

DOCUMENT MANAGEMENT SYSTEM
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Doc# NSCS-M-P-7091-12
 Title: Sedimentation Tanks Procedure
 Issue Dt: 12/30/2003
 Revision Dt: 08/02/2018 Review Interval: 12
 Cat: Quality Doc Type: SOP
 Auth:
 Desc: Sedimentation Tanks Procedure
 Loc: Midwest - Utilities-Midwest - Plant Maintenance-Midwest-Gary Works

STEPS**PROCEDURES**

Purpose

The primary purpose of the cross collector is to drag settled sludge to the sludge wells located in the southeast and southwest corners of each sedimentation basin.

Sludge Cross Collectors

From the sludge wells the sludge is drawn off by pumps and distributed to:

1. [REDACTED] Mix Tank influent channel via the return sludge.
2. Sludge dewatering plant (SDW).

The flow rate to the SDW is monitored by a flow meter. This flow rate is adjusted by the Operator based on the settleable solids test results, as well as visual observations of the sedimentation and equalization basins.

Sludge pumping rates should be changed as required:

**SETTLABLE
SOLIDS**

Min: [REDACTED]

Aim: [REDACTED]

Max: [REDACTED]

Adjusting Sludge
Pumping Rate

1. Check the Final Treatment Plant Operating Report for the previous 8 hours. Look for a pattern of rising or falling bed levels.
2. Check sludge flow chart, on the Honeywell Multitrend, for previous 8 hours to determine what actions were taken based on settleable solids tests.
3. Increase or decrease sludge flow rate by adjusting the return sludge chain valve. Observe the gpm flow meter to obtain the desired flow rate.
4. Once per turn, verify the sludge pump flows are balanced as follows:
 - a. close return sludge valve so all of the flow is going to SDW.
 - b. shut off east pump and note west pump gpm.
 - c. restart east pump.
 - d. shut off west pump and note east pump gpm.
 - e. restart west pump.
 - f. adjust discharge valves on pumps to obtain equal sludge levels.

Sludge Pump Rates Comments

Each sludge pump should be checked for proper operation. From the adjustment procedure above, each pump should be capable of a minimum of [REDACTED] gpm.

Sludge Flow Meter Out of Service

If the Final Treatment Plant sludge flow meter is out of service, call the SDW Operator on the phone or radio. Make sludge pump adjustments as

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needed while the SDW Operator uses the radio to inform the FT Operator of the sludge flow. This should be done once per turn at a minimum if the final treatment plant sludge flow meter is out of service.

Sedimentation Basins Sludge Percent Level Out of Balance

If the sedimentation basin sludge levels are out of balance, pinch back on the sludge pump discharge valve for the low basin or open the valve for the basin that is high. Make changes in the sludge flow rate per pump in [REDACTED] gpm increments once per hour until the basins are back in balance. See the sludge cross collectors section above for proper ranges. Out of balance sludge levels will make the treatment plant difficult to control.

Backflushing Sludge Pumps

Once per turn or more often as needed, backflush the sludge pumps.

- Open valve to S.D.W. to 100%.
- Lift counterweight on pump handle on check valve.
- Turn off pump - shaft will reverse and backflush.
- Drop handle, let shaft stop- check valve.
- Start pump.
- Repeat for other pump.

Sedimentation Tank Flare Ups Corrective Actions

Flareups are clouds of sludge that are rising to the surface of the sedimentation tank. This is an undesirable situation that indicates a light, poorly settled sludge.

As long as the flareups are in the first 1/2 of the sedimentation tank, it is not a serious problem. If the flareups are full length of the sedimentation tank, it is a serious problem.

1. Check equalization basin pH charts for the last six (6) hours looking for rapid fluctuations in incoming pH.
2. Check mix tank pH chart for last six (6) hours. Look for evidence that pH was less than [REDACTED] for extended periods of time. Also compare the grab sample pH to the observed pH on the monitoring equipment. If the grab sample test indicates the mix tank pH is less than [REDACTED] raise the setpoint on the mix tank auto controller. If the difference in pH readings is greater than [REDACTED] pH units, contact Instrument Repair for a pH calibration of the monitoring equipment.
3. Check the level in the CA day tank to ensure approximately [REDACTED] of the total tank volume is being used per hour.

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4. Check the sludge flow to SDW for last 8 hours looking for evidence of rapid and frequent changes in sludge pumping.
5. Verify sludge pumps are balanced and operating properly.
6. Check the settleable solids test results for last 8 hours.
7. Visual inspection of sludge loading. Check EQ Basin & Birdbath for physical characteristics including solids content, color & oil.
8. Secure grab sample at the midway point of the sedimentation tank and conduct total iron and pH test. Record results on the Chem Treat log sheet. If iron is below [REDACTED] mg/l, the flareups are not a serious problem unless they are carrying over the weirs. The pH test should be [REDACTED]. If not, secure a grab sample of the mix tank effluent (not the bird bath) and check the pH. If the grab sample pH agrees with the mix tank pH chart indicating low pH, increase the lime feed and monitor frequently. Check the pH at several locations north of the mix tank to see if pH is [REDACTED] but less than [REDACTED] pH.
9. Adjust sludge pumping to obtain favorable settleable solids test parameters. This will help keep the flareups from rising high enough to cause elevated TSS or iron readings.
10. Record in the treatment plant log sheet:
 - a. All observations;
 - b. Time flareups started/ended;
 - c. Location of flareups in sedimentation tank.
11. Notify Manager of the flareups as soon as possible and repeat steps 1-10 every hour until issue is resolved.

To skim oil off the surface of the sedimentation basins, use the following procedures:

Skimming Oil

1. Flights will bring oil and floatables to the skimmer tube.
2. Slowly lower the skimmer tube until it is just below the surface of the water.
3. The floating oil will flow into the skimmer tube and then into the north end pit, through the pipe to the sump where a Wilden Pump will pump it to the light oil tank.

Cleaning Strainer

A strainer is mounted on the [REDACTED] pump inlet line. When the [REDACTED] Pump begins to labor, the strainer needs to be cleaned using the following procedure:

- Shut off pump
- Close suction valves.
- Open drain and vent valves.

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- Open strainer cover and remove dirty strainer.
- Reinstall the spare clean strainer and cover.
- Close vent valves and drain.
- Open suction valves.
- Start Pump.
- Dump the contents of dirty strainer into the sludge dumpster.
- Check or Clean strainer at least once per shift.

Taking Sedimentation Tank
Out of Service

When the Manager advises that a sedimentation tank is to be taken out of service, use the procedure outlined below:

Special Environmental Note:

The following MUST be done prior to pumping down the basin:

1. Install an oil sock at Outfall 104.
2. Stock extra oil socks at Outfall 104.
3. The water leaving Outfall 004 should be checked on a regular basis every shift.
4. If oil is visible at Outfall 004, notify the Manager ASAP.

Sub-Drain Pumping:

1. Record the subdrain flow integrator/totalizer on log sheet [REDACTED]
2. Inspect the subdrain pumps for proper operation and lubrication.
3. Open the appropriate subdrain inlet valve in the north pumphouse at the [REDACTED]
 - Valve #1 for east sedimentation tank
 - Valve #2 for west sedimentation tank
4. Check Valve [REDACTED] to the sedimentation tank effluent channel. (normally locked closed)
5. Close Valve [REDACTED] to discharge drain line.
6. Check Valve [REDACTED] to the mix tank effluent channel (pipe discharge near the gate to the pretreat lift pumps, normally open).
7. Open Valve [REDACTED] which cross connects two wet wells in the north pumphouse.
8. Use the [REDACTED] pump to pump the subdrain water to the pretreat lift pump area.
9. Record the pumps "start time" in the log sheet [REDACTED] Check to ensure the subdrain integrator/totalizer readings were recorded.
10. Note the color of the water when pumping is started. It will be black or red brown. In 2-4 hours it will turn to clear water.

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11. When the pumps cycle on and off this indicates the subdrain system has been pumped empty. Record the time the pumps begin to cycle on log sheet [REDACTED]. Shut off [REDACTED] pump.
12. Close valve [REDACTED] - which cross connects two wet wells in north pumphouse.
13. At the end of each turn, record the subdrain integrator/totalizer on log sheet [REDACTED]
14. Notify the Supervisor that the sedimentation tank is ready to dewater.
15. Lower the sluice gate from the mix tank effluent channel to the sedimentation tank being taken out of service. Verify it is seated.
16. Increase the coagulant aid feed rate by [REDACTED]
17. The other sedimentation tank is now handling all of the [REDACTED] flow so the sludge pumping rates may need to be higher.
18. Leave the sludge pump ON until three (3) consecutive solids test readings are ZERO for the tank being taken out of service.
19. After lowering the sluice gate at the sedimentation tank influent, verify that Valve [REDACTED] is closed.
20. Verify valves are in the following positions: Valve [REDACTED] Open. Valve [REDACTED] Closed. Valve [REDACTED] Closed.
21. Dewater the sedimentation tank by opening the appropriate valve: Valve [REDACTED] for the east sedimentation tank, Valve [REDACTED] for the west sedimentation tank.
22. Start the south [REDACTED] subdrain pump to begin dewatering the sedimentation tank. Check to ensure the north [REDACTED] pump is still in AUTO pumping subdrain field.
23. Verify that the sedimentation tank sludge drags are left ON until the tank is completely empty.
24. Closely observe the flocculation drive paddles. Shut down the paddles as soon as the liquid level reaches the center drive shaft.
25. The sedimentation tank is considered empty just prior to the south [REDACTED] subdrain pump losing its prime. A float will shut the subdrain pump off. Verify this has happened to prevent the pump from being damaged.
26. The remaining liquid in the basin will need to be removed using a Wilden pump at the cross collectors.
27. Keep the north [REDACTED] subdrain pump ON until the sedimentation tank has been put back in service and is a minimum of half full.
28. Notify the Supervisor when the sedimentation tank is empty and ready for maintenance.

Placing a Sedimentation Tank
Into Service

When advised by the Supervisor, place a sedimentation tank into service using the procedure outline below: Note: ensure there is

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several feet between the water inlet and the first flight as too much water pressure may damage them.

1. Check to ensure the south [REDACTED] subdrain pump is OFF.
2. To fill the sedimentation tank, remove all lock outs.

West Tank

- a. open valve [REDACTED]
- b. open valve [REDACTED]

East Tank

- a. open valve [REDACTED]
- b. open valve [REDACTED]

3. Fill the tank until the water covers the concrete divider that runs the entire length of the sedimentation tank at which time the drags should then be started.
4. Open the fill valve further from [REDACTED] to [REDACTED] ([REDACTED] valve for east tank, [REDACTED] valve for west tank).
5. When the tank is at least [REDACTED] full, the fill valve can be opened to 100%.
6. Stop before water goes over weirs. Have vac truck clean off weirs before putting into service.
7. Stop the north [REDACTED] subdrain pump once the wet well is empty.
8. The cross collector and tank drags should be checked for proper operation.
9. DO NOT start the flocculation drive paddle until the center drive shaft is covered with water to avoid damage to the paddle bearings.
10. DO NOT raise the sluice gate to the sedimentation tank until the entire wall in the flocculation tank is under water to avoid damage to the floc paddles and wall.
11. Watch for oil and grease that may have floated to the north end of the sedimentation tank as it was filling. Hose it back into the main part of the tank BEFORE the weirs are under water. Have vac truck remove oil from surface before letting water go over weir.
12. Document the time the basin was put in service on Form [REDACTED].
13. Notify the Supervisor that the sedimentation tank is in service.