**NATIONAL REFINERY LIMITED**

7-B, Korangi Industrial Zone, P.O. Box 8228, Karachi-74900 – Pakistan

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**TENDER DOCUMENT**

**FOR**

**WATER TREATMENT PACKAGE**

**FY 2024-2025**

**TENDER REF: PUR/WHL-8131(A)/2024-2025**

**DUE DATE: FEBRUARY 21, 2024 AT 3:00 P.M.**

**TERMS & CONDITION**

1. This tender document is issued for inviting bids for Water Treatment Package for Cooling Towers.

2. Bids are invited as per the terms and condition as contained in the following clauses of this tender document.

3. In this tender document, wherever the term “NRL” is used will mean “National Refinery Limited” as the buyer – located at 7-B, Korangi Industrial Zone, Korangi, Karachi.

4. The bid is invited on rate remaining valid for **One Year period** effective from issuance of Purchase order by NRL.

5. **Pre-Bid Meeting:**

A pre-bid meeting and visit of the cooling towers facilities for which the water treatment package is required has been scheduled, as given below, to facilitate the bidders to fully understand and ascertain the actual quantum and nature of the job and to seek any clarification before submitting their bids.

Date & Time: February 13, 2024 at 10: 00 AM

Venue: Room No. 24 Management Block National Refinery Limited Korangi Karachi.

6. Due date and time for submission of bid till **February 21, 2024 until 2: 30 PM**

7. Bids shall be opened on **February 21, 2024 at 3:00 PM**

8. **Bidding procedure:**

**Technical** and **commercial bids** enclosed in separate envelopes. Initially, only **Technical Bid** envelopes will be opened on the above specified due date & time by the bid opening committee in the presence of bidders or their representative who may wish to attend the bid opening for evaluation of technical offers against NRL’s requirement.

 The **Commercial Bid** envelopes shall retain in custody of NRL purchase department without being opened and shall be opened by the bid opening committee after evaluation and approval of technical offers. The Commercial Bids of only those bidders will be opened whose technical offers are found acceptable in the presence of NRL bid opening committee and bidders or their representative who may wish to attend the bid. The commercial bids of those bidders whose offers are technically non-responsive shall be returned (un-opened) to the respective bidders.

Note: Vendor shall submit treatment program separately for all cooling towers.

9. **Validity of Bids**:

The bids should be valid for **60 days** after due date of tender for our consideration. The validity should be extendable by another 30 days, if so required by NRL.

10. **Bid Money:**

Bid Money of Rs. 250,000/- is required to be submitted along with the Technical Bid in the shape of Bank Pay Order favoring National Refinery Limited A/C mentioned company name drawn on a first class scheduled bank of Pakistan. Bank Guarantee/Insurance Guarantee/Cash shall not be acceptable.

 The bid money of those bidders whose bids are **technically not responsive/not acceptable** shall be returned as soon as the technical bids scrutiny is completed or within two weeks after the validity period of the bids.

 The bid money of successful bidder whom order is placed shall be returned after receipt of Security Deposit / Performance Guarantee as required in clause – 11.

11. **Security Deposit / Performance Guarantee**:

The successful bidder will have to furnish Security Deposit in the shape of Bank Pay Order in favor of National Refinery Limited, drawn on a first class scheduled bank of Pakistan or a Performance Guarantee (as per format attached as **APPENDIX-1**) which should be countersigned by a first class scheduled bank of Pakistan for the amount equal to 15% of the **order value** (exclusive of GST) at the earliest possible but not later than 10 working days from the date of issue of purchase order by NRL.

12. **Supply Order:**

 12.1 Order for supply of water treatment chemicals for Cooling towers will be placed to single bidder on overall commercially lowest and technical acceptable basis.

12.2 Purchase Order shall be placed for the contract period of **one year**. However, it can be extended with the consent of NRL Management, satisfactory performance and on the same terms & condition, i.e. price remain same.

 12.3 The quantity of each type of chemicals as per daily dosage /consumption quoted by the bidder in the technical bid shall be considered.

 12.4 The successful bidder will be responsible for dosing /consumption of chemicals to monitor and maintain desired performance of water treatment chemicals for Cooling towers within the parameter of the purchase order & terms / conditions of this tender documents. If the consumption of chemicals increases not due to any reported / recorded / agreed problem at NRL end, the supplier will be responsible to supply the additional required quantity of chemicals without any additional cost to NRL. However, any increase / decrease in the dosing rate of chemicals shall be made with the written consent of NRL.

 12.5 The successful bidder is responsible to provide additional chemicals without any additional cost, in case of not meeting the criteria of controlling parameters with the initially proposed chemicals in technical offer.

 12.6 In case of any problem at NRL, the supplier will inform NRL in writing by letter within ONE working week of occurring of such problem, which has increased the chemical consumption. This letter will be evaluated by NRL Technical Services Department and the supplier will be informed regarding acceptance or rejection of their claim.

 12.7 The supplier should assign full time monitoring Engineer at site, who will be responsible for preparation of chemicals, laboratory testing of all streams of cooling towers and any other Job, which will be the required from time to time. The monitoring Engineer will also be responsible for monitoring of all process specification along with chemical consumption, preparation of daily analysis report and available stock of chemicals at warehouse and site (cooling towers areas).

**13. Supply of Chemicals**

13.1 **Supply of chemicals will be subject to acceptance by NRL**. Chemicals, if any, not accepted or rejected by NRL shall have to be replaced by the bidder within shortest possible time. In case of manufacturer / supplier, the local agent should furnish a certificate attached to their technical bid confirming to replace any **un-acceptable/ rejected supply of chemicals** as may be intimated by NRL.

13.2 Chemicals which are required on “as & when required basis” shall be supplied as per advice of NRL Technical Services dept.

 13.3 Chemicals with normal requirement shall be supplied on bi-annual basis and with the advice of technical services dept and in view of available quantities in NRL warehouse.

13.4 The vendor shall submit the certificate of analysis / Quality of supplied chemicals for the same manufacturing batch

13.5 **Sodium hypo chlorite (Free chlorine concentration 12%) and sulfuric acid (98% concentrated)** are not part of the water treatment package, therefore all bidders should quantify the requirement of these chemical for their offer package and NRL will directly purchase it from local market. However, cost of these commodity chemicals shall be part of commercial evaluation.

13.6 **ClO2 plant is installed for cooling Tower-2 & 4/5. Raw material for this plant are HCL and Sodium chlorite. App. 12000 kg of sodium chlorite is available at NRL ware house. ClO2 plant is not in operation due to some maintenance jobs. NRL desires that selected vendor must rectify the jobs and helps in startup of this unit.**

14. **Payment terms:**

Payment against supplies will be made within 21 days from the date of receipt of bills along with Delivery Challan in original duly verified/acknowledged by our Warehouse subject to technical acceptance of material by NRL team. Payment shall be made on actual consumption / requirement basis irrespective of the purchase order / proposed/ estimated quantity for defined period.

15. **Price Quotation:**

15.1 Price should be quoted in Pak Rupees. Services charges or any other charges will be included in chemical cost.

15.2 The quoted price should be valid for ONE year effective form date of issuance of Purchase order.

16. **Submission of Bids:** Bids to be submitted as under:

 16.1 **Technical Bid** should be submitted consisting of two parts as below:

**PART A**

1. Bid Money of Rs. 250,000/- in the shape of Bank Pay Order/Demand Draft favoring National Refinery Limited A/C mentioned company name as required.
2. Information as required shall be submitted by the bidder as per **APPENDIX- 2**.

 **PART-B**

1. TECHNICAL OFFER as per formats attached as SHEET- 1for offers of water treatment chemicals for Cooling towers, mentioning the name of chemicals and quantity offered as required.
2. Submit Technical literature, data sheets and MSDS along with Technical offer, showing the specification / properties / application / method of testing of the offered chemicals

 16.2 **Commercial Bid** should be submitted as per COMMERCIAL BID Formats, attached as sheet -2 with this tender document for price quotation of water treatment chemicals corresponding to chemicals offered for cooling towers, respectively. The price should be quoted as required under clause-16 of this tender document.

 16.3 Both **Technical** and **Commercial Bids**, complete in all respect and duly signed by authorized person with seal of the bidder, should be sealed in separate envelopes, respectively marked as **TECHNICAL BID** and **COMMERCIAL BID** - **for Cooling towers Water Treatment Package**. Both these envelopes should then be enclosed in a Master Envelope which should either be personally dropped in the **TENDER BOX placed** in the reception, at the Refinery’s address before the Due Date & Time All the envelopes, that is, Technical Bid, Commercial Bid and Master Envelopes should bear Bidder’s Name and duly marked and addressed as under:

 **Marked as:** TENDER BOX NO. (LOCAL PURCHASE)

 TENDER REF: PUR/WHL-8131 (A)/2024-2025

 DUE DATE & TIME: 21-02-2024 (3:00 P. M)

 **Addressed to:** MANAGER LOCAL PURCHASE

 NATIONAL REFINERY LIMITED

 7-B, KORANGI INDUSTRIAL ZONE

 KARACHI (PAKISTAN)

 16.4. Bids sent by mail/courier should reach NRL at least one day before the “Due Date & Time” of opening of bids to ensure inclusion of the bid in the tender opening. However, NRL bears no responsibility for the bids sent by mail. Further bids dispatched through mails / fax will not be entertained.

 16.5 Bids received after the Due Date & Time will not be accepted or considered at any cost.

**17. Bids Evaluation Criteria**:

Bids shall be evaluated as per following criteria:

17.1 Bids with incomplete information or without required enclosures may be rejected/not acceptable.

 17.2 Bids without required amount of Bid Money will be rejected.

 17.3 Bidder providing evidence of supplying similar chemicals to major oil and gas companies in Pakistan will be given consideration.

 17.4 Only offer from internationally renowned and financially sound bidder will be considered.

 17.5 Offers of only reputed international brands will be considered. However, locally manufactured/blended chemicals may or may not be considered.

 17.6 Past performance of the bidder will be considered while evaluating the bids.

 17.7 Local & international reference will be considered during evaluation.

 17.8 Vendor shall provide calculation / projection sheet for evaluating chemicals consumption in technical bid.

**18.** **Penalty**: Regular supply and performance of the chemicals as per the ordered specification is very essential. accordingly, in case of any deviation in the chemicals specification and delivery schedule and/or refusal to supply the chemicals/provide the necessary services for execution of the job on the subject once order is placed shall liable to:

 18.1 Cancellation of order and forfeiture/encashment of bidder’s/supplier’s Bid Money/ Security Deposit/Performance Guarantee, as the case may be.

 18.2 De-barring/de-listing of such bidders from doing business/future tendering with NRL.

 18.3 Above penalties will also be liable in case of any information/document submitted if found false or incorrect at any time after placing of order.

**19. PERFORMANCE CRITERIA**

 19.1 Consumption of chemicals as given in Technical/Commercial offers **as per Sheets 1& 2of this tender document**.

 19.2 Performance of the cooling water system as per operating conditions specified in ANNEX-3 of this tender document.

19.3 To ensure availability of chemicals as defined in this tender document.

**20. GENERAL TERMS & CONDITION:**

20.1 The supplier shall study the tender documents in detail to assess the quantum of work and type of responsibilities before bidding.

20.2 After awarding the job, the supplier shall strictly follow safety practices and procedures. This includes adequate safety arrangements for his manpower on site.

20.3 The supplier shall deployed qualified persons, who shall represent the supplier and conduct all dealings with our Technical service and Utilities Departments.

20.4 Transportation, loading / unloading and manpower arrangement will be the responsibility of the supplier.

20.5 The supplier manpower must be equipped with safety helmet, safety shoes, gloves, PPE’s etc.

20.6 The supplier shall carry out the job carefully so as no damage is done to any NRL equipment/property situated near the work site. The supplier shall be liable for any such damage or loss to NRL.

20.7 Any unsafe practice during execution of job will result in cancellation of the contract at the risk and cost of the supplier.

20.8 In case of delay in supply or sub-standard supply of chemicals, NRL reserve the right to take over the job at any stage from the supplier and get it done through other sources at supplier’s risk and cost.

**21. TECHNICAL SPECIFICTION**

NRL is looking for improved Water Treatment Package for Cooling Towers according to Water Management System, which is part of resources management, protecting environment, pollution reduction & ensuring safety.

The program must ensure water & energy conservation with optimization in chemicals consumption to achieve peak efficiency, maintaining the metallurgical integrity and equipment performance. The supplier shall be responsible for all activities including monitoring & advice on chemicals dosage, adjustment of blow downs, on-site & off-site testing, suggestions for monetary savings and plant efficiency improvements.

**The water treatment package combination of strong scale&corrosion inhibitor and polymer that must work on low flow / velocity areas to avoid settling of suspended solids. The package should also include high temperature, high stress polymer along with strong dispersant, oil** and **bio dispersant, oxidizing and non-oxidizing biocide. The surfactant should also include in the water treatment package to encounter the high suspended solid level.Whenever process heat exchangers leak,the package should be free of acid injection and does not include the metal treatment program.**

 On award of contract, the supplier will furnish the following guarantees:

21.1 The supplier will be responsible to maintain the performance of cooling water circuit equipment with respect to supplied chemicals by providing technical back-up services including regular onsite and offsite testing.

21.2 The supplier will ensure and maintain dosing of chemicals as per contract agreement. If the consumption of chemicals is increased vendor will supply additional chemicals without any additional cost to NRL. However, any increase/decrease in the dosing rate of chemicals shall be with the consent of NRL.

21.3 Performance bond equal to 15% of the total Purchase Order value (exclusive of GST) will be furnished by the vendor, and will be released after one year of successful operation, based on the results of two test runs performed at beginning and end of the year.

21.4 Before dosing of all chemical, their physical and chemical properties will be counter checked and certified by NRL laboratory as and when required.

21.5 If any contradiction arises between NRL and Supplier’s laboratory results, then on site testing with the help of Operation and Technical staff of NRL will be carried out to resolve the discrepancy and in case of dispute between NRL laboratory results and Supplier test results then third party laboratory testing will be carried out from renowned Testing company like M/s SGS etc. Chemical supplier is responsible for carrying out 3rd party testing. 04 numbers of samples will be collected under the presence of operations, Tech Services, Chemical supplier representative for NRL Lab, 3rd party and chemical supplier. One sample shall be retained by Tech services.

21.6 The monitoring schedule will be mutually prepared after selection of vendor.

21.7 All water testing will be carried out as per ASTM water testing methods.

21.8 All available chemicals of previous treatment program shall be consumed first and switching of treatment program shall be done accordingly.

21.9 Vendor shall submit the month performance report to technical services department and discuss the report on first week of every month

22. Following details are provided as **Annexure(s)** to this tender document for the selection of suitable water treatment package for NRL to achieve the desired results.

**ANNEX-1**: SPECIFICATIONS OF COOLING TOWERS

**ANNEX-2**: WATER CHEMISTRY OF MAKE-UP WATER

 **ANNEX-3**: DESIRED WATER CHEMISTERY OF COOLING WATER

**ANNEX-4**: DESIRED CONTROLLING PARAMETERS OF COOLING WATER

23. **Performance Test Run:**

23.1 Performance test run for water treatment chemicals for Cooling Tower shall be carried out as per operating conditions given in ANNEX-3 and to achieve test results as given in ANNEX-4.

23.2 Following formats as APPENDIX & SHEETS are attached with this tender document for submitting the Technical Bid & Commercial Bid as per respective formats.

**FOR TECHNICAL BID**

**APPENDIX-2**: Required information should be provided by the vendor

**SHEET-1** : For submitting Technical Bid for Water Treatment Chemicals offered and their consumption for **Cooling Towers No.2, 4/5, 3 & 313**

**FOR COMMERCIAL BID**

**SHEET-2**: For submitting Commercial Bid for the Chemicals& Quantity as offered in Technical Bid [Sheet-1] for Water Treatment Chemicals for **Cooling Towers No. 2, 4/5, 3& 313.**

24. **Please find below KPI’s of cooling water system**.

* 1. Cooling Water Corrosion rate should be less than 2.0mpy.
	2. Scaling & Fouling- Nil or negligible.
	3. Microbiological Count should be less than 10,000 cfu/ml.
	4. Heat Exchangers KPI’s i.e. Approach, Fouling Factor & Overall Heat Transfer Coefficient should remain within 10% of the clean heat exchangers values for a whole calendar year.
	5. No Biological / Algae growth on cooling tower structure and packing.
	6. Chemical Treatment Cost should remain as per recommended or agreed values for the whole calendar year.
	7. The shipment of all chemicals must be done through country of origin
	8. Representative or country manager of the successful bidder should meet concerned technical managers of the NRL and he should issue a technical report or minutes of meeting for every fortnightly visit.
	9. Representative of the multinational company should submit monthly progress report w.r.t trend of cooling water results
	10. He should also submit the monthly corrosion coupon and fortnightly TBC report.
	11. He should also contact foreign expert of their company for problem area of NRL and communicate their guideline to resolve the problems particularly leakages of the heat exchangers.
	12. The supplier should arrange ultrasonic flow meter to measure the flow velocity of cooling water system on different streams and adjust flow rate accordingly to avoid starvation in process heat exchangers.
	13. Certificate of analysis / Quality shall be provide each time of supply of chemicals.
	14. All dosing of chemical shall be done as per the NRL lab results. Chemical vendor shall test same sample with NRL lab at around 0900 hrs on bi-weekly basis (on every Tuesday and Thursday) and field testing shall be carried out on daily basis.
	15. Chemical supplier shall submit actual vs design chemical consumption report along with available inventories on first week of every month.

25. Each page of the Tender documents shall be signed by Authorized representative of the bidder along with stamp in confirmation to contexts of Tender documents**.**

26. NRL reserve the right to accept or reject any or all bids without assigning any reason whatsoever.

**APPENDIX-1**

Guarantee No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date of Issue \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Amount \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date of Expiry \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PERFORMANCE GUARANTEE**

Whereas National Refinery Limited, 7-B Korangi Industrial Area, P.O. Box No. 3964, Korangi, Karachi-4 (hereinafter referred to as the “Buyer”) has accepted the offer against advertised invitation for “Supply of “Water Treatment Chemicals” vide Tender Ref: PUR/WWHL-8131 (A)/2024-2025 Due on February 21, 2024 submitted by M/s.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (hereinafter referred to as “Seller”) on the Terms and Conditions governing the Tender Document and subsequent purchase order/letter of offer issued/to be issued by the Buyer.

And whereas the Seller has requested to issue a guarantee for an amount of Rs.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Rupees *(in words* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).

Now, therefore, in considerations aforesaid, we the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bank Limited, hereby undertake the Guarantee of due and satisfactory Performance of the Contract by the Seller in all respects and we unconditionally and absolutely bind ourselves to the following:

1. To make payment of Rs. \_\_\_\_\_\_\_\_\_\_\_\_\_ to the Buyer, or as directed by the Buyer, on the date of the receipt of demand from the Buyer in writing without reference to the Seller, and without any question whatsoever.

2. To keep this Guarantee valid and in force for the period upto \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the effective date of purchase order/letter of offer plus one month after completion of supply of the total quantity of goods.

3. To extend the Guarantee for such further period as may be required by the Buyer in Buyer’s sole discretion five days before the expiry of the validity date.

Our this Guarantee is unconditional, and the sole judge for deciding whether the Seller has supplied the goods as per Purchase Order afore-mentioned and fulfilled the Terms & Conditions of the Order, will be the Buyer.

Any grant of time or indulgence to the seller without reference to us shall not in any manner absolve us from our liability to make payment to the buyer as stipulated above under this Guarantee.

Our commitment under this Guarantee is limited in amount of Rs. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |
| --- |
| For: Full Name of Guarantor (Bank) (A First Class Scheduled Bank of Pakistan) Branch/Office Address, Phone & Fax |

 Signature Signature

 Designation Designation

|  |
| --- |
| NOTE: Do not form part of the Guarantee1. Stamp paper to be issued in the name of Guarantor.2. Stamp paper issue date should be of or before the date of issue of Guarantee.3. Contents of stamp of vendor should be legible.4. Date of Expiry of Guarantee should be determined by NRL.5. Prior approval from relevant department of NRL to be taken in selection of Name of the Guarantor. |

**APPENDIX-2**

# INFORMATION REQUIRED FROM THE VENDORS

**TECHNICAL BID** (PART-A)

Required information should provide by vendor:

1. Local Company/Agent: Registered Name, Address, Telephone& Fax Numbers, E-Mail, etc. and Company profile.

2. Foreign Principal: Name, Address, Telephone & Fax Numbers, Mailing Address, E-Mail, etc. and Company profile.

3. Detail of experience, including reference list of end-users/refineries inside and outside Pakistan and their performance certificate.

4. Detail of local technical back-up services, such as resource manpower, their status, qualification and experience of technical staff regarding monitoring and testing of similar water treatment systems.

5. Status/details of laboratory setup in Karachi and list of laboratory and portable equipments for water testing. NRL team of engineers will visit the local laboratory facilities.

6. Letter of Authorization (hard copy in original) from manufacturer/principal in favor of local agent/supplier.

7. Letter of Authorization from the Principal that the local agent has the required capability in terms of equipment and human resource for monitoring of the water system.

8. Details of financial health of the principal and local company with a copy of bank statement, audited accounts of last 12 months.

9. National Tax number, status and registration date.

10. No litigation certificate by the company.

11. Any other information, which may be considered by the company to entitle them for pre-qualification.

12. Vendor will be responsible to monitor, preparation of their chemicals on daily basis, along with technical reports of cooling water system and must be submitted to concern dep’t, He will also assigned full time technical person at NRL site for close monitoring and performance of their chemicals.

13. All vendors must submit concentration of polymers along with offered chemicals from their foreign principal and successful bidder should also mention it in the each shipment of their chemicals to NRL.

NOTE: 1) Bids received with incomplete information will not be considered.

2) Any information/document submitted if found incorrect/false at any time will result in cancellation of order if placed on the party.

**ANNEX-1**

**SPECIFICATIONS OFCOOLING TOWERS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sr.#** | **Parameters** | **Unit** | **CT-2** | **CT-3** | **CT-4/5** | **CT-313** |
| 1 | System volume  | m3  | 1100 | 2700 | 2350 | 2270 |
| 2 | Re-circulation rate  | m3/h | 950 | 1600 | 1250 | 1525 |
| 3 | Delta T  | C | 4 | 5 | 4 | 5 |
| 4 | COC | No.  | 4  | 4 | 4  | 3.0 |
| 5 | Service unit |  | Fuel Refinery | Lube-2 | Lube-1 | Phase-1 |
| 6 | Metallurgy |  | CS | CS | CS, Cu | CS, SS |

**ANNEX-2**

**WATER CHEMISTRY OF MAKE-UP WATER**

|  |
| --- |
| **Make-up Water** |
| **Sr.#** | **Parameters** | **Unit** | **Range** |
| 1 | PH |   | 7.5 - 8.2 |
| 2 | Total Alkalinity as CaCO3 | ppm | 80 - 140 |
| 3 | Calcium as CaCO3 | ppm | 80 - 120 |
| 4 | Magnesium as CaCO3 | ppm | 60-100 |
| 5 | Total Hardness as CaCO3 | ppm | 140 - 220 |
| 6 | Chloride ppm as CI  | ppm | 80 - 120 |
| 7 | TDS | ppm | 350 - 500 |
| 8 | Conductivity  | uS/cm | 550 - 800 |
| 9 | Suspended solids | ppm | <10 |

**ANNEX-3**

**DESIRED WATER CHEMISTRY OF COOLING WATER**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr.#** | **Parameters** | **Unit** | **Desired Range** |
| 1 | PH |   | VTS |
| 2 | Total Alkalinity as CaCO3 | ppm | VTS |
| 3 | Calcium as CaCO3 | ppm | VTS |
| 4 | Magnesium as CaCO3 | ppm | VTS |
| 5 | Total Hardness as CaCO3 | ppm | VTS |
| 6 | Chlorides | ppm | VTS |
| 7 | TDS | ppm | VTS |
| 8 | Conductivity  | uS/cm | VTS |
| 9 | Suspended solids  | ppm | <30 |

Note: Vendor to specify (VTS) the desired range of cooling water parametersbased on the treatment program

**ANNEX-4**

**DESIRED CONTROLLING PARAMETERS**

|  |
| --- |
| **Controlling parameters** |
| **Sr.#** | **Parameters** | **Unit** | **Range** |
| 1 | O- Phosphate | ppm | 3 – 5 |
| 2 | Total Iron | ppm | <1.0 |
| 3 | TBC | CFU/ml | <103 |
| 4 | RSI | ppm | 5-6 |
| 5 | LSI | ppm | 0.5-2 |
| 6 | Free Chlorine | ppm | 0.2 - 0.3 |

Note: Vendor shall specify the range of controlling parameters based on their treatment program

SHEET-1

**CHEMICAL CONSUMPTION FOR COOLING TOWER**

# TECHNICAL BID

######  Basis: 365 days/year

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr. #** | **Chemical Name** | Function | Initial / Switch over dosage | Regular Chemical Consumption | Total Consumption |
|  |  |  | **CT-2, kg**  | **CT-3, kg**  | **CT-4/5, kg**  | **CT-313, kg** | **Total, kg** | **Duration** | **Total, kg** | **CT-2 Kg /day** | **CT-3 Kg /day** | **CT-4/5 Kg /day** | **CT-313 Kg /day** | **Total /day** | **Total / year** | **Kg / year** |
|  |  |  | **A** | **B** | **C** | **D** | **E** | **F** | **G****(E x F)** | **H** | **I** | **J** | **K** | **L (A+B+C+D)** | **M (L x 365)** | **G + M** |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 | Sodium hypochlorite | Control biological growth |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 | Sulfuric Acid | PH adjustment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

 1) Quantity of Initial/switchover dosage to be kept separate from regular consumption of chemicals.

 2) Duration of Initial /switch dosage should be specified.

3) Chemicals of previous programme shall be consumed first and then switch over to new programme.

NAME & ADDRESS OF BIDDER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PHONE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ FAX: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SIGNATURE & SEAL OF BIDDER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**SHEET-2**

**CHEMICAL CONSUMPTION FOR COOLING TOWER**

# COMMERCIAL BID

######  Basis: 365 days/year

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sr. #** | **Chemical Name** | **Total Initial / Switch over Dosage** Quantity to be specified by bidder as quoted in Technical Bid | **Total Regular Consumption for One Year** Quantity to be specified by bidder as quoted in Technical Bid | **Combined Total Consumption for One Year**[Initial / switch over + Regular] | UNIT PRICE | **AMOUNT** **[For combined total Qty. for One year]** |
|  |  | **A** | **C** | **D** = A+B+C | E | **F** = D\*E |
|  |  | Kg. | Kg /Year | Kg | PKR/kg | PKR |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |
| 9 | Sodium hypochlorite |  |  |  |  |  |
| 10 | Sulfuric Acid |  |  |  |  |  |

**GRAND TOTAL (PKR): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

## NAME & ADDRESS OF BIDDER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## PHONE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ FAX: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SIGNATURE & SEAL OF BIDDER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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