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|  | **APARNA PROPERTY MANAGEMENT SERVICES PRIVATE LIMITED**  **STANDARD OPERATING PROCEDURE FOR STP OPERATION** |

**Objective:**

Standardize procedure for operation of Sewage treatment plant to obtain maximum efficiency.

**Policy:**

To ensure that plant is operated for the purpose which the plant was installed.

**Responsibility:**

STP operator / Shift Engineer

**Procedures:**

1. Check bar-screen chamber. Clear it from clogging materials if any.
2. Check the water level of equalization tank. Always maintain a proper level.
3. Start Air Blowers for aeration of the sewage in Equalization tank and for other systems.
4. Start Raw Sewage pumps and ensure that raw sewage water is transferred to the SBR tanks rapidly and continuously till the SBR tank is full to free board level depending on the inflows into the equalization tank. This process boosts the growth of certain micro-organisms with better settling characteristics.
5. Ensure for proper operation of air blowers.
6. Stop the raw sewage pumps to start the reaction phase. Allow the aeration to continue for the prescribed time, the reactor is aerated allowing the waste water to undergo further process of oxidation and nitrification.
7. Stop the SBR air blowers after the prescribed time. By suspending the Air blowers, solids are allowed to settle to the bottom of the tank.
8. After the settling phase, supernatant water is transferred from the SBR to the decant tank by decanter mechanism.
9. Clean SBR tank surface area from any algae formation or clogging materials.
10. Check fluidized sludge from the bottom is transferred/ drained periodically from SBR to sludge holding tank.
11. Let the SBR be idle for few minutes and start the next cycle by starting the raw sewage pumps.
12. Fix liquid chlorine dosage to disinfect the treated water.
13. Start transfer water pump i.e. filter feed pumps for filtration through PSF (Pressure Sand Filter) and ACF (Activated Carbon Filter).
14. Check pressure drop in the filters and back wash the filters if the drop across the filters is more than 0.2Kg/cm2
15. Test quality of water and treated water for its designed TDS, BOD level and pH value.
16. Check Hydro Pneumatic System for proper supply of irrigation & flush water.
17. Check and ensure the working of drain pit de-watering pumps. Divert water from the drain pit chamber when required.
18. Check sludge volume in sludge holding tank (SHT). Divert the excess water to SBR/Equalization tanks. Check for suspended solids in SHT by settling test. If adequate quantity is available, start centrifuge feed pumps.
19. Collect the output de-watered sludge in a tray and recycle the liquid output to Equalization tank.
20. Record parameters in the log sheet.

**Backwashing the Filter:**

Backwashing the filters to wash out the dirt accumulated on top of the filter beds is an essential part of the operation routine. The frequency of backwash depends upon the turbidity of the water to be filtered. The filter is provided with a gauge panel on which are mounted two pressure gauges connected to the inlet and outlet of the filters. The difference in the gauge readings will indicate the loss of head through the filters. Normally, a head loss of 6 feet (3 PSI) is allowed and if it exceeds, backwashing has to be taken up.

Backwashing is done by sending a current of water at a high rate through the filter bed in a reverse upward direction. The high velocity agitates the filter sand bed, loosens and carries away the accumulated dirt out through the backwash drain pipe.

**Procedure for Backwashing the Filter:**

This consists of the following steps:

* Close all valves of the filter and stop the pump.
* Open Backwash inlet and outlet valve **V3** & **V4** fully.
* Start both pumps and immediately open their delivery valves fully. Observe the dirty water coming out of the drain pipe. This backwashed water can be let into the Equalization tank.
* Continue the operation until the water coming out is clear.
* Stop the pump and close the valve **V3** & **V4**.

**CAUTION:**

The filter beds should not be allowed to become dry at any time. Otherwise under dry conditions, the filter media will cake up. Afterwards it becomes difficult to break it by back washing. Whenever, the filter is to be shut down, close all valves tightly and lock up the water inside the filter.

Leaky valves & joints should be attended immediately. An efficiently backwashed filter will show a head loss of 1 to 2 feet at normal flow. In due course, due to accumulation of dirt on the filter bed, the head loss increases. When it reaches 6 feet or 3 psi or 0.2 kg /cm2, the filter has to be backwashed immediately. Do not operate for long periods at high head losses.

**NOTE:**

Life of the activated carbon depends upon the quality of feed inlet from the pressure filter. When the carbon bed is exhausted, it has to be replaced. It is anticipated that the carbon bed will last minimum 6 months.

**ACTIVATED CARBON FILTER:**

The filter water from the Pressure Sand Filter passes through an Activated Carbon Filter which comprises of Vertical Pressure vessel, perforated plates fitted with polystyrene strainers at the bottom, top and in between the filter media comprising 900 mm deep Activated Carbon granules over a bed of Graded Gravel. Outlet is led to final sump. One on line chlorine solution is dosed into the line for disinfection before disposal.

**PROCEDURE FOR AC FILTER INTO NORMAL OPERATION:**

To operate Activated Carbon filter procedure as under

* Keep all the valves of the A.C. Filter closed.
* Open valve **V6.**
* Water flows into the Carbon Filter.
* After ensuring that the Filter is full and under pressure open the outlet valve **V7.**
* Filter is now in operation and the inlet water flows through the Carbon bed. This will result in absorbing Residual odor and color if any.

**BACKWASH THE A.C. FILTER:**

Backwash the carbon filter periodically as it is necessary to remove any dirt and to thoroughly agitate and homogenize the carbon bed. This may be done once as a routine. The strainers on the top of the filter prevent the carbon granules from getting washed out and only the fine particles are washed out.

**Proceed as follows:**

* Keep all valves of the Carbon Filter closed.
* Open the backwash inlet valve **V8.**
* Start the filter feed pumps and the Pressure Filter in normal mode.
* Now open the backwash drain valve **V9.**
* Carbon filter backwash is now on.
* Backwash for about 5 to 10 minutes should be sufficient.
* After backwash close all valves and stop the pump.

**TO SHUT DOWN THE A.C. FILTER**

Close inlet and outlet valves **V6 & V7.**

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# Safety Precautions

1. Never descend into any tank for whatsoever reason, unless another operator is also present.
2. Check and ensure the safety guards are intact.
3. DO NOT Carry out any work while pump is in operation.
4. Exercise care while making up chemical solution for dosing. Use appropriate safety equipment.
5. Keep and maintain coupling guard, motor covered at all the times.
6. When working on Air Blowers, Motors and Pumps, switch off respective motor at the panel.
7. Never run the pumps with Inlet and Outlet valves closed.
8. Lock Out/Tag Out the power supply from incoming feeder before commencing any maintenance.
9. Care must be taken while opening rusted nut bolts which are prone to be broken / cause slippage.
10. Ensure thorough cleanliness of the area before and after the maintenance work.
11. While inspecting the pumps/blowers in operation, keep safe distance.

**Revision Guide:**

Any change in the system needs review of SOP.

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