

EXAMPLE TEMPLATE

Drinking Water Filter Backwash

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I. Scope

Purpose:

Suspended material in the water must be removed by passing the water through a bed of granular material called filter media. Filter media is contained in the filter units. Over time materials removed from the water build-up in or on the filter media and the filter must be backwashed by reversing the flow of water through the filter media to remove the entrapped solids and thereby maintain filter effectiveness and efficiency.

Location:

Filters - In the center floor area of the ground floor of the Main Control Building
Filter Control Panels - At the north end of each filter

Normal Operating Range: Filter

Filter Effluent Turbidity < 0.10 NTUs
Filter Headloss < 9 feet

II. Applicability

Personnel with one (1) months or more experience as a Water Operator I, or personnel having completed the in-house operator training program - "Water Operator I Training".

III. Summary

Upon an automatic or manual shutdown of the filter turn both switches to the OFF position on the filter control panel. Manually open the filter effluent valve and drain filter. Manually close filter effluent. Complete Filter Performance Sheet and also Daily Plant Operational Log on the plant computer. Check and ensure equalization tank is empty. Call Wastewater Plant (123-4567). Initiate backwash of the filter. Hose down the filter walls. When filter backwash is complete reset filter panel switches and the pneumatic actuator switches. Reset Alarm 1 to setting on turbidimeter to "99.0". When at least 3 steps are showing in the backwash equalization tank, turn both clarifier toggle switches to the ON position. Close lid on backwash equalization tank.

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IV. Definitions

Backwashing - The process of reversing the flow of water back through the filter media to remove the entrapped solids.

Head - The vertical distance (in feet) equal to the pressure (in psi) at a specific point. The pressure head is equal to the pressure in psi times 2.31 ft/psi.

Head Loss - The head, pressure or energy (they are the same) lost by water flowing in a pipe or channel as a result of turbulence caused by the velocity of the flowing water and the roughness of the pipe, channel walls or restrictions caused by fittings. Water flowing in a pipe loses head, pressure or energy as a result of friction losses. The head loss through a filter is due to friction losses caused by material building up on the surface or on the top part of a filter.

Turbidity - The cloudy appearance of water caused by the presence of suspended and colloidal matter. In the waterworks field, a turbidity measurement is useful to indicate the clarity of water. Technically, turbidity is an optical property of the water based on the amount of light reflected by surrounding particles. Turbidity cannot be directly equated to suspended solids because white particles reflect more light than dark-colored particles and many small particles will reflect more light than an equivalent large particle.

Turbidimeter - An instrument for measuring and comparing the turbidity of liquids by passing light through them and determining how much light is reflected by the particles in the liquid. The normal measuring range is 0 to 100 and is expressed in Nephelometric Turbidity Units (NTUs).

V. Triggering Mechanisms

- ◆ Effluent turbidity spike > 0.10 NTU
- ◆ Headloss > 9'

VI. Cautions

N/A

VII. Interferences

N/A

VIII. Health and Safety

N/A

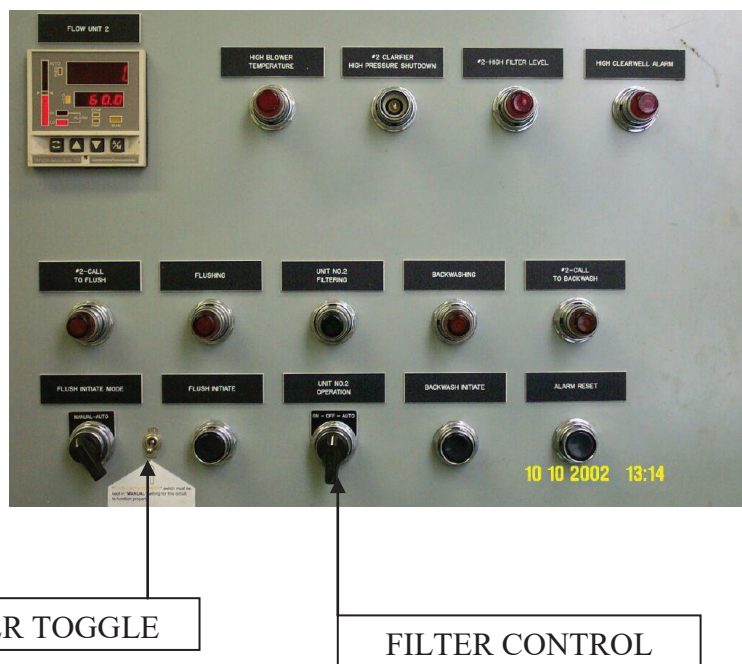
IX. Equipment and Supplies

N/A

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X. Procedures

1. If filter requiring backwash automatically shutdown or was manually shutdown due to head loss, shutdown plant by turning both filter control switches to the “OFF” position.



2. Manually force open filter effluent valve and drain filter to the first joint on the surface sweep.
3. Manually force filter effluent closed.

If filter backwash is required due to turbidity spike omit steps #2 and #3.

4. Record raw meter reading and head loss on “**Filter Performance Sheet**” and calculate filter run hours.
5. Enter backwash time on “**Filter Performance Sheet**” and also “**Daily Plant Operational Log**” in plant computer.
6. Open lid on backwash equalization tank (in parking lot); if empty proceed, if not wait until empty.
7. Call Wastewater Plant (**123-4567**) and inform personnel or leave message on machine that a backwash will be conducted.
8. Turn filter control switch to “**ON**” position while simultaneously pressing “**Backwash Initiate**” button.
9. Hose down filter walls and observe backwash sequence.

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10. When backwash sequence is complete turn opposite filter clarifier toggle switch to the **“OFF”** position and turn filter control switch to the **“ON”** position; open console door and leave open.
11. Return to the filter being backwashed and set its filter effluent valve pneumatic actuator switch to the **“MAN”** position.
12. Turn the pneumatic actuator switch on the rewash valve to the **“AUTO”** position; when this valve automatically opens and finds its position, set the pneumatic actuator switch back to the **“MAN”** position. (This holds the valve in this position.).
13. Change Alarm 1 setting on turbidimeter to **“99.0”**.
14. Observe turbidity spike during rewash and backwash equalization tank level simultaneously.
15. If turbidity spike drops below 0.30 NTU and tank is still not near the overflow, proceed to step **“16”**. (If tank is near overflow, shutdown plant and wait for tank to drain until at least 3 steps are visible, then resume filter to waste until turbidity drops below 0.30 NTU and proceed to step **“16”**.)
16. Turn effluent valve pneumatic actuator switch back to the **“AUTO”** position.
17. Turn rewash valve pneumatic actuator switch back to the **“AUTO”** position.
18. When rewash valve closes turn its pneumatic actuator switch back to the **“MAN”** position.
19. Reset Alarm 1 on turbidimeter back to **“.30”** NTU.
20. Turn filter control switch back to the **“AUTO”** position.
21. Turn opposite filter control switch to the **“AUTO”** position also.
22. When at least 3 steps are showing in the backwash equalization tank, turn both clarifier toggle switches to the **“ON”** position.
23. Close lid on backwash equalization tank.

XI. Quality Control

Turbidimeter should record less than 0.10 NTUs for filter effluent after backwash procedure has been completed.

XII. References

Filter Performance Sheet on plant computer.
Daily Plant Operational Log on plant computer.