

## DOCUMENT MANAGEMENT SYSTEM

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Doc# NSCS-M-P-7091-10  
 Title: Mix Tank and Coagulant Aid  
 Issue Dt: 12/30/2003  
 Revision Dt: 07/20/2018 Review Interval: 12  
 Cat: Quality Doc Type: SOP  
 Auth:  
 Desc: Mix Tank and Coagulant Aid  
 Loc: Midwest - Utilities-Midwest - Plant Maintenance-Midwest-Gary Works

**STEPS****PROCEDURE****Purpose of Mix Tank**

The purpose of the Mix Tank is to treat the wastewater from the equalization basins with lime and acid to a pH of 7 to 9. This allows for the precipitation of heavy metals from the wastewater.

**Controlling Mix Tank pH**

At times, the influent wastewater pH is acidic and acid is not required to lower the pH. In these cases, only lime and return sludge are added to the Mix Tank. Acid is added whenever the incoming wastewater pH is high enough to cause the pH in the Mix Tank to exceed 8.0 after adding lime. Lime is always added since this chemical provides the "OH" ions (hydroxide ions) needed to precipitate heavy metals.

The return sludge contains large quantities of unreacted lime and precipitated metals. This sludge assists in the formation of heavy solids that readily settle in the sedimentation basins. Without the return sludge, larger quantities of chemicals would have to be added to the Mix Tank to adequately treat the wastewater.

**Control Limits**

The following control limits should be used for the mix tank and coagulant aid feed system at the Final Treatment Plant.

Mix tank pH aim: 7 to 9 pH  
 pH cross-check potable to on-line: within 0.5 pH  
 Run Blowers: 55 amps  
 Coagulant aid feed rate: min: one day tank per shift  
 max: two day tanks per shift

**Raw Polymer Warnings and Spills**

Actual demand to be determined by JAR test on regular basis. Never use more than 2.5 gallons of raw polymer per shift. Too much polymer will upset the treatment plant. If raw polymer is spilled, clean the spill by obtaining a bucket of rock salt from Transportation to solidify the polymer. Do **NOT** use deicing salt. Also, never add water to polymer in an effort to clean up a spill - the spill will become worse.

**Mix Tank Corrective Actions**

The following corrective actions can be used if out of control limit conditions occur. Be sure to log all work in the Final Treatment Plant logbook.

If the pH is out of range, high or low, verify that the pH equipment is working properly. See Routine Inspection SOP NSCS-M-P-7091-02.

If the **pH** in the mix tank is too **low**, place a lime rotodip in manual and add lime as needed to raise pH. If both rotodips are in service at 100% or

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one or more are out of service for maintenance, open the manual dog leg and add lime as needed to raise the pH. If sufficient lime cannot be added, run a hose from the lime slurry storage tank directly to the west mix tank. If any of these corrective actions are used, notify the Manager as additional manpower may be needed to control the problem.

If the pH in the mix tank is high, add sulfuric acid as needed. Check all pH equipment and if needed, use pH paper to verify the mix tank pH.

### Rotodip Overflow

If a rotodip overflows the first thing that has to be done is stop the overflow and regain control of the mix tank pH. Immediately call on the two-way radio for the UT Helper to come and help with the problem as several things need done at the same time to mitigate the potential for a NPDES pH exceedance at outfalls 104 and 004.

The two major issues with a rotodip overflow are the potential for a pH exceedance at outfalls 104 and 004 and establishing control over the mix tank pH.

Operator:

- Regain control of the mix tank pH by adding sulfuric acid and controlling the lime slurry feed. Use a mix set point of 7.5-8.0 for 20 minutes to help get the pH under control.
- After 20 minutes take the portable pH meter and check the pH in the floc section discharge and divide the sedimentation basin into three sections and secure and test a pH sample.
- Then every 20 minutes for the next two hours retest the sedimentation basin to see if the pH will be > 8.7 at outfall 104.
- If it looks like the pH will be > 8.7 pH in the sedimentation basin or outfalls 104 or 004 prepare carboys of sulfuric acid and drip feed it into the treatment plant effluent to keep the pH at outfalls 104 and 004 below 8.8 pH.
- Assign the helper to assist with feeding acid, securing samples, so forth as needed.
- Discuss with the helper the status of the treatment plant.
- When the emergency is over return both plants to normal operations.
- Report the incident to the Pretreat Operator for inclusion on the shift report. Also, document what happened on the back of the final treat log sheet.

### Mix Tank Air Corrective Actions

If the blower trips out, attempt to restart it. If it will not restart, use the other blower. If neither blower will work, connect an air hose between the plant air

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supply located east of the blowers to the Chicago fitting on either air main into the mix tanks. Close valve south of the air connection to the main. Then notify the Shift Manager so maintenance can be notified.

## Coagulant Aid Corrective Actions

If the coagulant aid (polymer) pump is not working, blow the pump down with air, service water or hot water. If the pump will not work, switch pumps. If neither pump works, open the manual drain on the CA tank and drain CA into the trench which flows to the sump. Add a water hose to the sump and turn on the pump. This will feed CA to the treatment plant. Then notify the Shift Manager so maintenance can be notified.

Also, see raw polymer warnings and spills above in this SOP.

## Adjusting Air Flow to Mix Tank

Oxygen in the air bubbling through the mix tank oxidizes iron in the wastewater which is necessary prior to precipitation with lime. This air flow is adjusted as follows:

1. Adjust mix tank air valve.
2. Adjust air valve to equalization basin to obtain desired mix tank cfm. Pull chain one link at a time and observe results.
3. Observe "Air to Mix Tank" meter. Record any change of air to mix tank on log sheet 7091-01.
4. Observe the amp meter. If amps are greater than 55, the air blowers may overheat and drop off line. Adjust air valve to maintain 55 amps.

## Make Up Coagulant Aid

When it becomes necessary, make up a day tank of CA following the procedure outlined below:

1. Inspect the tank, pump, piping, and valves for proper operation.
2. Take the day tank out of service.
3. Fill the day tank 2/3 full of water.
4. Start the mixer.
5. Once a vortex is formed, slowly pour required quantity (in approximately a pencil width stream) polymer into the vortex. See the control limit section of this SOP NSCS-M-P-7091-10 for the required amount of CA.
6. Fill day tank with water until one (1) inch from the top.
7. Let mixer run an additional 30 minutes.
8. Do not run mixer again once the coagulant aid is prepared.
9. If knots or large fish eyes are present, notify Turn Supervisor.
10. Place day tank in service when the other day tank needs to be refilled with coagulant aid.

**NOTE:** Do not let polymer freeze. If is frozen, let it thaw naturally. Then remix in the barrel. Do not add water.

Record volume of raw polymer used per turn on the log sheet 7091-01.