

Process Name	Operating Control System Monitor Method / Location	Frequency Recording data and abnormal conditions	Reference Procedure(s)	Potential upset state Potential Abnormal condition(s)	Potential problem source	Reaction if Abnormal Conditions are Encountered
Equalization Basin Basin Level	Visual inspection Normal control range is █ feet of freeboard below the maximum level the basin can hold	4 times per turn Operator: Record abnormal conditions on Form █	NSCS-M-P-7091-09	1) █ freeboard 2) █ freeboard	1) More lines may be operating, or a dump may have occurred. 2) A line may have shutdown	1) If equalization basin has less than █ of freeboard, open effluent valves on basin. Do not cause a drastic change in flow which can have an impact on the flocculation/sedimentation basins. Open the valve slowly and adjust in small increments. It takes several hours for adjustments to stabilize. Monitor the Equalization Basins to ensure the increase in flow is not due to an unanticipated leak. Mill dumps may not be reported as they should to Final Treat. If this occurs, contact the production lines to determine the origin and characteristics of the material. 2) If more than █ of freeboard, partly close effluent valve. Do not close quickly and cause a drastic change in flow. It takes several hours for adjustments to stabilize. The best control is attained when the concrete chimneys are not visible.
North and South Equalization Basins Oil Removal	Visual inspection	4 times per turn Operator: Record abnormal conditions on Form █	NSCS-M-P-7091-09	█ surface area oil	1) The North API Interceptor or South Interceptor may have excessive oil that needs to be skimmed. 2) Check the dump sheets for both Pretreat and Final Treat. Check for both dumps and washdowns. If the excessive oil issue occurs a second time within 12 hours, there may be a leak from a production line. Check with Pretreat Operator for oil loading on the API separator █ 3) Effluent distribution box gate valves height 4) Manual skimmer system issue (scum and oil pit pump may have failed)	1) Ask the Pretreat Operator to check the North API Oil interceptor chemical feeds and determine if interceptor needs skimming. 2) Contact the Production Manager and ask them to inspect the 52" Five Stand, 80" Five Stand and the DCR Mill for leaks or operating problems related to loss of oil. Ask the lines to repair or stop the loss of oil if the source is found. Continue to skim and remove the oil until an appropriate amount is achieved. Contact the Utilities Manager if oil skimming cannot keep up. 3) If the distribution box gate valves are significantly different in height, one basin will have a much lower retention time than the other. Oil will not have enough time to separate and float to the surface. Adjust the valves for equal level. 4) There may be an issue with the skimmer pump system. If the sump pump failed, the sump will fill and when full, oily water will remain in the equalization basin. If the skimmer tube is clogged, no wastewater will be able to be transferred through the pump. Use a water spray to jet and clear the obstruction.

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Mix Tank Air Flow	Visual inspection of air bubbles/agitation in Mix Tank	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-10	1) < [REDACTED] psi 2) [REDACTED] psi	1) Blower tripped out 2) Air blower may overheat then trip	If no air is injected for a period of time, perform more frequent iron sampling as air is needed to oxidize and precipitate iron. Iron is also an indicator of the concentration of other metals. 1) Attempt to restart blower. If it will not restart, use the other blower. If neither works, connect an air hose between the plant air supply located east of the blowers to the [REDACTED] fitting on either air main into the mix tanks. Close the valve south of the air connection to the main. Notify the Maintenance and the Utilities Manager. 2) If the current is greater than [REDACTED] amps, the air blowers may overheat and shutdown. Restart the blower and adjust the air valve to maintain [REDACTED] amps. Adjust the mix tank air valve and adjust the equalization basin air valve by pulling one chain link at a time and observing the results. The control valves are located in the basement.
Coagulant Aid (CA) Storage Tank Level	Level detector display, liters	1 time per turn Operator: Record level on Form [REDACTED]	NSCS-M-P-7091-02	Volume < [REDACTED]	The pump rate may be too high	Contact Utilities Manager. If tank is low, call [REDACTED] to order Coagulant Aid and check the inventory sheet. If tank is high, check for spills from overflow. Check and adjust the pump rate if needed. If the pump rate is fine, blow down the [REDACTED] lines with air. Switch the [REDACTED] pump in service, note the percent setting on the pump scale, look for leaks and check flushing water. Check condition of air valves, valve position and pump lubrication. Check for signs of leaks around the tank and from the valves and associated piping.
Starch Storage Tank Tank Level	Level detector display, %	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-02	Volume < [REDACTED]	Pump rate too high	Contact Utilities Manager. If tank is low, call Chemtreat to order Starch and check the inventory sheet. If tank is high, check for spills from overflow. Check and adjust the pump rate if needed. If the pump rate is fine, blow down the starch lines with air. Switch the starch pump in service, note the percent setting on the pump scale, look for leaks and check flushing water. Check condition of air valves, valve position and pump lubrication. Check for signs of leaks around the tank and from the valves and associated piping.

Process Name	Monitor Method / Location	Recording data and abnormal conditions	Reference Procedure(s)	Potential Abnormal condition(s)	Potential problem source	Reaction if Abnormal Conditions are Encountered
East & West Sedimentation Basins Return Sludge Rate	Settleable solids test with sludge Note: check both East and West Sedimentation Tanks. Allow the sludge to be discharged and flush the lines for one minute before collecting a sample.	4 times per turn Operator: Record settleable solids % on Form	NSCS-M-P-7091-12	1) % solids settled 2) % solids settled 3) East and West % solids settled differ significantly	1) Poor sludge return rate to Mix Chamber. a) The return sludge rate may be too low and not providing a base of unreacted line and floc to form the heavy solids. The return sludge flow should contain large particles of floc that help the coagulation and sedimentation process. The return sludge also helps keep the mix tank pH in the proper range. b) The drags and cross collectors may not be operating or sufficiently pulling the sludge into the collection hoppers. 2) Not sending enough sludge to Sludge Dewatering 3) The settleable sludge solids content % is significantly different between the east and west sedimentation basins.	Ideally, the settleable solids should be . A high-quality sample would have solids that settle and compact rapidly, leaving a clear supernatant free of floating debris. 1) Sludge imbalance a) Change the sludge valve position to direct more flow of solids back to the Mix Tank. If the ratio change is still sending enough to both the Mix Tank and Sludge Dewatering, increase the pump rate. (Similarly, decrease if the pump rate is too high). If a pump has failed, change to a standby. Check the polymer , coagulant , lime, acid and starch feeds as well for proper dosing. Notify the Utilities Manager and Maintenance as needed. b) Confirm that Cross Collector drags are working properly 2) Increase the Sludge Pump rate to direct more sludge to the Sludge Dewatering Plant and reduce the load in the Mix Tank. The maximum total pump rate is gpm and the ratio to the Mix Tank and Sludge Dewater is based on the valve position. 3) Follow the Adjusting Sludge Pumping Rate section of SOP NSCS-M-P-7091-12 to check both the east and west Sludge Pumps. Adjust the discharge valves on the pumps to obtain equal sludge levels. Make changes in , or gpm increments once per hour until the basins are back in balance. Verify once per turn.

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Sedimentation Basins Oil Removal	Visual inspection oil surface area	4 times per turn Operator: Record oil pool size on Form ██████	NSCS-M-P-7091-12	Oil coverage > █ % basin surface area ██████	1) Accumulation of oil in the north end of the sedimentation tanks needs skimmed. Flights collect the light floatable oils at the north end of the sedimentation basins at the skimmer tube. These light oils should be skimmed off and sent to the Oil Decant Tank via the sump. 2) Soluble oils from Pretreat passing through 3) Oil passing through EQ Basin 4) Skimmer tube discharge opening is clogged 5) Sufficient time was not provided in the Decant storage tank for oil separation, and oily wastewater is returned to the system rather than decanted water	1) Check that the flights are operating properly and the skimmer tube is at the correct height just below the water surface. Check the cross collector drives, sprockets and guard as well. If the flights can't skim as fast as the oil layer is appearing, contact the Utilities Manager. The Manager will contact the lines and perform an investigation into the source while the operator continues to monitor the skimming. 2) Soluble oils from pretreat passing through - ██████, ██████ can break emulsions (at pretreat) – check if dosing at API North Interceptor discharge 3) Inspect oil coverage at the EQ Basins. Skim basins to prevent excess oil getting to sedimentation basins. 4) Check that the skimmer sewer and tube are not clogged. Use a water hose to flush and jet out any scum accumulation that is stuck in the tube. 5) Check that the Decant Oil Tank is not discharging oil. Stop decanting. Sufficient residence time is needed in the tank to separate the oils from the water.
Wastewater Skimmings Decant Tank Tank Level	Level detector display %	4 times per turn Operator: Record level on Form ██████	NSCS-M-P-7091-09	Volume > █████ full	1) If tank level low, strainer on scum and oil sump pump may be clogged and therefore not pumping up into the Decant Tank. 2) Incorrect level sensor reading	1) Shut off the pump, close the valves and replace the strainer with the spare clean strainer. Dump the sludge contents into the sludge dumpster. If needed, use solvent to remove debris. 2) Attempt to draw liquid using the sample taps on the tank. Does the level sensor reading correlate to the highest level from the sample taps? If not, contact IR.
Outfall 104 Iron	Hach Benchtop Meter Hach 3700 sc-series, or similar	4 times per turn Operator: Record concentration on Form ██████	NSCS-M-P-7091-02	██████ g/L Average	1) The iron is not oxidized by air injection in the mix tank prior to precipitation with lime 2) Oxidized iron carried over with excess solids	1) Check that the air blower setting is appropriate. Adjust the mix tank air valve and the air valve to the equalization basin. Pull chain one link at a time and observe results. Record any change of air to the mix tank from the "Air to Mix Tank" meter and the amp meter. If greater than 55 amps, the air blowers may overheat and drop offline. Adjust the air valve to maintain █████ amps. 2) Check for higher turbidity and solids in the outfall. If the iron was oxidized and in the ferric state, it will form a metal hydroxide complex and can be settled with the solids. If the solids were not removed, the iron will be present with the solids in the discharge.

Doc# NSCS-M-P-7093-02-47
Title: Final Treat Process Control Practices
Issue Dt: 10/04/2018
Revision Dt:12/03/2018
Cat: Quality
Auth:
Desc: Final Treat Process Control Practices
Loc: Midwest - Utilities-Midwest - Plant Maintenance-Midwest-Gary Works

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Process Name	Monitor Method / Location	Recording data and abnormal conditions	Reference Procedure(s)	Potential Abnormal condition(s)		
Outfall 104 Hexavalent Chromium	Hach Benchtop Meter Hach 3700 sc-series, or similar	2 times per turn Operator: Record concentration on Form [REDACTED]	NSCS-M-P-7093-02-32	[REDACTED] mg/L Any Sample	Entrance of chrome containing wastewater into the Final Treat Plant that should been treated at the Chrome Treatment Plant	Retest immediately. If still high, Contact Environmental immediately! Contact Production Manager immediately and ask them to tell all of the lines to shutdown immediately! Begin to dose sodium trithiocarbonate into the Mix Tank. Continue to measure hexavalent chromium every [REDACTED] minutes. Shut the valve to sludge dewatering and only recirculate sludge. Contact Sludge Dewatering Operator that no more sludge will be pumped to them.
Outfall 104 Turbidity	Hach Benchtop Meter Hach 3700 sc-series, or similar	4 times per turn Operator: Record concentration on Form [REDACTED]	NSCS-M-P-7091-02 NSCS-M-P-7091-06 NSCS-M-P-7091-21	> [REDACTED] NTU Average > [REDACTED] NTU Maximum	See "Sedimentation Basins - Solids Floc Formation" above	See "Sedimentation Basins - Solids Floc Formation" above
Outfall 004 Clarity	Visual inspection of outfall	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-02	Visible solids	Solids not settling in sedimentation basin	Look for indication of proper flocculation in the sedimentation basins. If flocs are not forming, check coagulant aid [REDACTED] polymer, and starch dosing levels and increase as appropriate. If flocs are forming but not settling, increase the rate of solids pumping to sludge dewatering. If there are low solids in the Outfall 104 effluent, but they are present in the Outfall 004 discharge, contact the Utilities Manager and ask them to initiate investigation into the Non-contact cooling water and stormwater.
Outfall 104 and 004 pH	Handheld pH meter Hach 3700 sc-series, or similar	1 time per turn Operator: Record pH on Form [REDACTED]	NSCS-M-P-7091-02	pH S.U. < [REDACTED] or pH S.U. > [REDACTED]	1) The Final Treatment Plant may have lost acid/lime control 2) The Chrome Treatment Plant may not have returned the pH to an acceptable range in the pH Adjustment Tank following the Reduction Tank 3) The non-contact cooling water may have developed a leak of an acidic/basic solution	If pH at Outfall 004 is < [REDACTED] or [REDACTED] contact Environmental immediately! If grab sample out of range, retest sample. Make sure pH meter is calibrated. Contact Utility Utilities Manager ASAP. Check acid/lime feed. 1) See the Mix Tank pH Reactions above. 2) Contact the Chrome Treatment Plant to test their pH after Outfall 104 is confirmed to be within range. 3) 3) If both Outfall 104 and 204 are within range, contact the lines and ask them to check for any abnormal conditions. Have a grab sample collected of the non-contact cooling water and test for pH.

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Midwest - Utilities-Midwest - Plant

Operating Control System

Frequency

Maintenance-Midwest-Gary Works

Potential upset state

Potential problem source

Reaction if Abnormal Conditions are Encountered

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Outfall 104 and 004 Visible Foam	Visual inspection of outfall	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-02	Visible foam	1) The various soaps, cleaners and surfactants used on the production units 2) The anti-foam batch solution was mixed improperly	If foam is on the stream, contact Environmental immediately! 1) These materials sometime cause foam to be produced on the surface of the effluent leaving Outfall 104. The NPDES permit requires that the treated effluent be free of visible foam. As such, anti-foam is applied on an as-needed basis to the effluent channel prior to Outfall 104. Increase or turn on the anti-foam to reduce the discharge channel foam. 2) [REDACTED] should not be violently mixed with an electric mixer or pumped using a centrifical pump. The base chemicals that make up the defoamer will turn into a jelly that can not be placed back into solution. Always mix the [REDACTED] using a recirculation pump or gently rolling the tank with compressed air. If the defoamer [REDACTED] is not working very well switch to [REDACTED] defoamer. Chemtreat [REDACTED] is available in pails, drums, or totes. It is mixed and handled exactly like the [REDACTED]
Antifoam Storage Tank Tank Level	Level detector display, %	1 time per turn Operator: Record level on Form [REDACTED]	NSCS-M-P-7091-02	Volume < [REDACTED]	Too much antifoam is used in the makeup.	Contact Utilities Manager. If tank is low, call Chemtreat to order antifoam and check the inventory sheet. If tank is high, check for spills from overflow. If low, check for signs of a tank leak. Mix a two gallon pail of anti-foam with one drum of water. Using more than two gallons of neat anti-foam will draw the tank down too quickly. The [REDACTED] is stored in a [REDACTED] gallon bulk storage tank. At Outfall 104 [REDACTED] is fed as needed. A typical monthly consumption is [REDACTED] to [REDACTED] lbs./month.
Outfall 104 and 004 Visible Sheen	Visual inspection of outfall	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-02	Visible sheen	Oils are not separating in Equalization Basins or Sedimentation Basins	If sheen is on the stream, contact Environmental immediately! Check the Equalization Basins and Sedimentation Basins for signs of oil. Skim and then increase future skimming frequency. If oil accumulation is excessive, contact the lines to investigate for oil leaks or releases. If oil is present at either outfall, deploy a boom around Outfall 004. Replace the internal boom if oil is present in the Outfall 104 effluent. If oil is only present in the Outfall 004 discharge, contact the Utilities Manager to investigate the Non-Contact Cooling Water and Stormwater.

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Outfall 104 and 004 Color	Visual inspection of outfall	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-02	Visible color	Various oils or chemical spill	If the stream is discolored, contact Environmental immediately! Contact the Utilities Manager and let them know if the discoloration is at Outfall 104, 004 or both. If at Outfall 004, trace back through the treatment stages to try and identify where the discoloration originates. If originating from within the Final Treatment System, close all valves from the associated tank. If the source cannot be identified, contact the Production Manager and ask them to contact the lines to investigate for leaks or releases from within their areas.
Outfall 104 and 004 Odor	Visual/odor inspection of outfall	1 time per turn Operator: Record Abnormal Conditions on Form [REDACTED]	NSCS-M-P-7091-02	Presence of odor	Release or leak of a material into the system	If the odor is strong in the area around the outfall, contact Environmental immediately! Contact the Utilities Manager and describe the smell. Check if the smell is originating from a particular area within the Final Treatment Process. Wear a gas monitor. Note if the odor is a fuel [REDACTED] smell, sanitary, or something else.