**Scope Of Work**

**1 Scope for clarification (pre-treatment) chemicals**

The supply, delivery and offloading of clarification chemicals for raw water and cooling water at Lethabo Power Station Water Treatment Plant for a period of 5 years “AS AND WHEN REQUIRED”.

1. **Summary of the scope**

* Supply, deliver and offload coagulant and flocculent as specified for Potable and demin water clarification.
* Do sampling (jar test) and submit reports to Eskom on monthly basis, provide technical support for plant optimization and recommend dosages as and when required to achieve required turbidity and organic removal specifications.
* Provide test methods used to test the active ingredient of the supplied chemicals.
* Attend quarterly meetings at Lethabo Power Station Water Treatment Plant
* Provide Personal Protective Equipment (PPE) for their employees
* Supply certificates of analysis, and Safety Data Sheet (SDS) during delivery.
* Supply, deliver and offload coagulant and flocculent for Concentrated Cooling Water

(CCW) treatment

1. **Delivery**

The supplier must ensure that the transport vehicle complies with all the legislative requirements for transporting of chemicals. The supplier is responsible for any environmental damage caused by any spillage while transporting or offloading the product.

The supplier will be held responsible for any damages to Eskom property either due to bad handling of the transport vehicle or offloading equipment.

Delivery shall be made to Lethabo Power Station Water Treatment Plant on the date specified by

Water Lethabo Power Station representative.

The size of the tankers to be considered due to limited turning areas and on-site road conditions. The supplier must acquaint themselves with the condition of the access roads, delivery points to ensure effective deliveries and offloading.

The delivery vehicle must be fitted with the necessary equipment to offload into storage tanks. In the event that product does not comply with specification the supplier will be responsible to discard inferior batch and replace the batch. All the consequential costs as will be at the suppliers

account.

1. **Equipment**

The equipment installed on site is as follows: Flocculent Dosing Pumps (Poly electrolyte) for CCW:

Operating Conditions:

• Liquid: 2% Flocculent Solution

• Temperature: Ambient

• Viscosity: 30/40 cp

• Flow (l/hr):100-1000 (±3% Accuracy) Materials:

• Cylinder or head: 316L SS

• Diaphragm: Hypalon

• Valves: 316L SS

• Valve seat: 316L SS

Flocculent Dosing Pumps (Poly electrolyte) for Potable and Demin Water: Operating Conditions:

• Liquid: 2% Flocculant Solution

• Temperature: Ambient

• Viscosity: 30/40 cp

• Discharge pressure (kPa) : 400

• Flow (l/hr):35-350 (±3% Accuracy) Materials:

• Cylinder or head: 316L SS

• Diaphragm: Hypalon

• Valve seat: 316L SS

Coagulant Dosing Pump (Ferric Chloride) for CCW:

Diaphragm pump, Capacity 49 LPH, PP head, PTFE Diaphragms, Pyrex ball valve, PVC seat, FPMO rings.

Coagulant Dosing Pump (Poly Aliminum Chloride) for Potable and Demin Water

**Note:**

- Cooling water flocculent dosing tanks are already available

- It remains the responsibility of the supplier to familiarise themselves with all equipment, storage tanks and layout for delivery.

1. **Flocculent and Coagulant Requirements**

Chemicals to be supplied

Bulk chemical : ferric chloride

Form: liquid

Container: bulk ferric iron: 14% m/m min, ferrous iron: 0.5%m/m min speci gravity: 1.45 free acid:

0.5% m/m max material

Bulk chemical: coagulant -poly aluminium chloride or aluminium chlorochydrate

Form: liquid

Bulk chemical: flocullent – polyelectrolyte- nonionic

Form: liquid

**4.1 Potable & demin water clarification**

- Pure Poly aluminium chloride (PAC) or hydrate

- Polyelectrolyte (nonionic same for CCW)

- Approximate volume to be treated is 400 Ml per month

Note:

Coagulant storage facilities hold 20 000 liters. Flocculent storage facilities hold 19 000 liters.

**Factors of importance**

- Turbidity removal

- Removal of organic material

- Must have no negative effect on RO/demin processes

- Coagulant shall not to be Aluminum Sulphate based.

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- Polyelectrolyte flocculants shall not exceed 1 mg.kg-1.

- The coagulant and flocculent shall be supplied as separate products and not as a single product application, no blends shall acceptable.

- Chemicals shall only be supplied in liquid form

- NSF/ANSI 60 Certification

**4.2 Concentrated cooling water treatment (CCW)**

- Pure coagulant (ferric chloride)

- Polyelectrolyte (nonionic same for potable)

- Approximately volume to be treated is 4000 to 6000 Ml per month

Note: Ferric storage facilities hold 45 000 liters.

- **Factors of importance**

- Assist with lime softening, the clarifiers operate at pH 9.4 to 9.8 normally but the clarifiers can also be used for turbidity removal and operated at pH 8.4

- Alkalinity removal

- Turbidity removal

- Removal of organic material

- Must have no negative effect on Reverse Osmosis (RO) process

- Must minimize the addition of salts

**Product Quality and Tolerance (applicable to all chemicals):**

The product may not deviate by more than 2% from the percentage active ingredient in the SDS.

1. **General Requirements**

The contractor is expected to do the following:

- Supply, deliver and offload the chemicals

- Conduct monthly on site optimization testing

- Submit the SDS and Chemical certificates of analysis with each delivery.

- Attend meetings on quarterly basis.

- Provide PPE for their employees and ensure that their worker use the appropriate personal safety equipment at all times while on site.

- The supplier will be responsible for off-loading.

- Weigh bridge certificates to be supplied with every delivery and to go over the Lethabo weigh bridge before coming on site and when leaving site.

- Delivery to be arranged for daylight hours, ideally between 8:00 and 14:00.

- To supply emergency plan(s) e.g. for spillage.

- All chemical spills to be reported to the Snr Supervisor and/or plant operating personnel.

- Conduct a risk analysis before the first delivery and supply copy to Eskom.

- Conduct job observation at least every 6 months and supply copies to Eskom.

- Appropriate PPE to be worn by offloading personnel prescribed by the SDS for the specific chemical.

- Driver to contact staff member prior to offloading.

- A safety plan covering the transport, handling, emergency procedures, security of supply contingency measures, safe disposal of non-compliant product and other relevant information must be provided to Eskom.

- Proof of ownership of delivery vehicles (vehicle make, model, year, vehicle mass, vehicle registration number, vehicle roadworthy status) must be submitted. (If the transport is being outsourced, an agreement of transport to be submitted with detail of fleet).

- Security of supply – are measures in place to continue local supply

- Indicate relevant past/current experience –

o Brief description of contract

o Start and end date

o Value of contract awarded

o Number of tons supplied per year

o Name of where the chemical was used

o Awarder of contract

o Contact person of awarder

o Analysis of plant parameters

1. **Consumption rates**

The following table indicates the estimated requirements per annum. Eskom does not guarantee the purchasing of these quantities as it might increase or decrease.

|  |  |
| --- | --- |
| Chemical | Approximate tonnage per  month |
| Coagulant | 20 |
| Flocculent | 10 |
| Biocide | 1 |
| Bio-dispersant | 1 |