITUATED AT VISAKHAPATNAM OR OUTSATTION) WITH A CLAUSE TO ENFORCE THE SAME ON THEIR LOCAL BRANCH ATVISAKHAPATNAM OR ANY SCHEDULED BANK (OTHER THAN NATIONALISED BANK) SITUATED AT VISAKHAPATNAM. BONDS ISSUED BY CO-OPERATIVE BANKS ARE NOT ACCEPTED.

To
Rashtriya Ispat Nigam Limited,
Visakhapatnam Steel Plant,
Administrative Building,
Visakhapatnam-530031

Bank Guarantee No Dt

LETTER OF GUARANTEE
WHERE AS M/s_____hereinafter referred to as the SELLER) and M/s RASHTRIYA ISPAT NIGAM LIMITED (hereinafter referred to as the PURCHASER) have entered into an AGREEMENT vide ACCEPTANCE TO TENDER No._____Dated_____(hereinafter called the said A/T) for the supply of_Chemicals(_____) hereinafter referred to as the MATERIALS) on the terms and conditions mentioned therein.

2. We, ……..... (name of bank & branch) at the request of the SELLER, do hereby undertake and indemnify and keep indemnified the PURCHASER to the extent of Rs. _____(Rupees_____)against any loss or damage that may be caused to or suffered by the PURCHASER, byreason of any breach by the SELLER of any of the terms and conditions of the said A/T and/or in the performance of the said A/T by the SELLER. We agree that the decision of the PURCHASER as to whether any breach of any of the terms and conditions of the said A/T or in the performance thereof has been committed by the SELLER and the amount of loss or damage that has been caused to or suffered by the PURCHASER shall be final and binding on us and the amount of the said loss or damage shall be paid by us forthwith to the PURCHASER on demand and without protest or demur.

3. We, ……. (name of bank & branch) hereby further agree that the guarantee herein contained shall remain in full force and effect during the period that would betaken for satisfactory performance and fulfillment in all respects of the saidAGREEMENT and that it shall continue to be enforceable for (a) 120 days after thedate of L/R of the last consignment of the MATERIALS under the said AGREEMENTor (b) in the event of any dispute(s) between the PURCHASER and the SELLER,until such period(s) the dispute is settled fully, whichever date is the latest and that ifany claim accrues or arises against us, …….(name of bank & branch)by virtue of this guarantee before the dates referred to at (a)

and (b) herein above,the same shall be enforceable against us, …….. (name of bank & branch), notwithstanding the fact that the same is enforced after the dates referred to at (a) or (b) herein above, whichever date is the latest, provided that notice of any such claim has been given by the PURCHASER before the dates referred to at (a) or (b) herein above, as the case may be. Payments under this LETTER OF GUARANTEE shall be made promptly upon our receiving the notice to that effect from the PURCHASER on demand and without protest or demur.

4. We, …… (name of bank & branch) undertake not to revoke this Guarantee during its currency without the prior written consent of the PURCHASER.

5. We, …….. (name of bank & branch) hereby further agree that the PURCHASER shall have the fullest liberty, without affecting in any manner our obligations here under, to vary any of the terms and conditions of the said A/T or to extend the time of performance of the said A/T by the SELLER from time to time or to postpone for any time or from time to time any of the powers exercisable by the PURCHASER against the SELLER and to forbear or to enforce any of the terms and conditions relating to the said A/T and We, ... (name of bank & branch) shall not be released from our liability under this Guarantee by reason of any such variation or extension being granted to the SELLER or any forbearance and/ or omission on the part of the PURCHASER or any indulgence by the PURCHASER or by any other matter or thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of so releasing us from our liability under this Guarantee.

6. We, …….. (name of bank & branch) hereby further agree that the Guarantee herein contained is initially valid upto _____and that the same shall be extended further according to the provisions contained herein above.

7. We, ..…… (name of bank & branch) hereby further agree that the Guarantee herein contained shall not be affected by any change in the constitution of the SELLER and/ or the PURCHASER.

8. We, ……(name of bank & branch) hereby further agrees that the claims if any, against this Bank Guarantee shall be enforceable at our Branch office at Visakhapatnam situated at …….. (Address of local branch at Visakhapatnam).

"Issuance of this bank guarantee may also be got confirmed from our Controlling Branch/Office/Higher Authority (Name & Address)"

Note: The expression "SELLER" wherever appearing in this Performance Guarantee Bond shall also include the "PRODUCER".

FOR AND ON BEHALF OF

(name of bank & branch)

Signature:
Name:
DULY CONSTITUTED ATTORNEY
& AUTHORISED

*****