Chapter – c

Maintenance

The routine maintenance of filter includes the following:

3.1 Valves

At periodic intervals (say one month) open the valves and check for Seating, change gland packing or diaphragm depending on the type of valve. Carry out lubrication of spindle.

3.2 Extended backwash

Once in a week the backwash should be given for more time say at least for 45 Minutes. This will help to keep the bed clean.

3.3 Air Scouring & Cleaning of Media

The manhole should be opened once in 6 months and the condition of media should be checked. Any lumps formed on the top of bed should be thrown away.

On units where no regular air scouring is provided; air scouring is done as follows:-

1. If compressed air supply is available, take a temporary tapping (say 1" hose). Attach the hose to a M.S. pipe about 1 meter long. The water level inside the vessel should be about 3" above the bed. The pipe is inserted into the bed till it is half way through the bed. The media will get violently agitated. Move the pipe all over the bed Carry out the air scour for a period of 10 minutes.

2. After the air scour carry out an extended backwash. This extended backwash also called open manhole backwash is given very carefully.

3. Drain the bed till the surface of the bed and scrape of all the dust.

4. Close the manhole.

3.4 Vessel condition

Once a year vessel internal condition should be checked for paints and internals re-paint the vessel after removing the media. Filter media replacement can also be done if required. Filter media is replaced normally once a year.

The routine maintenance guidelines are given both for mild steel filters as well as FRP filters. FRP filters normally require less attention once installed. Operational care is a must for FRP Filter. The pressure should not be more than the recommended pressure or it is likely to damage the filter. FRP filters are of molded design and hence repair is not possible and has to be replaced.

The permanent hardness is found by boiling the water. IT is cooled and then above procedure repeated. Temporary hardness is given by the difference of two readings.

Interference

If bicarbonate exceeds 250 PPM it is advisable to add 1ml of 2N HCL before adding the buffer solution. Any other metal ions chelating with EDTA can interfere with the result provided they are in excess then mentioned below

Al^{++} > 20ppm, Cu^{++} > 20ppm, iron (Fe^{++} or Fe^{+++}) > 10 PPM PO3 >25ppm.

Calcium Hardness

The water sample is titrated against EDTA solution using MUREXIDE INDICATOR (Ammonium perpetrate) in highly alkaline medium.

Reagents

1. 1N Sodium Hydroxide Solution
2. 0.01M Standard EDTA Solution
3. Murex idée Indicator.

Apparatus required

1. Porcelain dishes 100ml capacity.
2. Burette 25 to 50ml
3. Pipettes
4. Stirring rods (Glass)
5. Graduated cylinder.

Procedure:

1. Prepare standard solution as described in chapter.
2. Prepare a color comparison blank in a porcelain dish. The dish should be of white color 2.0ml of IN NaOH and 0.2g (4 to 6 drops of indicator) solid indicator is added to 50ml of distilled water with constant stirring 0.05 to 0.1ml of EDTA titrant is added to produce unchanging purple color.
3. 50ml of sample solution is pipette into similar white dish.
4. Add few drops of 0.02 N HCL to neutralize the alkalinity.
5. Boil for 2 to 3 minutes to expel CO2 and then cool to room temperature.
6. Add 20ml of 1N NaOH or volume sufficient to produce pH of 12 – 13 and mix.
7. Add 0.2gm of powdered indicator or 4 to 6 drops of solution.
8. Stirring constantly titrate with EDTA solution to the colour of comparison blank.

9. Add 1 to 2 drops of titrant in excess to be sure that no further deepening of colour takes place.

Calculation

$$\text{Calcium as ppm } CaCO_3 = \frac{(A-B) \times C \times 1000}{\text{Ml of sample}}$$

Where A = ml of EDTA required for titration of sample.
B = ml of EDTA required for titration of blank.
C = mg of $CaCO_3$ equivalent to 1.0 ml of EDTA.

Magnesium Hardness: The difference between Total Hardness and Calcium Hardness is magnesium Hardness.

Caution: Laboratory Testing should be done only by qualified personnel. The person should verify the method before testing

SYSTEM OPERATION:

OPERATING GUIDELINE:

All the system pipe work are to be lined up properly before commissioning of any part of the system such as pre-treatment, All the valves are tagged for easy identification for closing and opening as per the guidelines provided in our comprehensive operation & maintenance manual.
Pressure Sand Filter is powered by the energy of moving water. The tanks offer 24 hr. service and trouble free operation. When one tank is exhausted, service automatically switches to the other while the first backwashes,
All the equipments are to be started after ensuring the system's pipe work and vessels is full of water and free of air.

Water samples from different stages of the treatment plant are to be taken regularly checking TSS, Hardness, TDS, and Conductivity of water from RO product water, Filter water, and raw water to assess the performance level.

Detail recording of the plant parameters in standard log sheets, to check and review the performance of the plant as well as to observe for any abnormalities.

All the system pipe work are to be lined up properly before commissioning operation of any part of the system such as pre treatment , All the valves are tagged for easy identification for closing and opening as per the guidelines provided in our comprehensive Operation & Maintenance Manual

Multi Media filters are to be backwashed for 15 minutes at the rated flow once in a day or if the pressure drop across the vessel exceeds 0.5 kg/cm2 whichever is earlier.
All the chemical solution for Pre-filtration is prepared at the right concentration and dosage at the right capacity to achieve desirable water quality.

All the equipments are to be started after ensuring the system's pipe work and vessel is full of water and free of air.

Water samples from different stages of the treatment plant are to be taken regularly for checking Hardness of water from MMF and outlet Water softener to assess the performance level

Detailed recording of the plant parameters in standard log sheets, to check and review the performance of the plant as well as to observe for any abnormalities.

PRECAUTIONS TO BE TAKEN:

1) Ensure that all fittings as shown on the enclosed "Flow Diagram and General Layout Drawing" are intact and that there is no damage done in transit

2) Ensure that the screwed joints for pressure gauge connections are made leak tight by using Teflon tape or fit-tight compound or o-ring.

3) Before taking the water inside the vessel, rotate valve handle to the position 'Bypass to Drain' & let raw water flush the pipeline till the water is clear. This will ensure that any debris is removed from the system.

4) Ensure that the inlet and outlet piping is properly supported.

General Maintenance

The water treatment plant should be inspected externally every six month and any damaged on vessels, pipe work and valves renewed.

An internal inspection of vessels is also recommended every six month, although this period could be extended if service experience indicates that a longer period would not jeopardize this preventative maintenance.

Consequently when removing scale on such items (eg. Bulk storage tanks, measuring and dilution tanks) exercise caution. If there is any possibility of a break-through consult the Water Treatment Plant Chemist or Engineer. If the internal and external inspections are carried out systematically at regular intervals, and a record kept of any work carried out systematically at regular intervals, and a record kept of any work carried out, there will be little likelihood of the unexpected happening.

If it is necessary for maintenance personnel to enter any of the treatment units, rubber or soft soled shoes must be worn and great care taken to avoid damage to any rebber lining and internal lateral systems. The feet should be place on the lateral clamping bars, not on the laterals themselves and every effort taken to avoid standing on the small plastic strainers. Entry into the vessels should be discouraged, but if unavoidable, must be carried out under the supervision of the WATER TREATMENT PLANT Chemist or Engineer.

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WTP PLANT

DOS	DO NOT DO'S
EVERY DAY DO THE BACK WASH	DON'T DRY RUN THE PUMP.
AND RINSING	
ADD THE CHLORINE IN DOSING	DON'T OPERATE THE VALVES
TANK REGULARLY.	WHILE PUMP RUNNING.
CHECK THE HARDNESS VALUE	DON'T RUN THE PUMPS
EVERY DAY.	CONTINUIOUSLY EVERY FOUR
	HOURS CHANGE THE PUMP.
AIR SHOULD REMOVE FROM THE	
PRESSURE SAND FILTER THROUGH	DON'T REACH THE PRESSURE
AIRVENT	ABOVE 2 KG .
WHEN THE PRESSURE INCREASES	DON'T FALLING THE WATER ON
DO THE BACK WASH REGULARLY	FILTER FEED PUMPS
CHANGE THE SAND MEDIA IN	DON'T CHANGE THE PH VALUE
SAND FILTER EVERY 12 MONTHES	RANGE 6.5 -9.5.