

Sequence of Operations for the South Bay International Wastewater Treatment Plant



San Ysidro, CA.

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Introduction

The South Bay International Water Treatment Plant (SBIWTP) is a secondary waste water treatment plant, with 25 million gallons per day capacity located in the south of San Diego County, California, two miles west of the San Ysidro Port of Entry. In this plant, sewage originating in Tijuana, Mexico is treated; the liquid wastes resulting from the process are discharged into the Pacific Ocean, whereas the biosolids are loaded on trucks and sent back to Mexico. In the future a secondary treatment system will be in application to recycle and purify waste water even further, so it is eligible for irrigation use.

The plant was designed and built under the International Boundary and Water Commission (IBWC) to reduce and prevent the contamination of the Tijuana River in the U.S as a result sewage waste from Tijuana. The SBIWTP was built on a 75-acre site, on the northern side of the border immediately to the north of Tijuana's main wastewater pumping station, to cover an average 25 mgd of sewage in excess to Tijuana's system capability. The plant can cover up to a total capacity of 100 mgd.

This document covers the Sequence of Operation (SOO) in place to run and maintain the plant, and its relevance to the SCADA system.

Influent Flow

Introduction and Purpose:

Junction Box 1 (JB-1) is located outside of Gate 2 at the S/E corner of the South Bay International Wastewater Treatment Plant (SBIWTP). A key is required to access the fenced-in facility in order to access to the Motor Operated Valve (MOV) that allows wastewater flow to enter the plant via a 72-inch influent line. This MOV is operated with a Limit torque actuator to open and close the gate valve. This gate valve is operated partially open, to regulate the metered influent flow. The outlet gate valve is a 96-inch valve which, under normal operation, is fully open.

Safety Precaution:

The JB-1 channel is defined as a **Permitted Confined Space**. No entry shall be allowed, unless all requirements as defined by OSHA have been satisfied. In addition to the concern of atmospheric conditions, engulfment and drowning are major concerns. Because of its depth and line size of 96 inches, it could be very easy for one to become engulfed and drown in this large, high flow and velocity pipeline.

Therefore, if it is required that you must open the access hatches, fall protection shall be implemented. Another area of concern is the location of JB-1, being located adjacent to the U.S/Mexican Border fence. If you have any concerns

regarding your personal safety, consult with you Shift Supervisor or Operations Supervisor.

Procedure:

1. Always let someone know if you are going out to JB-1. If you see suspicious activity in the area, leave immediately and return to the plant. Let your Supervisor know and call for assistance if needed.
2. To regulate the influent flow, the gate will usually be open between 6 to 10 inches, depending on variables. The metered flow can be observed on the SCADA screen.
 - i) To increase flow, open the JB-1 using the MOV. Push the “Open” button. When the valve has reached your desired position, push the “Stop” button. The valve will not stop on its own. Verify that the valve stopped opening.
 - ii) To decrease flow, push the “Close” button until the desired opening is established. Push the “Stop” button and ensure that the valve has stopped closing.
 - iii) Make small moves, ½ to 2 inches, and monitor the flow changes on SCADA. Give the flow time to stabilize and do not make too many adjustments in a short period of time.
3. If no electrical power is available to operate the Limitorque, engage the lever and operate the valve manually using the hand wheel.
4. As a preventative maintenance task, we should stroke the JB-1 valve at least once a week. To do this, implement the following:
 - i) Note the current setting of the valve stem in inches. (This task should be performed on Day Shift; Monday thru Friday, while Operations and Maintenance support is available.)
 - ii) Press the “Open” button and allow the valve to open to the 24-inch mark.
 - iii) Press the “Stop” button. Allow this valve setting to remain for 5 minutes.
 - iv) Press the “Close” button, and once the valve reaches its original setting, press the “Stop” button.
 - v) Make sure that the valve has ceased moving and that the gate is secured prior to leaving the JB-1 location.

Keep in mind while performing this task that you must monitor the plant Influent Wet Well. Do not allow the plant to enter into an upset condition due to this exercise. If required, shorten the duration of the aforementioned task. If unsure, check with your Supervisor.

Headworks

Unit Equipment:

Slide Gates



Start-Up Procedure:

1. Open the selected slide gate and the selected slide gate for scum removal according to the procedures listed below:
 - a. Select the gate that will be opened.
 - b. Open the gate as follows:

Automatically - Portable Hydraulic Operator

Since the portable hydraulic operator is not used continuously, the operator must be inspected before each use. Perform a brief examination of the unit, checking the following items:

- a. Proper hydraulic oil level. If low, fill as directed in manufacturer's O&M Manual.
- b. Unusual wear or damage to components.
- c. Fluid leakage.
- d. Clean out covers, filler caps and breather caps on reservoir are properly fastened.
- e. All filtration devices are in place
- f. The unit should be clean and free from material buildups that may result in over heating and/or damage.
- g. Energize the operator by inserting plug in receptacle and starting motor.
- h. Position remote drive unit (RDU) over the gate operator drive shaft.

- i. Verify the gate position and direction of the necessary gate movement.
- j. Activate the directional control valve. Observe carefully the gate head movement and operator to detect irregular movement. If this occurs, then release directional control valve to avoid damage.
- k. Deactivate RDU when gate is within 2-inches of its desired position.
- l. Use manual operator to move gate into its final position.

Manually - Square Nut Operator

- a. Position the t-handle over the operator nut; make certain the nut is fully-recessed into the socket.
- b. Rotate the operator clockwise to open the gate.
- c. Visually inspect the gate head to verify proper position.

Bar Screens



Screening Equipment

Start the influent mechanical bar screening equipment according to the procedures listed below:

1. Select the screenings conveyor(s) that will be in service.
2. Place the respective ROT switch for conveyor in the “Remote” position.
3. Place the screenings conveyor(s) into operation as follows:

Automatic Mode of Operation

- a. Place the respective HOA switch at the LCP-HWE for conveyor in the “Auto” position.

- b. In the “Auto” mode, the mechanical bar screen operates as called for by signals from PLC-HWE

Manual Mode of Operation

- a. Place the respective HOA switch of the LCP-HWE for conveyor in the “Hand” position.
4. Visually verify the conveyor system is operating.
5. Select the mechanical screen(s) that will be in service.
6. Place the FOR switch for the selected mechanical screens in the “Forward” position.
7. Ensure the LOS switch for the screen(s) is in the “On” position.
8. Place the mechanical bar screen(s) into operation as follows:

Automatic Mode of Operation

- a. Place the HOA switch at the LCP-HWE for the selected mechanical bar screen(s) in the “Auto” position.
- b. In the “Auto” mode, the conveyor operates as called for by signals from PLC-HWE.

Manual Mode of Operation

- a. Place the respective HOA switch at the LCP-HWE for the selected mechanical bar screen(s) in the “Hand” position.
10. Open the isolation slide gates to the appropriate screening channels as required by your Operations Supervisor. NOTE: If the channel for the screen to be started has been dewatered, the isolation slide gates should be opened to fill the channel before starting the screen.
11. Monitor the water level differential of the upstream and downstream channel of the screens at the headworks bubbler level system. Your Operations Supervisor should establish the water level.
12. Visually monitor the operation of the mechanical screens to ensure that debris is being removed from the bar rack by the steel rake assembly.
13. Test rake wiper assembly.
14. Check limit switches for proper alignment when in contact with rake.
15. Run rake until it engages in bar section at bottom.
16. Run rake into bar section and check engagement of teeth into bars as it travels to top of bar section. Adjust if required.
17. Check contact of rake wiper with rake and adjust if required.
18. Run rake to home position (up position switch) to make sure it functions properly.
19. Run rake in local for an entire cycle.
20. Initiate start and stop of rake from timer.

21. The manually cleaned bar screens are used during periods of maintenance or repair of the mechanical bar screens. Cleaning the manually cleaned bar screen is accomplished with a rake with tines (prongs) which fit between the bars.

Influent Pumps



Exercise & Rotations Purpose:

1. To prevent accumulations of sand and grit in the wet well.
2. To inspect operation and vibration.
3. To increase pump reliability.

Safety:

Communicate with staff and make certain that no one is working on the Influent Pumps before completing this procedure. Make sure someone monitors the pump's operation at Headworks to make sure there are no breaks, leaks or excessive vibrating.

Alerts:

Communicate with the Instrumentation Technician and Electrician to make sure that they are standing by in case there are any problems during the process of this procedure. If there are any problems, communicate this with Maintenance and notify your immediate Supervisor.

Procedure:

1. Proceed to a SCADA system computer.
2. Keep a close watch on the wet well at all times during this task.
3. Pull up the "Influent Pump Station" screen.

4. Verify which pumps are in operation. Normally, the pumps are in the following sequence due to operational efficiency:
 - a. LEAD = IP #6
 - b. LAG 1 = IP #1
 - c. LAG 2 = IP #3
 - d. LAG 3 = IP #5
 - e. LAG 4 = IP #2
 - f. LAG 5 = IP #4
5. **Exercise and inspect each pump for a minimum of five (5) minutes.**
6. Pumps can be run by changing the above LEAD/LAG sequences, by placing the pumps in Manual via SCADA, or by placing them in Hand in the Headworks MCC.
 - a. To place pumps in Manual via SCADA
 - i. Click on the Influent Pump's icons on the SCADA screen.
 - ii. Underneath each column, refer to the area labeled "Controls".
 1. Under normal operations, the "SCADA AUTO" box should be highlighted green.
 2. Click on the "SCADA MANUAL" box: this box should turn red once activated.
 3. Then start the Influent Pump by clicking the "START" button: allow the pump to run for about five minutes.
 4. Once the five minutes have passed, then click the "STOP" button and make sure that the pump stops completely.
 5. Once the pump has stopped, return the pump to automatic operation by clicking the "SCADA AUTO" box; the green highlight should return to this box when the system is back in auto.
7. Once each pump has been exercised and inspected, verify that all pumps are returned to automatic and in the correct sequence.
8. Verify all pumps are operating properly and wet well level is stable.

Startup Procedure:

1. Select the influent pump(s) that will be in service.
2. Verify the influent pump(s) pipe valving is in the proper orientation and selected pump discharge and suction valves are open.
3. Ensure that seal water is being supplied to the pump(s).
4. Place the respective ROT switch in the "Remote" position.
5. Place the influent pump(s) into operation as follows:

Automatic Mode of Operation

- a. Place the respective HOA switch at the LCP-IPS in the "Auto" position.

- b. Under normal conditions the selected pump will start after a 0 to 180 second delay and operate continuously.

Manual Mode of Operation

- a. Place the respective HOA switch at the LCP-IPS in the “Hand” position.
 - b. After a 0 to 180 second delay the pump motor starts and pump will operate continuously.
6. Visually verify the pump is operating.
 7. Check driver lubrication levels and flow.

Headworks Odor Control

Introduction and Purpose:

In order to meet air quality standards, Veolia operates odor control units within the wastewater treatment plant. This standard operating procedure is a guide for the start-up, routine operation, and shutdown of the Odor Reduction Station system located at the Headworks.

Trigger:

On a monthly basis operators will perform Odor Control Scrubber cleaning utilizing muriatic (hydrochloric) acid. Refer to the Document titled “Odor Control Scrubber Cleaning Utilizing Muriatic (Hydrochloric) Acid” for performing this task; this Document can be found under the General Operations SOP Manual: #24.

Required Safety Equipment:

Wear Veolia uniform, steel toed safety boots, safety glasses, and latex gloves when performing duties associated with Odor Reduction Stations. Refer to the “Safety” section within this Operator procedure for proper PPE to enter containment basins, and for Odor Control Scrubber cleaning.

Start-up Procedure:

Start-up the exhaust fans:

- 1) Select the odor reduction fan that will be placed in service.
- 2) Verify that the odor reduction duct is in the proper orientation and that the selected fan inlet and discharge dampeners are open.
- 3) Place the respective remote-off-test (ROT) switch in the “Remote” position.
- 4) Place the fan in an automatic or manual mode of operation as follows.
 - a) Automatic mode of operation:
 - i) Place the Hand/Off/Auto (HOA) switch at the Local Control Panel

- (LCP) in the “Auto” position.
- ii) In the automatic mode, the fan operates as called for by signals from the Programmable Logic Control (PLC). Under normal conditions, the selected fan will start and operate continuously.
- b) Manual Mode of Operation:
 - i) Place the HOA switch at the LCP in the “Hand” position.
 - ii) The pump motor starts and the fan will operate continuously.
- 5) Visually verify the fan is operating.

Start-up the water softener:

- 1) Ensure that the local electrical disconnect is positioned to energize the water softening systems controls.
- 2) Open the appropriate isolation valves to the inlet and outlet of the water softening system.
- 3) Close the bypass valve.
- 4) Adjust the flow of softened water to the scrubber tower to meet the desired flow rate.
- 5) Observe the calcium analyzer indicator (reading should be below 8 ppm).

Start-up the odor scrubber:

- 1) Ensure that the drain and sample valves are closed.
- 2) Open the appropriate isolation valves including the sodium hypochlorite feed line, sodium hydroxide feed line, and the sump make-up water line.
- 3) Ensure that the sump level is at three feet (3ft.).

Start-up the recirculation pumps:

- 1) Select the recirculation pump that will be placed in service.
- 2) Verify that the recirculation pipe valving is in the proper orientation and that the selected pump suction and discharge valves are open.
- 3) Ensure that the upstream needle valves and downstream ball valves which isolate the pH and ORP controllers from the recirculation pump suction and discharge piping are closed. (Excessive pressure can damage the probes).
- 4) Ensure that the seal water is being supplied to the pump seal.
- 5) Place the respective ROT switch in the “Remote” position.
- 6) Place the pump into operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch at the LCP in the “Auto” position.
 - ii) In the automatic mode, the pump operates as called for by the signal from the PLC. Under normal conditions, the selected pump will start and operate continuously.
 - b) Manual Mode of Operation
 - i) Place the HOA switch at the LCP in the “Hand” position.
 - ii) The pump motor starts and operate continuously.

- 7) Visually verify that the pump is operating.
- 8) Verify that the isolation valves on the inlet and outlet of the metering tube associated with the flow meter are open and that the valve in the meter bypass line is closed.
- 9) Observe the flow meter reading (flow rate should be 230GPM or greater).

Start-up the pH and ORP controllers:

- 1) Open the upstream and downstream ball valves which isolate the pH and ORP inlet header (by-pass line) from the recirculation pump suction and discharge piping.
- 2) Open the respective downstream ball valves which isolate the pH and ORP probes from the common outlet headers.
- 3) Ensure that the ORP analyzer is energized and displaying a millivolt reading.
- 4) Ensure that the pH analyzer is energized and displaying a reading.
- 5) Verify that the pH setpoint is set to achieve the desired value (between 9.0 and 11.0) per air permit requirements. Adjust if needed.

Start-up the sodium hypochlorite (NaOCL) system:

- 1) Ensure that there is sufficient sodium hypochlorite in the storage tank.
- 2) Open the appropriate isolation valves on the outlet lines.
- 3) Select the NaOCL metering pump that will be placed into service.
- 4) Verify that the NaOCL metering pump valving is in the proper orientation and that the pump suction and discharge valves are open.
- 5) Place the respective ROT switch in the “Remote” position.
- 6) Place the pump into operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch at the LCP in the “Auto” position.
 - ii) In the automatic mode, the pump operates as called for by the PLC. Under normal conditions the selected pump will start and operate continuously.
 - b) Manual Mode of Operation
 - i) Place the HOA switch at the LCP in the “Hand” position.
 - ii) The pump motor starts and will operate continuously.
- 7) Visually verify that the pump is operating.
- 8) Observe the discharge pressure of the pump (discharge pressure should be approximately 40psi).
- 9) Manually adjust the electronic speed control on the metering pump to achieve the desired ORP millivolt reading at the ORP transmitter (between 575mV and 725mV) per air permit requirements.

Start-up the sodium hydroxide (NaOH) system:

- 1) Ensure there is sufficient NaOH in the tank.
- 2) Open the appropriate isolation valves on the outlet lines.

- 3) Select the NaOH metering pump that will be placed into service.
- 4) Verify that the NaOH metering pump valving is in the proper orientation and the selected pump suction and discharge valves are open.
- 5) Place pump into operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch at the LCP in the “Auto” position.
 - ii) In the Automatic mode, the pump operates as called for by the PLC. Under normal conditions, the selected pump will start and operate continuously with the pump stroke being automatically adjusted by the signal from the pH analyzer.
- 6) Manual Mode of Operation
 - i) Place the HOA switch at the LCP in the “Hand” position.
 - ii) The pump motor starts and the pump will operate continuously.
- 7) Visually verify that the pump is operating.
- 8) Observe the discharge pressure of the pump (discharge pressure should be approximately 40psi).

Sump pumps:

- 1) Inspect the sump for debris.
- 2) Make sure that the discharge valves are open.
- 3) Verify that the level control floats are not tangled up.
- 4) Place the control power switch to the “On” position.
- 5) With liquid in the sump, press the “Start” button.
- 6) Make sure that the pumps are pumping and that the pumps shut off at the low level float.

Tower Packing Inspection & Clean Up:

The tower packing and mist eliminator should be inspected regularly for signs of fouling and plugging. Fouling occurs primarily from precipitation of sulfur compounds (excludes ORSC4, which utilizes sulfuric acid). Additional fouling can occur from the collection of iron, carbonate and bacterial deposits. Cleaning can be accomplished with a specialized de-fouling chemical, sulfuric acid or muriatic acid. This Document describes the use of muriatic acid.

Safety Precautions:

1. The scrubbers contain high concentrations of caustic and sodium hypochlorite that are potentially hazardous. They will react with the muriatic acid generating heat and gases.
2. No less than two operators are to be present during project setup and take-down.
3. Wear appropriate PPE, including rubber gloves and eye protection when connecting or disconnecting acid containing fittings.
4. Keep all hoses and cords out of the way to prevent trip hazards.

5. Always keep a water hose nearby in the event of a spill.
6. When removing the window from the scrubber for cleaning, do not over tighten the bolts when reinstalling. Set the cordless drill chuck to the #14 setting. Complete the torquing sequence by hand, and make sure not to damage the window by over-torquing.
7. Read and understand the MSDS for muriatic acid.
8. Never pour acid from one carboy to another. Use the pump to empty the carboy.

Required Equipment:

1. Muriatic acid in 15-gallon carboys
2. Odor control tower cleaning kit
3. 12" crescent wrench
4. 9/16" combo wrench
5. Manometer
6. 15/16" socket; 1/2" drive ratchet
7. Portable pH meter
8. Clipboard with Acid Washing check list
9. 1-gal of muriatic acid (for cleaning probes)

Procedure:

1. Take manometer reading; open sample ports on the exhaust fan and the top of the tower (above media). Drain out all water (if water will not cease, abort the manometer reading, and note it). Record the manometer reading.
2. Turn on the manometer in the In/wc mode. Set to zero until the "+" bar displays.
3. Connect the manometer to the sample ports and open the valves simultaneously. Take an average reading and record it.
4. Close both sample valves and disconnect the manometer.
5. Record which scrubber is to be washed on the check list and note the start time.
6. Remove the sump drain extension pipe and open the drain valve
7. Turn off the scrubber fan, chemical feed pumps and the scrubber recirculation pump.
8. Setup the white sump with the yellow sump inside. Fill yellow sump $\frac{3}{4}$ with water.
9. Connect the suction hose to the metering pump, being careful not to lose the retaining ring (inspect the ends of the hose for damage and repair if needed). Tighten the retaining nut tightly.
10. Place the metering pump on top of the yellow sump and place the suction hose into the sump of water to prime the pump.

11. Connect the discharge hose from the acid pump to the scrubber and tie-off hose with tie strings to prevent hose damage. Open the acid injection valve on the scrubber.
12. Setup the equipment for the recovery system.
13. Install the fixed fitting for the sump pump discharge to the blind flange on the northeast side of the scrubber. Install the hose adapter flange to the scrubber and tighten the bolts.
14. Connect the discharge hose to the adapter, minimizing any tripping hazards. Remove “U” tubes from the fan discharge and ensuring that the valves are left in the open position. Install the drain extensions on one of the drains. Place the green sump under the drain valves to recover all drainage. Place the automatic sump pump into the sump. Connect the discharge hose and tie it off as well as the sump pump.
15. Arrange the sump pump cord to prevent it from interfering with the float switch and ensure that there are no tripping hazards.
16. The recovery system is now complete.
17. Drain the scrubber sump.
18. Fill the sump with fresh water; flush and rinse until clear.
19. Close the drain valve from the scrubber sump and cap it.
20. Inject the muriatic acid into the scrubber tower at a 50-50 setting. Fill the sump to the bottom of the window. Open the upper diffuser valve.
21. Turn off the make-up water when the level is at the bottom of the window (fill SP Tower #5 to 1.6 ft).
22. Install the cap for the vent on the drain.
23. Set the metering pump to 15 – 15.
24. Prime both recirculation pumps.
25. Start one pump, and rotate pumps every 4-hours.
26. Record readings for pH and sump level every hour (this can be done at SCADA). If the pH begins to rise, then check/replace the carboy.
27. Run the scrubber for about 24 hours.
28. After 24 hrs, flush the metering pumps with water for 30-minutes at max stroke/speed.
29. Disconnect all of the equipment and put it away.
30. Drain the sump.
31. Refill the sump. Re-prime the recirculation pumps. Run one pump at a time for ~10 minutes each to rinse out the pumps/media.
32. Drain the sump.
33. Rinse the sump until clear. Close the drain valve.
34. Close the upper diffuser valve
35. Refill the sump with make-up water (MUW) and caustic with one caustic pump running.
36. Check the sump level in ~20 minutes.
37. Prime the recirculation pumps when the sump is at its operating level.

38. Return the scrubber back into operation by following the appropriate start-up instructions.
39. Adjust the pH and ORP.
40. Complete the Scrubber Washing PM by taking a manometer reading the following day and record the results.

Routine operations:

- 1) Monitoring and recording of (ORP 575mV or greater) per air permit requirements.
- 2) Monitoring and recording of pH (9.0 or greater) per air permit requirements.
- 3) Monitoring, adjusting, and recording of make-up water (MUW) to be greater than 5GPM.
- 4) Monitoring and recording of recirculation flow (230GPM or greater).
- 5) Record the above listed items in the Air Quality Readings log and initial. Recordings will be validated by another operator and initialed.
- 6) Failures and/or alarms experienced in this process include:
 - a) ORP Low = 600
 - b) ORP High = 900
 - c) pH Low = 9.2
 - d) pH High = 9.6
 - e) Odor Reduction Exhaust Fan (OREF) failures
 - f) Recirculation pump seal water failure, motor failure, and/or low flow (less than 230GPM).
 - g) High sump pump alarms (typically in dry weather this is a false alarm).

Routine monthly maintenance for the operations department includes:

- 1) "Odor Control Scrubber Cleaning Utilizing Muriatic (Hydrochloric) Acid":
Please refer to the Document with the above title for specific guidelines on this procedure.

Headworks Startup

Introduction and Purpose:

The following is a standard operating procedure for the start-up and shut-down of the Headworks for the South Bay International Wastewater Treatment Plant.

Procedure:

The Headworks Facilities should be started according to the following procedures:

1. Ensure that the inlet and junction structures, barscreen channels and grit chamber are free of accumulated grease, rags and other debris.

2. Visually inspect all equipment for any signs of damage or improper installation.
3. Verify the grit/screenings storage bins are positioned properly.
4. Inspect the entire length of the screenings conveyor belt for debris and clean surface of debris if needed.
5. Ensure that the screenings conveyor emergency taglines are set and have not been pulled. If they have been pulled, reset the tagline switches.
6. Select the bar screen(s), grit chamber blower, and the grit pump(s) that will be in service.
7. Ensure the Control Panels LCP-HWE located at the HWE-LCC-EAST and LCP-ORHW at the Headworks Odor Reduction Station, and Distribution Panels DPP4, DPC4, DPL4, DPM4, located at the HWE-LCC-EAST are energized.
8. Ensure that the circuit breakers at Motor Control Centers MCC-HWE in HWE-LCC-EAST and at MCC-PSTE "A" BUS and MCC-PSTE "B" BUS in the PST-LCC-EAST are energized for all equipment to be operated.
9. Energize the SG-HWE in the HWE-LCC-EAST.

Start Headworks Odor Reduction Station according to the procedures descriptions, in the following order:

- a. Screening and Wetwell Areas Exhaust Fan and Automatic Damper
 - b. Storage Bin/Grit Dewatering Areas Air Supply and Exhaust Fans
 - c. Scrubber Exhaust Fan
 - d. Water Softening System
 - e. Scrubber
 - f. Recirculation Pumps
 - g. pH and ORP Controllers
 - h. NaOC1 Storage Tank
 - i. NaOC1 Metering Pump
 - j. NaOH Storage Tank
 - k. NaOH Metering Pump
10. After normal operation of the Odor Reduction Station is established, start to feed the influent flow to the Screening Area by opening Junction Box No. 1 sluice gate.
 11. The pH and ORP of the odor control scrubber should be continuously monitored. The optimum set points (pH, ORP) should be in accordance with the Odor Reduction Station Air Permit and your Operations Supervisor's direction based on operating experience. Start the screenings conveyor(s) that will be in service according to the procedures described in Section screenings conveyor
 12. Open the isolation slide gates to the appropriate screening channels as required by your Operations Supervisor.

13. Start the respective bar screen(s) that will be in service according to the procedures described in Section Bar Screen.
14. Start the grit handling equipment according to the procedures described in Grit handling.
15. Start the influent pump station according to the procedures described in Pump station.

Headworks Shutdown Procedure

Slide Gates

Close the selected slide gate and the selected slide gate for scum removal according to the procedures listed below:

1. Select the gate that will be closed.
2. Close the gate as follows:

Automatically - Portable Hydraulic Operator

- a. Since the portable hydraulic operator is not used continuously, the operator must be inspected before each use. Perform a brief examination of the unit, checking the following items:
 - Proper hydraulic oil level. If low, fill as directed in manufacturer's O&M Manual.
 - Unusual wear or damage to components.
 - Fluid leakage.
 - Clean out covers, filler caps and breather caps on reservoir are properly fastened.
 - All filtration devices are in place.
 - The unit should be clean and free from material buildups that may result in over heating and/or damage.
- b. Energize the operator by inserting plug in receptacle and starting motor.
- c. Position remote drive unit (RDU) over the gate operator drive shaft.
- d. Verify the gate position and direction of the necessary gate movement.
- e. Activate the directional control valve. Observe carefully the gate head movement and operator to detect irregular movement. Should this occur, release directional control valve to avoid damage.
- f. Deactivate RDU when gate is within 2-inches of its desired position.
- g. Use manual operator to move gate into its final position.

Manually - Square Nut Operator

- a. Position the t-handle over the operator nut, make certain the nut is fully-recessed into the socket.
 - b. Rotate the operator counter-clockwise to close the gate.
3. Visually inspect the gate head to verify proper position.

Screening Equipment

Shut down the mechanical screening equipment according to the procedures listed below:

1. Close isolation slide gates upstream of the screening equipment.
2. Turn the respective FOR switch to the “Off” position when the screen has reached the “End of Travel” position.
3. Continue to operate the screenings conveyor(s) to transfer debris to the storage bin area.
4. When debris transfer to the storage bin area is complete, turn the ROT switch for the respective conveyor to the “Off” position.
5. After water level in screenings channel has reached the low level setting, close the respective isolation slide gate downstream of the screening equipment.
6. Use a non-potable water eductor to dewater screenings channel, which has been isolated at either end.

Note: The screens also automatically shut down on high torque, motor overload, and drive temperature high conditions or as called for by signals from PLC-HWE

Influent Pump Station

Shut down the influent pump station according to the procedures listed below:

1. Turn the respective HOA switch at the LCP-IPS for the pumps to be shut down to the “Off” position.
2. Verify the pump is stopped.
3. Lock the appropriate ROT switch.
4. If the pump is to be out of service for an extended period of time, disconnect power source.
5. If either half of the pump station is to be out of service for an extended period of time, close the appropriate isolation stop plates and slide gates in the pump station wetwell and IPS influent channel.

Note: The influent pumps will also shut down on pump failure, seal water failure, and IPS wetwell low level.

Headworks Odor Control

Shutdown Procedure:

Shutdown of the sodium hydroxide (NaOH) system:

- 1) Select the pump that is in service.
- 2) Take the pump out of operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Auto” position.
 - ii) In the automatic mode, the pump operates as called for by the PLC.
Under normal conditions, the pump will shut off when placed in the “Off” position.
 - b) Manual Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Hand” position.
- 3) Close the appropriate isolation valves on the outlet lines.
- 4) If taking this system offline for service and/or maintenance follow the lock-out / tag-out procedure under Volume 1 General Procedures SOP #13.

Shutdown of the sodium hypochlorite (NaOCL) system:

- 1) Select the pump that is in service.
- 2) Take the pump out of operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Auto” position.
 - ii) In the automatic mode, the pump operates as called for by the PLC.
Under normal conditions, the pump will shut off when placed in the “Off” position.
 - b) Manual Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Hand” position.
- 3) Close the appropriate isolation valves on the outlet lines.
- 4) If taking this system offline for service and/or maintenance follow the lock out / tag out procedure under Volume 1 General Procedures SOP# 13.

Shutdown of the pH and ORP controllers:

- 1) Isolate the pH and ORP controllers by closing the respective upstream and downstream ball valves; this isolates the pH and ORP meters from receiving flow from the recirculation pumps.
- 2) If taking controllers offline for service and/or maintenance follow the lock-out / tag-out procedure under Volume 1 General Procedures SOP #13.

Shutdown of the recirculation pumps:

- 1) Select the pump that is in service.
- 2) Take the pump out of operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Auto” position.

- ii) In the automatic mode, the pump operates as called for by the PLC. Under normal conditions, the pump will shut off when placed in the “Off” position.
- b) Manual Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Hand” position.
- 3) Close the appropriate isolation valves on the outlet lines.
- 4) If taking these pumps offline for service and/or maintenance follow the lock out / tag out procedure under Volume 1 General Procedures SOP# 13.

Shutdown of the exhaust fans:

- 1) Select the exhaust fan that is in service.
- 2) Take the exhaust fan out of operation as follows:
 - a) Automatic Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Auto” position.
 - ii) In the automatic mode, the Exhaust Fan operates as called for by the LCP. Under normal conditions, the exhaust fan will shut off when placed in the “Off” position.
 - b) Manual Mode of Operation
 - i) Place the HOA switch in the “Off” from the “Hand” position.
- 3) If taking offline for service and/or maintenance follow the lock out / tag out procedure under Volume 1 General Procedures SOP #13.

Shutdown of the water softener

- 1) Open the bypass valve.
- 2) Close the appropriate isolation valves to the inlet and outlet of the water softening system.

Grit Removal

Grit Handling Equipment Start-Up

Grit Chamber Blowers



Start the grit chamber blowers according to the following procedures listed below:

1. Select the blower that will be in service. One blower should be normally in service and one in standby mode.
2. Verify that the blower pipe valving is in the proper orientation and the selected blower pressure relief valve is operating.
3. Place the respective ROT switch in the “Remote” position.
4. Place the grit chamber blower into operation as follows:

Automatic Mode of Operation

- a. Place the respective HOA switch at the LCP-GB in the “Auto” position.

Manual Mode of Operation

- a. Place the respective HOA switch at the LCP-GB in the “Hand” position.
5. Visually verify blower is operating and that the discharge pressure does not continue to rise above the design point.

Grit Pumps



Start the grit pumps according to the procedures listed below:

1. Select the grit pump(s) that will be in service.
2. Verify the grit pump pipe valving is in the proper orientation and selected pump discharge and suction valves are open.
3. Ensure that seal water is being supplied to the pump(s).
4. Place the respective ROT switch in the “Remote” position.
5. Place grit pump(s) into operation as follows:

Automatic Mode of Operation

- a. Place the respective HOA switch at the LCP-GP in the “Auto” position.
- b. In the “Auto” mode, the grit pump will operate as called for by signals from PLC-HWE

Manual Mode of Operation

- a. Place the respective HOA switch at the LCP-GP in the “Hand” position.
- b. After a 0 to 180 second delay the pump motor starts and pump will operate continuously.
5. Visually verify the pump is operating.

Grit Classifier/Separators

Start the grit classifier/separator according to the procedures listed below:

1. Select the grit classifier/separator(s) that will be in service. The cyclone degritting unit starts when the grit pumps are called to start and will run for an adjustable off-delay period after the grit pumps have stopped.

2. Verify the grit classifier/separator pipe valving is in the proper location.
3. Ensure that the classifier is bedded with clean sand. If not, then fill the tank with water and then with the unit running, load the tank with sand in the pool area until sand is discharged by the conveyor at the upper end of the classifier.
4. Place the respective ROT switch in the “Remote” position.
5. Place the appropriate On/Off switch at the LCP-GC in the “On” position to start the selected grit classifier/seperator.
6. Visually verify the grit classifier/seperator is operating.

Grit/Screenings Storage Bin Winches

Start the grit/screenings bin winches according to the procedures listed below:

1. Inspect the winch and other equipment. Make sure to check lubrication before use.
2. Make sure the load is free to move and will not tip or in any way move uncontrollably.
3. Turn electric power on by using the local disconnect switch.
4. Operate the winches as required by your Operation Supervisor by using the respective Forward/Off/Reverse switches located at the north wall of the Grit/Screenings Storage Area.

Grit Handling Equipment Shut Down

Grit Chamber Blowers

Shut down the grit chamber blowers according to the procedures listed below:

1. Turn the respective HOA switch at the LCP-GB at the PST-LCC-EAST for the blower to be shut down to the “Off” position.
2. Verify the blower is stopped.
3. Lock the appropriate ROT switch.
4. If the blower is to be out of service for an extended period of time, disconnect power source.

Note: The grit chamber blowers will also shut down on low discharge pressure or as called for by PLC-HW

Grit Pumps

Shut down the grit pumps according to the procedures listed below:

1. Turn the respective HOA switch at LCP-GP at the PST-LCC-EAST pumps to be shut down to the “Off” position.
2. Verify the pump is stopped.
3. Lock the appropriate ROT switch.
4. If the pump is to be out of service for an extended period of time, close the isolation valves on pump suction and discharge sides.

Note: The grit pumps will also shut down on pump failure and grit classifier failure conditions or as called for by PLC-HWE

Grit Classifiers/Separators

Shut down the grit classifiers/separators according to the procedures listed below:

1. Turn the respective On/Off switch at LCP-GP at the HW-LCC-EAST for the grit classifier/separator to be shut down to the “Off” position.
2. Verify the grit classifier/separator is stopped.
3. Lock the appropriate ROT switch.
4. If the grit classifier/separator is to be out of service for an extended period of time, disconnect power source.

Note: The grit classifier/separator will also shut down on a grit classifier/separator failure condition

Grit/Screenings Storage Bin Winches

Shut down the grit/screenings storage bin winches as follows:

1. Release the respective Forward/Off/Reverse switch. The switch should spring return to the “Off” position to stop the associated winch.
2. Turn electric power off by using the local disconnect switch.
3. Make sure the clutch is engaged, this will help keep the wire rope from uncoiling.

NPW

Individual Units Start Up

NPW Pump 1 Station

Trigger:

Operation of Non-Potable Water Pump Station No.1

Equipment:

- NP Water Pump Station No. 1 pumps
- Inlet and discharge valves
- Air compressors
- Hydropneumatic tank
- Local ROT switches
- Local Control Panel – NPW1

Procedure:

Refer to General System Start-up Procedures, for initial startup of the system.

1. Remove lock and tag and energize LCP-NPW1.
2. Remove locks and tags and energize circuit breakers in MCC-NPW1
3. Verify that all branches and services off the NPW system are valved off.
4. Close all NPW system valves.

NPW Wetwell

Procedure

1. Verify that there is no debris in the NPW wetwell.
2. Close the isolation valve on the NPW wetwell drain.
3. Verify that the two wetwell float switches are energized and are operational.
4. Verify that the float valve on the inlet line to the NPW wetwell is operational and is set to open at 9.17ft and to close at 7.5ft below the top of the wetwell.
5. Open the motor-operated inlet valve to the NPW wet well and place it in the “Auto” position.
6. Verify that the float valve closes at 7.5ft below the top of the wetwell.

Hydropneumatic Tank

Procedure

1. Verify that the air compressors are operational.
2. With the HOA switches at the LCP-NPW1 in the “Off” position, place each compressor’s ROT switch in the “Remote” position.
3. Close the isolation valve on the air fill line to the hydropneumatic tank and manually open the solenoid valve on the air fill line.

4. Open the gate valve between the hydropneumatic tank and the NPW discharge header. Allow the system to stabilize.
5. Place the HOA switch for one air compressor in the “Hand” position while monitoring the level of the hydropneumatic tank. Open the air fill line ball valve simultaneously. When the tank level drops to 5.5ft above the concrete pad, close the air fill isolation ball valve, then turn off the air compressor.
6. Place the HOA switch for NPW Pump 1 in the “Hand” position while simultaneously monitoring the hydropneumatic tank level. When the tank level reaches 7.5ft above the concrete pad, place the pump in the “Off” position.
7. Repeat steps 5 and 6 until the system pressure reaches 85 psi.

Air Compressors

Procedure

1. Select the compressor that will be in service.
2. Verify that the valving is in the proper orientation.
3. Place the respective ROT switch in the “Remote” position.
4. For the **automatic mode** of operation, place the appropriate HOA switch at the LCP-NPW1 in the “Auto” position to start the selected compressor.
 - i. The selected compressor will automatically start and stop based on a signal equal to low pressure in the air receiver.
5. For the **manual mode** of operation, place the appropriate HOA switch at the LCP-NPW1 in the “Hand” position to start the selected compressor.
 - i. After a 0 to 180 second delay, the compressor motor starts and the compressor will run continuously.

Vertical Turbine NPW Pumps

Procedure

1. Select the pump that will serve as the lead pump.
2. Verify the pump inlet and outlet valves are in the proper orientation.
3. Place each pump’s ROT switch in the “Remote” position.
4. For the **automatic mode** of operation, place the appropriate HOA switch at the LCP-NPW1 in the “Auto” position to start the selected pump.
 - i. The pump will automatically start and stop based on system pressure.
5. For the **manual mode** of operation, place the appropriate HOA switch at the LCP-NPW1 in the “Hand” position to start the selected pump.
 - i. After a 0 to 180 second delay, the pump starts and will operate continuously.
6. Monitor the pump’s pressure gauge. The pressure should range from 70 to 90 psi.

NPW Water Pump 2 Station

Trigger:

Operation of Non-Potable Water Pump Station No.2

Equipment:

- NP Water Pump Station No. 2 pumps
- Inlet and discharge valves
- Air compressors
- Hydropneumatic tank
- Local ROT switches
- Local Control Panel – NPW2

Procedure:

Refer to General System Start-up Procedures, 4.5.2.3.1, for initial startup of the system.

1. Remove lock and tag and energize LCP-NPW2.
2. Remove locks and tags and energize circuit breakers in MCC-NPW2
3. Verify that all branches and services off the NPW system are valved off. Close all NPW system valves.

NPW Wetwell 2

Procedure:

1. Verify that there is no debris in the NPW wetwell.
2. Close the isolation valve on the NPW wetwell drain.
3. Verify that the two wetwell float switches are energized and are operational.
4. Verify that the float valve on the inlet line to the NPW wetwell is operational and is set to open at 9.17ft and to close at 7.5ft below the top of the wetwell.
5. Open the motor-operated inlet valve to the NPW wet well and place it in the “Auto” position.
6. Verify that the float valve closes at 7.5ft below the top of the wetwell.

Hydropneumatic Tank 2

Procedure:

1. Verify that the air compressors are operational.
2. With the HOA switches at the LCP-NPW2 in the “Off” position, place each compressor’s ROT switch in the “Remote” position.
3. Close the isolation valve on the air fill line to the hydropneumatic tank and manually open the solenoid valve on the air fill line.
4. Open the gate valve between the hydropneumatic tank and the NPW discharge header. Allow the system to stabilize.
5. Place the HOA switch for one air compressor in the “Hand” position while

- monitoring the level of the hydropneumatic tank. Open the air fill line ball valve simultaneously. When the tank level drops to 5.5ft above the concrete pad, close the air fill isolation ball valve, then turn off the air compressor.
6. Place the HOA switch for NPW Pump 1 in the “Hand” position while simultaneously monitoring the hydropneumatic tank level. When the tank level reaches 7.5ft above the concrete pad, place the pump in the “Off” position.
 7. Repeat steps 5 and 6 until the system pressure reaches 85 psi.

Air Compressors NPW 2

Procedure:

1. Select the compressor that will be in service.
2. Verify that the valving is in the proper orientation.
3. Place the respective ROT switch in the “Remote” position.
4. For the **automatic mode** of operation, place the appropriate HOA switch at the LCP-NPW1 in the “Auto” position to start the selected compressor.
 - i. The selected compressor will automatically start and stop based on a signal equal to low pressure in the air receiver.
5. For the **manual mode** of operation, place the appropriate HOA switch at the LCP-NPW2 in the “Hand” position to start the selected compressor.
 - i. After a 0 to 180 second delay, the compressor motor starts and the compressor will run continuously.

Vertical Turbine NPW Pumps 2

Procedure:

1. Select the pump that will serve as the lead pump.
2. Verify the pump inlet and outlet valves are in the proper orientation.
3. Place each pump’s ROT switch in the “Remote” position.
4. For the **automatic mode** of operation, place the appropriate HOA switch at the LCP-NPW2 in the “Auto” position to start the selected pump.
 - i. The pump will automatically start and stop based on system pressure.
5. For the **manual mode** of operation, place the appropriate HOA switch at the LCP-NPW2 in the “Hand” position to start the selected pump.
 - i. After a 0 to 180 second delay, the pump starts and will operate continuously.
6. Monitor the pump’s pressure gauge. The pressure should range from 70 to 90 psi.

Primary Sedimentation



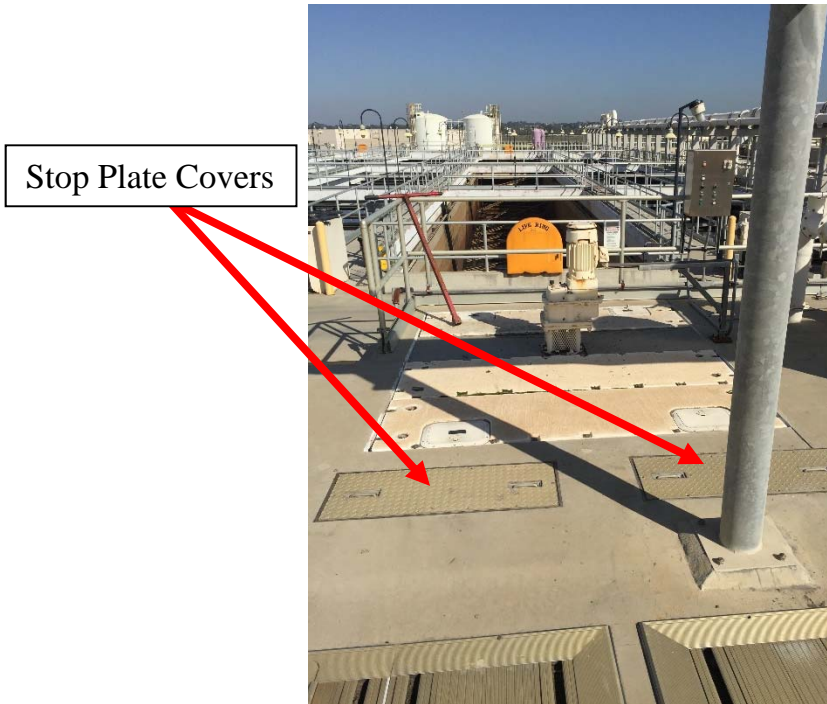
Introduction and Purpose:

The following is a procedure for the start-up and shut-down of the Primary Sedimentation Tanks (PST's) for the South Bay International Wastewater Treatment Plant.

Procedures:

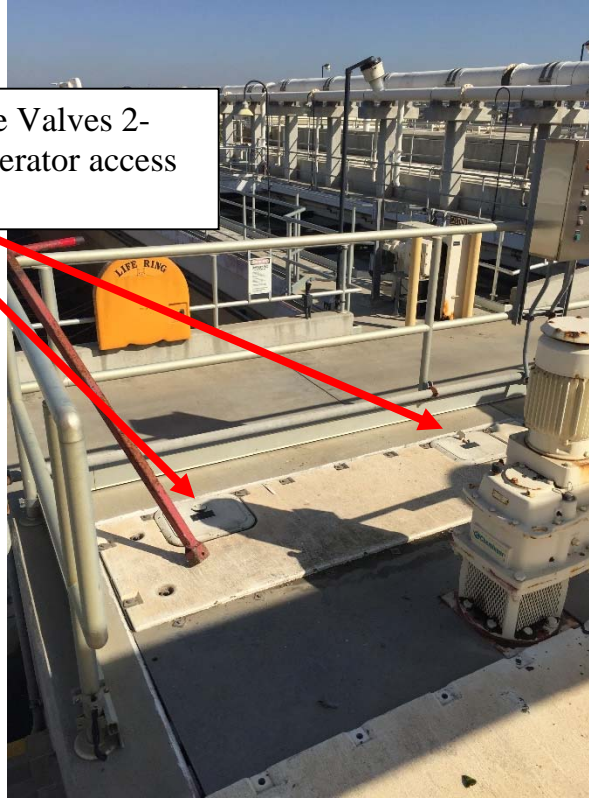
Start-Up

1. Visually inspect tanks, covers, PST Gallery, PST Access Gallery, and the Skimming's Dry Well for any signs of damage, wear, or improper installation. All areas (tanks, sludge collectors, weirs, etc.) should be cleaned of all installation or maintenance equipment and other any other items that are not part of the operating system.
2. Ensure that all ROT switches are in the "Off" position.
3. Determine which Primary Sedimentation Tank will be placed in service.
4. Ensure that all of the Local Control Panels (LCP) are energized.
5. Ensure that all of the Distribution Panels are energized.
6. Ensure that the circuit breakers at the Motor Control Centers (MCC) are energized for all equipment that will be operated. Also, ensure that the local On/Off disconnect boxes are energized.
7. Ensure that the tank drain valves, and the fill-and-draw valves on the effluent end of the PST's, are all closed.
8. Ensure that the USST facilities are on-line and operational.
9. If not already removed, remove the SS Stop Plates located on the south end of the RMC to allow influent from the influent channel to flow into the RMC.



- a. This requires the use of a crane.
10. If the PST Influent Valves (24-inch x 24-inch pressure slide gates) located on the north side of the RMC next to the PST are closed, then open them fully open so the full hydraulic capacity of the tank is available.
- a. The PST Influent Valves are located at the north end of each RMC (see photos below).
 - b. If the PST Influent Valves are not closed, then make sure they are fully open so the full hydraulic capacity of the tank is available.
 - c. This requires the use of the Gate Valve Key with T-Handle (see photo below).

Influent Slide Gate Valves 2-inch square nut operator access hatches.



11. After an RMC is full, start the chemical addition pumps and the Rapid Mixers for its designated tank.
12. Observe the tank as it fills.
13. Start the sludge collector system (flights and chains) when the tank is almost full.

14. Determine the sludge build-up in the hopper by analyzing the sludge level (Volume 3: SOP #2) every 30 minutes until there is a 6-inch layer above the top of the hopper. Sludge should not exceed 2-feet above the top of the hoppers. Once sufficient sludge has built up, start the primary sludge pumps.
15. Once skimmings have built up, start the Rotary Skimmers.

Shut-Down

1. Verify that the online tanks are fully operational and select the tank that is to be taken offline.
 - a. Ensure that the other online tanks influent valves are fully open.
2. Manually remove skimmings from the tank to be removed from service. Turn off its rotary skimmer.
3. Close the selected PST's Influent Pressure Slide Gate (see photos above).
 - a. As the Influent Pressure Slide Gates are being closed, make sure a second operator keeps an eye on the PST Influent Channel's water level.
 - i. If there is an increase in the PST Influent Channel's water level:
 1. If the water level increases while the Influent Slide Gates are being closed, then immediately reopen the Influent Slide Gate to prevent PST Influent Channel overflow.
 2. Investigate the cause of the increase water level before attempting to close the PST Influent Pressure Slide Gate Valves again.
 3. This may be caused by some of the other online PST's Influent Slide Gate Valves not being fully open.
 - ii. No increase in PST Influent Channel water level: continue isolating PST until valves are closed and flow to the PST stops.
 - iii. Monitor the PST Influent Channel periodically throughout the next 24 hours to make sure that the PST Influent Channel's water level continues to be stable, especially during peak flow.
4. If the slide gates are not working properly or are not sealing, then the stop plates may need to be used to isolate the PST.
 - a. This requires the use of a crane.
5. Turn off the tank's chemical feed systems. If the entire chemical feed system is being taken offline, then flush all chemical lines thoroughly with water.
6. Turn off the tank's rapid mixer.
7. Keep the sludge collectors running to collect any remaining sludge, and continue the sludge pumping cycle for several hours to remove any residual sludge.
8. Once all residual sludge has been removed, shut down the primary sludge withdraw system.
9. Shut down the sludge collector system.
10. Make sure the sample chamber discharge isolation valves are closed.

11. Make sure that all tank drain valves are closed for all PST's.
12. Open the tank drain for the selected tank.
13. Wash down the interior of the tank intermittently as the level subsides.
14. When the tank is finally empty, perform a final wash down until the tank is clean, flush the tank drains with water, and close the drain valve.

Ferric Chloride

Introduction and Purpose:

The SCADA computer controls Ferric chloride and anionic polymer applications to the primary clarifiers. This Document outlines the procedures needed to determine appropriate dosages of both chemicals and how to program the SCADA computer to deliver those dosages.

Ferric chloride is normally introduced into the raw sewage at JB-1. (Alternatively, the ferric chloride can also be introduced to both the influent and effluent of the grit chamber). Ferric chloride dosages can be changed by changing the desired set-point of the dosage in mg/L in the SCADA system.

Anionic polymer dosage follows ferric chloride dosage. i.e.; changes to the ferric chloride dosage produce a corresponding change in anionic polymer dosage.

The purpose of these feed systems is to maximize the ferric chloride and polymer efficiencies for Suspended Solids and BOD removal.

Procedure:

The Plant Manager or the Operations Supervisor will establish dosages based on performance history. Chemical use efficiencies are analyzed as a part of the Process Control Management Plan (PCMP). (Refer to the PCMP for current targets.) Generally the goal is to maximize the ration of pounds of suspended solids removed for each pound of chemical applied.

Control System Overview:

Currently:

As of May 7, 2007, the normal operation regarding ferric chloride addition is based on an influent flow-paced dosing. A set-point value, in mg/L of desired dosage, is entered into SCADA. In this mode of operation, the aforementioned strategy of dosing ferric chloride ceases to have control, sitting idle.

The new formula, which calculates the dosage of ferric chloride is as follows:

$$(\text{Inf } Q) \times (\text{Oper setpoint}) \times (8.34) \times (.4) / (11.68) \times (1440) = \text{GPM set point for the Ferric Pumps}$$

Note that in this mode, the TSS / NTU value is an indicator of performance, having no effect on the dosage to the system.

Ferric Chloride is being fed with dilution water at a ratio of 3:1, with the ferric feed set to 100% at JB-1.

Anionic Polymer dosing, currently set for 0.25 mg/L, may also be increased during this process.

History: (old system)

Click on the green “JB-1 Ferric” button at the far right of the SCADA main screen. This will call up the Ferric Chloride Master Screen on the bottom computer monitor. Click on the gray “Effluent TSS” button near the bottom left of the screen to activate the ferric chloride efficiency graphs on the top computer screen. These screens provide a comprehensive overview of the ferric chloride feed system-operating parameters. The bottom screen shows the ferric chloride feed pump operating status. Operating pumps are shown in green, available pumps are black and out of service pumps are highlighted in red. The graph on this screen provides information on the pump output set points and actual performance, along with influent TSS and Flow. The top graph on the top screen plots influent and effluent TSS. The bottom graph on the top screen plots the plant performance as percent TSS removal. The Plant Manager or Operations Manager will specify upper and lower set point guides (red lines) for inclusion on this graph. (These set points must be reinstated each time the computer is “re-booted”). The high and low targets are set by typing in the desired values in the white boxes located at the right end of the large blue box immediately below the graphs.

Operator Input Control Set Points:

Activate the Operator Input Control screen by clicking once on the gray “Feed System Timer Bypass.” The modes of operation are; Operator controlled single set point, dual time Operator input control, chemical system on and off control and dual time with on/off control. The Operator input specifies the ferric chloride dosage in proportion to the influent TSS. An Operator input of 10 will result in delivery of one pound of ferric chloride for each ten pounds of TSS. An Operator input of 4 will result in the delivery of one pound of ferric chloride for each four pounds of influent TSS. Therefore the lower the Operator input the higher the ferric chloride dosage. (Reference the computer screen view on the next sheet as you read the instructions below.)

1. **Operator controlled single set point mode:** In this mode the Operator input remains constant 24 hours a day. This mode becomes active by deactivating the “Feed System Bypass Mode” and the two “Operator input based on time” options. (The “Feed System Bypass Mode” is inactive and the “Operator input based on

time” options are active in the sample screen on the next page.) A white input box will open next to the Operator Input value (shown in blue in the reference) when the Operator input option is active. Change the Operator input by typing the desired value in the white box and pressing the enter key.

2. **Dual time Operator input control mode:** This mode provides the ability to specify two chemical feed dosages to optimize efficiency. Enter the hour and minute for the required dosage to take effect in both of the Operator Input Based On Time sections.
3. **Feed System Bypass Mode:** This mode feeds a single chemical dose for a preset period each day. No chemicals are fed during the remainder of the day.

SPECIAL NOTE: The time settings act as “trip switches”. The chemical feed set point is computer activated only at the precise moment set in the clock. EXAMPLE: Input #1 on the next page calls for a set point of 10 at 23 hrs and 0 minutes. An Operator set point change made at 23 hours and 10 minutes will not take effect until 23 hours and 0 minutes the NEXT DAY. Immediate changes are made using the **Operator controlled single set point mode**.

Effluent Chlorination Pumps

Introduction and Purpose:

Final effluent chlorination

Trigger:

Discharge of final effluent

Equipment:

- Effluent chlorination pumps
- Calibration column
- Pressure relief valve
- Inlet and discharge valves
- Local ROT switch

Procedure:

1. Verify that the back pressure valve at the chlorine discharge point is operational
2. Verify that the diaphragm valves are pressurized and that the diaphragm valve drain lines are closed. Open the isolation valves between the diaphragm valves and the product piping.
3. Verify that the pressure relief valves are operational. Open the isolation valves between the pressure relief valves and the product piping.
4. Isolate the calibration columns from the system by closing the isolation valves between the calibration columns and the product piping.

5. Open all isolation ball valves on the suction lines between the two pumps and the two hypo tanks, and on the pump's individual discharge lines.
6. At the LCP-NaOCL, select the lead pump via the lead selector switch.
7. With the HOA switch in the "Off" position, place the ROT switch for each pump in the "Remote" position.
8. Place each SCR drives Local/Remote switch in the "Remote" position.
9. Place the pumps in operation as follows:

Automatic mode

At the LCP-NaOCL, place the HOA switch in the "Auto" position.

Manual mode

1. At the LCP-NaOCL, place the HOA switch in the "Hand" position.
2. Utilizing the potentiometer at the pump, manually set the stroke.
3. Utilizing the potentiometer at the SCR drive, manually set the speed.

NPW Station 2 Chlorination Pumps

Introduction and Purpose:

Chlorination of the non-potable water.

Equipment:

- NP Water Pump Station No. 2 chlorination pumps
- Calibration column
- Pressure relief valve
- Inlet and discharge valves
- Local ROT switch

Procedure:

1. Verify that the back pressure valve at the chlorine discharge point is operational
2. Verify that the diaphragm valves are pressurized and that the diaphragm valve drain lines are closed. Open the isolation valves between the diaphragm valves and the product piping.
3. Verify that the pressure relief valves are operational. Open the isolation valves between the pressure relief valves and the product piping.
4. Isolate the calibration columns from the system by closing the isolation valves between the calibration columns and the product piping.
5. Open all isolation ball valves on the suction lines between the pump and the two hypo tanks, and on the pump discharge line.
6. With the HOA switch in the "Off" position, place the ROT switch for each pump in the "Remote" position.

Place the pumps in operation as follows:

Automatic mode

At the LCP-NaOCL, place the HOA switch in the “Auto” position.

Manual mode

1. At the LCP-NaOCL, place the HOA switch in the “Hand” position.
2. Utilizing the potentiometer at the pump, manually set the stroke.
3. Observe the discharge pressure on the pump, it should be ~45 psi.

Chlorination of the Primary Sludge

Equipment:

- Pre-chlorination pump
- Calibration column
- Pressure relief valve
- Inlet and discharge valves
- Local ROT switch

Procedure:

1. Verify that the back pressure valve at the chlorine discharge point is operational
2. Verify that the diaphragm valves are pressurized and that the diaphragm valve drain lines are closed. Open the isolation valves between the diaphragm valves and the product piping.
3. Verify that the pressure relief valves are operational. Open the isolation valves between the pressure relief valves and the product piping.
4. Isolate the calibration columns from the system by closing the isolation valves between the calibration columns and the product piping.
5. Open all isolation ball valves on the suction lines between the pump and the two hypo tanks, and on the pump discharge line.
6. With the HOA switch in the “Off” position, place the ROT switch for each pump in the “Remote” position.

Place the pumps in operation as follows:

Automatic mode

At the LCP-NaOCL, place the HOA switch in the “Auto” position.

Manual mode

1. At the LCP-NaOCL, place the HOA switch in the “Hand” position.
2. Utilizing the potentiometer at the pump, manually set the stroke.
3. Observe the discharge pressure on the pump, it should be ~45 psi.

RAS Chlorination Pump

Routine startup of RAS Chlorination Pump

Introduction and Purpose:

Chlorination of the RAS for control of filamentous organisms.

Trigger:

Presence of dominant growth of filamentous organisms in the activated sludge.

Equipment:

- RAS chlorination pump
- Calibration column
- Pressure relief valve
- Inlet and discharge valves
- Local ROT switch

Procedure:

1. Verify that the back pressure valve at the chlorine discharge point is operational
2. Verify that the diaphragm valves are pressurized and that the diaphragm valve drain lines are closed. Open the isolation valves between the diaphragm valves and the product piping.
3. Verify that the pressure relief valves are operational. Open the isolation valves between the pressure relief valves and the product piping.
4. Isolate the calibration columns from the system by closing the isolation valves between the calibration columns and the product piping.
5. Open all isolation ball valves on the suction lines between the pump and the two hypo tanks, and on the pump discharge line.
6. With the HOA switch in the “Off” position, place the ROT switch for each pump in the “Remote” position.
7. Place each SCR drives Local/Remote switch in the “Remote” position.

Place the pumps in operation as follows:

Automatic mode

At the LCP-NaOCL, place the HOA switch in the “Auto” position.

Manual mode

1. At the LCP-NaOCL, place the HOA switch in the “Hand” position.
2. Utilizing the potentiometer at the pump, manually set the stroke.
3. Utilizing the potentiometer at the SCR drive, manually set the speed.
4. Observe the discharge pressure on the pump, it should be ~45 psi.

Primary Sedimentation Tanks Grinders

Introduction and Purpose:

Inline grinders are used to prevent any large debris from plugging pipes. These grinders are located on the discharge piping from the PST Sludge Wasting Pumps, PST Skimming discharge to the USST, and the discharge of the Belt Filter Press feed lines. The following is the proper start up procedure for placing these grinders in service.

Procedure:

1. Place the Hand/Off/Auto switch in the “Hand” position.
2. Press the “Start” button and observe the direction of rotation.
3. Press the “Stop” button.
4. Press the “Start” button again and observe the direction of rotation (the rotation should reverse each time the grinder is re-started).
5. Open the inlet and outlet valves for the grinder.
6. Place the Hand/Off/Auto switch in the “Auto” position.
7. Assure that the grinder starts automatically each time the associated pump starts up.
8. Close the bypass valve.
9. The grinder should now start automatically.

USST

Equipment:

- Sludge Storage Tanks
- Sludge Mixing Pumps

Startup Procedure:

Refer to General Startup Procedures

Sludge Storage Tanks

1. Open the isolation valves on the sludge feed lines.
2. Open the isolation valves on the sludge recirculation lines.
3. Open the isolation valves for the desired sludge withdrawal point.
4. Open the isolation valves on the scum removal lines.

Sludge Mixing System

1. Select the sludge mixing pump(s) that will be in service.
2. Verify that mixing pipe valving is correct and that pump suction and discharge valves are open.
3. Ensure that seal water is being supplied to the pump(s).
4. Place the pump(s) ROT switch in the “Remote” position.
5. Place the pump(s) On/Off switch at the LCP-SP in the “On” position.
6. After a 0 to 180 second delay the pump motor starts and the pump will operate continuously.

Shutdown Procedure:

Refer to General Startup Procedures

Sludge Storage Tanks

1. Close the isolation valves on the sludge feed lines.
2. Close the isolation valves on the sludge recirculation lines.
3. Close the isolation valves on the scum removal lines.
4. Continue to operate the sludge mixing system and transfer of sludge to the belt filter presses – monitor sludge level.
5. After the sludge level reaches the low level, shut down the sludge mixing system.
6. Continue transfer of sludge to the belt filter presses. After the transfer of sludge is complete, close the sludge draw-off valves.
7. Close the damper on the odor control exhaust duct.

Sludge Mixing System

1. Turn the On/Off switches at the LCP-USS for the sludge mixing pumps to the “Off” position – verify that the pump(s) have stopped.
2. Lock the ROT switches.
3. Close the isolation valves on the recirculation lines and the pump suction and discharge valves.

Note: Each sludge mixing pump will shut down under the following conditions:

1. “No flow” as detected by a discharge check valve lever limit switch.
2. Seal water failure.
3. Motor overload
4. Low level condition in the storage tank..

USST Odor Control



Equipment:

- Exhaust Fans
- Scrubber
- pH and ORP Controllers
- Recirculation Pumps
- NaOH Metering Pumps
- NaOCL Metering Pumps

- Water Softening System

Start up Procedure:

Refer to General Startup Procedures

Exhaust Fans

1. Select the fan that will be in service.
2. Open the odor reduction duct and fan inlet and discharge dampers.
3. For the **automatic mode** operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Auto” position.
 - a. The fan operates as called for by signals from PLC-ORUSS. Under normal conditions the selected fan will start after a 0-180 second delay and operate continuously.
4. For the **manual mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Hand” position.
 - a. Place the Hand/Off/Auto switch at the LCP-ORUSS in the “Hand” position. After a 0 to 180 second delay the pump motor starts and the fan will operate continuously.

Scrubber

1. Ensure that the drain and sample valves are closed.
2. Open the isolation valves on the feed lines for the sodium hypochlorite, sodium hydroxide, and the sump make up water line.
3. Ensure that the sump water level is at least 3ft above the bottom of the sump.

pH and ORP Controllers

1. Throttle the upstream and downstream ball valves which isolate the pH and ORP inlet header (bypass line) from the recirculation pump discharge and suction piping so as to maintain a pressure of 11 psi in the bypass line.
2. Open the downstream ball valves which isolate the pH and ORP probes from the common outlet headers.
3. Adjust the flow rates into the pH and ORP probes with the upstream needle valves to achieve a flow of 11 gpm to each analyzer – re-adjust the bypass line pressure to maintain 11 psi.
4. Ensure that the ORP analyzer is energizing and displaying a millivolt reading.
5. Ensure that the pH analyzer is energized.
6. Verify and adjust the pH setpoint as necessary to the desired range of 9.0 – 11.0 as per the air permit requirements.

Recirculation pumps

1. Select the recirculation pump to be in service – open the suction and discharge valves.

2. Ensure that the upstream needle valves and downstream ball valves for the pH and ORP controllers are isolated from the recirculation pump lines as excessive pressures can damage the probes.
3. Ensure that seal water is being supplied to the pump.
4. Place the ROT switch in the “Remote” position.
5. For the **automatic mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Auto” position.
 - a. The pump will operate as called for by signals from PLC-ORUSS. Under normal conditions the pump will start after a 0-180 second delay and operate continuously.
6. For the **manual mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Hand” position.
 - a. After a 0-180 second delay the pump motor starts and will operate continuously.
7. Verify that the pump is running.
8. Verify that the isolation valves on the inlet and outlet of the metering tube associated with the flowmeter are open and that the valve in the meter bypass line is closed – the flowrate should be 180gpm or greater.

NaOH Metering Pumps

1. Select the NaOH metering pump to be in service – open the suction and discharge valves.
2. Place the ROT switch in the “Remote” position.
3. For the **automatic mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Auto” position.
 - a. The pump will operate as called for by signals from PLC-ORUSS. Under normal conditions the pump will start after a 0-180 second delay and operate continuously with the pump stroke being automatically adjusted based on the pH analyzer signal.
4. For the **manual mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Hand” position.
 - a. After a 0-180 second delay the pump motor starts and will operate continuously.
5. Verify that the pump is running – the discharge pressure should be ~40 psi.

NaOCl Metering Pumps

1. Select the NaOCl metering pump to be in service – open the suction and discharge valves.
2. Place the ROT switch in the “Remote” position.
3. For the **automatic mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Auto” position.
 - a. The pump will operate as called for by signals from PLC-ORUSS.

Under normal conditions the pump will start after a 0-180 second delay.

4. For the **manual mode** of operation, place the Hand/Off/Auto switch at the LCP-ORUSS in the “Hand” position.
 - a. After a 0-180 second delay the pump motor starts and will operate continuously.
5. Verify that the pump is running – the discharge pressure should be ~40 psi.
6. Manually adjust the electronic stroke control on the metering pump to achieve the desired ORP millivolt reading at the ORP transmitter – 575 to 725 mV per the air permit requirements.

Water Softening System

1. Ensure that the local electrical disconnect is positioned to energize the water softening system controls.
2. Open the inlet and outlet isolation valves and close the bypass valve.
3. Adjust the flow rate of softened water to the scrubber tower to desired setpoint.
4. Observe the calcium analyzer indicator – should normally be below 8 ppm.

Shutdown Procedure:

Refer to General Shutdown Procedures

Exhaust Fans

1. Turn the Hand/Off/Auto switch at LCP-ORUSS for the fan that is in service to the “Off” position – verify that the fan has stopped
2. Lock the ROT switch.
3. Close the odor reduction duct and fan inlet and discharge dampers.

Note: The fan will automatically shut down on a low discharge flow signal from the downstream flow sensor.

Scrubber

1. Ensure that the drain and sample valves are open.
2. Close the isolation valves on the feed lines for the sodium hypochlorite, sodium hydroxide, and the sump make up water line.

pH and ORP Controllers

1. Close the inlet needle valves and downstream ball valves to isolate the pH and ORP probes.
2. Disconnect the power to the controllers.

Recirculation pumps

1. Turn the Hand/Off/Auto switch at LCP-ORUSS for the pump that is in service to the “Off” position – verify that the pump has stopped
2. Lock the ROT switch.
3. Disconnect the power to the pump.

NaOH Metering Pumps

1. Turn the Hand/Off/Auto switch at LCP-ORUSS for the pump that is in service to the “Off” position – verify that the pump has stopped
2. Lock the ROT switch.
3. Disconnect the power to the pump.
4. Close the suction and discharge valves.

Note: The pump will automatically shutdown by the PLC-ORUSS for the following conditions:

5. Low low level signal from the tank liquid level sensor.
6. Ruptured diaphragm signal from the pump mounted conductivity sensor.

NaOCl Metering Pumps

1. Turn the Hand/Off/Auto switch at LCP-ORUSS for the pump that is in service to the “Off” position – verify that the pump has stopped
2. Lock the ROT switch.
3. Disconnect the power to the pump.
4. Close the suction and discharge valves.

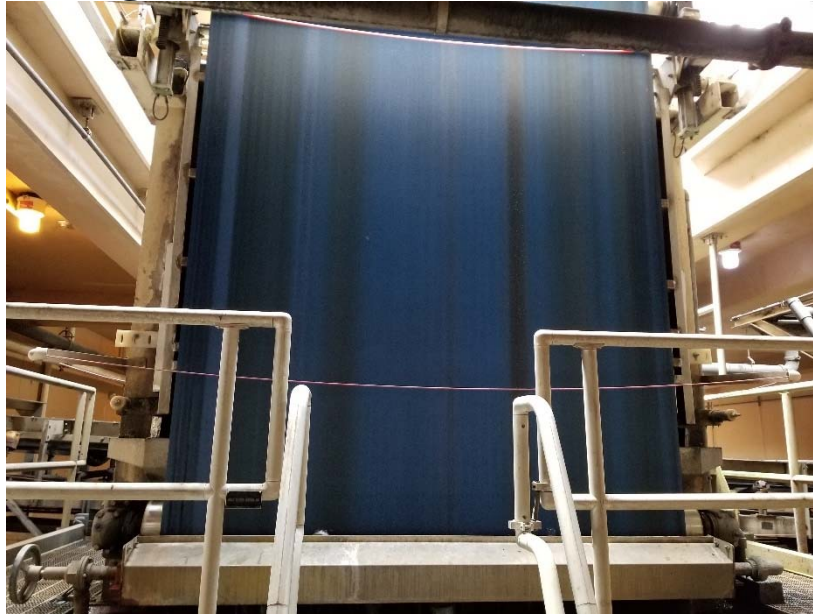
Note: The pump will automatically shutdown by the PLC-ORUSS for the following conditions:

1. Low low level signal from the tank liquid level sensor.
2. Ruptured diaphragm signal from the pump mounted conductivity sensor.

Water Softening System

1. Ensure that each of the vessels is in the “Operation” or “Stand-by” mode – if the system is in some other mode, wait until the regeneration cycle is complete.
2. Close the inlet and outlet isolation valves.
3. Disconnect the power source.

Solids Processing



Introduction and Purpose:

The following are the General Start-Up and Shut-Down procedures for the solids processing facilities. Reference should be made to the O&M Manual for any issues that are not covered in this Document.

Procedure:

General Start-Up:

1. Visually inspect the Sludge Dewatering Building, the Belt Filter Presses, the BFP Sludge Feed Pumps, and the Polymer Feed Pumps for any signs of damage or improper installation/configuration. The areas should be cleaned of all installation or maintenance equipment and any other unnecessary materials.
2. Determine which Belt Filter Press, Sludge Feed Pump, and Polymer Feed Pump will be placed into service.
3. Ensure that the following Local Control Panels are energized:
 - a. Solids Processing Local Control Panel (LCP-SP) located in the Solids Processing Local Control Center (SP-LCC)
 - b. Auxiliary Equipment Local Control Panel (LCP-AE) on second floor
 - c. The appropriate Belt Filter Press (LCP-BFP1 to LCP-BFP4) on the second floor
 - d. The Grinder (LCP-G1) located at the BFP Sludge Feed Pump Station
 - e. The appropriate Lime Silo (LCP-LS1 and/or LCP-LS2)
 - f. LCP-LU1 and/or LCP-LU2 located adjacent to the silo quick lime fill pipe
 - g. LCP-ORSP located at the SP Odor Reduction Station
4. Ensure that appropriate Distribution Panels are energized:

- a. Located at the SP-LCC
 - i. DPM5
 - ii. DPL5
 - iii. DPC5
 - iv. DPP5
 - b. Located at the Truck Loading Building
 - v. DPM7
 - vi. DPL7
 - vii. DPC7
 - viii. DPP7
- 5. Ensure that circuit breakers at the Motor Control Center MCC-SP located at SP-LCC are energized.
- 6. Start SP Odor Reduction Station according to the “Solids Processing Odor Reduction Station” SOP in Volume 1.
- 7. Verify that the USST has sludge to process and that at least two sludge mixing pumps are operational. Ensure that the draw-off valves at the USST are in the closed position and that the booster feed valves are open.
- 8. After normal operation of the Odor Reduction Station is established, begin mixing the polymer solution for the 60 minute mix time at the Sludge Dewatering Polymer Conditioning Facilities (this mixer is normally left running).
- 9. Ensure that the sludge feed pumps are ready to use by inspecting the hydraulic fluid level in the pumps sight glass and by making sure that the pumps’ isolation valves are open. Do not start-up the pump(s) yet.
- 10. Ensure that the polymers feed pumps are not isolated and are in operating condition. Do not start-up the pump(s) yet.
- 11. Start the respective Sludge Conveyance and Lime Stabilization System according to procedures. The “Conveyor/Lime System Running” light will illuminate.
- 12. Start the selected BFPs according to procedures described in the “Belt Filter Press Start Up and Shut Down” procedure.
- 13. Monitor the quality and quantity of the dewatering process at the Belt Filter and lime stabilization the Press and the Pug Mills and adjust parameters (e.g. belt speed, polymer feed, sludge feed, and lime dosage) accordingly.

General Shutdown:

- 1. If **all** BFPs are to be shut down, then shut down the entire Polymer Conditioning Facilities according to procedures.
- 2. If **all** the BFPs are shut down, then shut down the Lime Stabilization Facilities according to the procedures.
- 3. If **all** the BFPs are shut down, then shut down the Sludge Dewatering Odor Reduction Station according to the procedures.

Individual Equipment Start-Up Procedures

Dewatering System Pumping Facilities

BFP Sludge Feed Pumps

Start the BFP sludge feed pumps according to the procedures listed below:

1. Select the BFP and the BFP sludge feed pump that will be in service.
2. Place the Sludge Pump 1/2/3 selector switch at the selected LCP-BFP to the appropriate position based on the desired configuration
3. Verify all appropriate isolation valves are in proper orientation through the entire sludge feed line from the sludge grinder to the selected BFP.
4. Ensure that seal water is being supplied to the pump.
5. Place the respective ROT switch for the pump in the “Remote” position.
6. Select the “Remote” position for the Start/Stop Control and the “Remote” position for the speed control at the appropriate VFD located in the Sludge Processing Building.
7. After the “Press Ready” light is illuminated and the “Polymer Feed Pump Running” light is illuminated, press the Sludge Pump Start pushbutton located at the LCP-BFP of the BFP which is to be in service.
8. After a 0 to 180 second delay the pump motor starts and pump operates continuously. When the BFP sludge feed pump starts, the Sludge Pump Running light illuminates.
9. Control the speed of the sludge feed pump by adjusting the potentiometer at the respective LCP-BFP as required by your Operations Supervisor.
10. Visually verify that the pump is running.

Sludge Grinder

Start up the Sludge Grinder according to the procedures listed below:

1. Open the isolation valves on each side of the grinder.
2. Place the respective ROT switch in the “Remote” position (located at the LCP-G1 in the BFP Sludge Feed Pump Station).
3. Place the grinder into operation as follows:

Automatic Mode of Operation

- a. When the HOA switch at the LCP-BFP is placed in the “Auto” position, the grinder operates based on signals from the PLC-SP. The grinder will operate when any sludge feed pump is operating to feed sludge to the BFPs.

Manual Mode of Operation

- a. When the HOA switch at the LCP-BFP is placed in the “Hand” position, the grinder operates based on controls at the LCP-AE.
- b. Push the Start pushbutton located at the LCP-AE to “Start” the grinder.

- c. Visually verify the grinder is operating.

Belt Filter Presses

1. Select the BFP that will be in service.
2. Verify all appropriate valves are in proper orientation at the BFP.
3. Prepare the BFP for start up by performing the following pre-start inspection:
 - a. Verify no foreign objects are on belts or in an area that will interfere with the belt filter press operation.
 - b. Ensure the chicanes are positioned on the belt.
 - c. Verify tensioning control valve is in the tension position and that the belts are ready for tensioning.
 - d. Ensure all feed pumps are ready for operation and all valves are open.
 - e. Verify panel and machine have not been locked-out due to a prior alarm or maintenance condition.
 - f. Inspect hydraulic power unit and verify the oil level is adequate for operation.
 - g. Verify the taglines are set and have not been pulled. If they have been pulled, reset the tagline switches.
4. Place the Control Power On/Off selector switch located at the respective LCP-BFP to the “On” position. The Control Power On light will illuminate, the Alarm Horn will sound, and all the annunciator windows will flash. After a time delay, the horn will be automatically silenced and the annunciator windows will remain on steady. The annunciator will automatically reset the alarm windows with the “EMERGENCY STOPPED” alarm window remaining on.
5. Press the “Reset” pushbutton to energize the Emergency Stop Relay, de-energize the emergency stop alarm condition and reset the alarm window.
6. Place the respective ROT switches in the “Remote” position for the following BFP equipment:
 - a. Hydraulic Unit Pump Motor
 - b. Washwater Booster Pump
 - c. Upper Belt Drive
 - d. Lower Belt Drive
7. Select the “Remote” position for the Start/Stop Control and the “Remote” position for the Speed Control at the appropriate VFD located at the SP-LCC.
8. Place the BFP into operation as follows:

Semi-Automatic Mode of Operation

- a. When the Conveyance/Lime System Running light is illuminated at the LCP-BFP, place the HOA switch for the BFP to the “Auto” position.
- b. Press the Auto Start pushbutton at the LCP-BFP.
- c. After time delays, the washwater booster pump, the hydraulic unit pump and the belt drives will come into operation in a way as called for by signals from the respective LCP-BFP PLC.
- d. Ensure hydraulic pressure is set to 350 psig or as required by your Operations Supervisor.

Manual Mode of Operation

- a. When the Conveyance/Lime System Running light is illuminated at the LCP-BFP, place the HOA switch for the BFP to the “Hand” position.
- b. Press the Washwater Pump Start pushbutton at the LCP-BFP. The washwater valve will open and after a time delay the washwater pump will start. When the washwater pump is proofed running, the Running pilot light will be illuminated.
- c. Press the Hydraulic Pump Start pushbutton at the LCP-BFP. When the hydraulic pump is proofed running, the Running pilot light will be illuminated.
- d. Set the pressure of the hydraulic unit to 350 psig or as required by your Operations Supervisor.
- e. Ensure the Tension/Retract switch of the hydraulic control valve is in the “Tension” position and that the belts are in tension (allow two minutes for belts to completely tension).

CAUTION: In the manual mode, there are no interlocks to prevent the belt drive from being energized prior to the belts being fully tensioned. Operating the belt drive without allowing the belts to be fully tensioned may cause damage to the belts.

- f. Press the Belt Drive Start pushbutton at the LCP-BFP. When the belt drive is proofed running, the Running pilot light will be illuminated.

CAUTION: In the manual mode, there is no interlock to prevent the polymer pump from being energized prior to the belts being fully pre-wetted. Operating the polymer pump without allowing the belts to be fully pre-wetted may cause damage to the belts.

- g. Run the belts for two minutes to allow the belts to become completely pre-wetted prior to adding sludge.

9. Visually verify the washwater booster pump, hydraulic unit pump, and lower and upper belt drives are in operation.
10. Control the speed of the belts by adjusting the potentiometer at the LCP-BFP as required by your Operations Supervisor.

Individual Equipment Shutdown Procedures

Dewatering System Pumping Facilities

BFP Sludge Feed Pumps

Shut down the sludge feed pumps according to the procedures listed below:

1. Press the Sludge Pumps Stop pushbutton at LCP-BFP for the pump to be shut down.
2. Verify the pump is stopped.
3. Lock the appropriate ROT switch.
4. Turn off the seal water supplied to the pump.
5. If the pump is to be out of service for an extended period of time, flush all sludge lines with non-potable water.
6. If the pump is to be out of service for an extended period of time, disconnect power source, close the isolation valves on pump suction and discharge sides.

Note: The pumps will also automatically shut down on high discharge pressure, a “no flow” condition as detected by signals from a check valve lever position switch, and high motor temperature.

Sludge Grinder

If all the sludge feed pumps are to be out of service, shut down the grinder according to the following procedures:

1. Press the Stop pushbutton located at the LCP-AE.
2. Turn the grinder ROT switch to the “Off” position.
3. If the grinder is to be out of service for an extended period of time, disconnect power source, close the isolation valves on grinder suction and discharge sides.

Dewatering System Polymer Conditioning Facilities

Shut down the Dewatering System Polymer Conditioning Facilities according to the procedures outlined below:

Polymer Bulk Storage Tank

Shut down the polymer bulk storage tanks according to the procedures listed below:

1. Continue to operate the respective transfer pump and to transfer polymer to the mixing tank(s).
2. Monitor polymer level in the bulk tank.

3. After polymer level in the tank reaches the low low-level setting, the polymer transfer pump will automatically shut down. Complete the shut down according to the procedures described in the next section.
4. Materials that do not drain from the storage tank must be diluted, pumped out using a portable submersible pump, and safely disposed.
5. Close the respective tank discharge isolation valve.
6. If the tank is to be out of service for an extended period of time, disconnect the power to the level transmitter.

Polymer Transfer Pumps

Shut down the polymer transfer pumps according to the procedure listed below:

1. Turn the respective HOA switch at LCP-POL for the pumps to be shut down to the “Off” position.
2. Verify the pump has stopped.
3. Lock the appropriate ROT switch.
4. If the pump is to be out of service for an extended period of time, flush all chemical lines with non-potable water and disconnect power source.
5. If the bulk storage tank is to be out of service for an extended period of time, close the isolation valves on pump suction and discharge sides.

Note: The pumps will also automatically shut down on low or high discharge pressure, on low low storage tank level, or on motor failure. Additionally, the pump will automatically shut down as called by the mixing tank level switch signals.

Polymer Mixing Tanks

Shut down the polymer mixing tanks according to the procedures listed below:

1. Close the respective isolation valves on the feed lines to the mixing tank.
2. Continue to operate the polymer feed pumps.
3. Monitor the polymer solution level in the mixing tank.
4. When the level in the mixing tank is below the low level, turn off the mixer by turning the ROT switch to the “Off” position and lock it out. Do not operate the mixer when the polymer level is below the low setting to prevent excessive splashing and mixer vibration.
5. After polymer level in the tank reaches the low- low level setting, shut down the mixing tank as follows:

If alternate mixing tank is to be operational:

- a. Place the Tank 1/Tank 2/Tank 1-2 switch to the mixing tank which is to be operational.
- b. Start-up alternate tank.

If entire polymer system is to be shut down:

- a. Shut down the polymer feed pumps according to the procedures described in the next section.
6. Materials that do not drain from the mixing tank must be diluted, pumped out using a portable submersible pump, and safely disposed.

- a. If the tank is to be out of service for an extended period of time, disconnect the power to the level transmitter.

Note: The mixer will also automatically shut down on motor overload.

Polymer Feed Pumps

Shut down the polymer feed pumps according to the procedures listed below:

1. Press the “Stop” pushbutton at the respective LCP-BFP.
2. Verify the pump has stopped.
3. Lock the appropriate ROT switch.
4. Turn off the seal water supplied to the pump.
5. If the pump is to be out of service for an extended period of time, flush all chemical lines with non-potable water, disconnect power source, and close the isolation valves.

Note: The pump will also automatically shut down on polymer solution low level in the mixing tank, on no flow condition as detected by a flow switch or on motor overload.

Solids Processing Polymer Storage Area Sump Pump

Shut down the sump pump according to the following procedures:

1. Press the Pump Stop pushbutton.

Note: A key is required to unlock the stop pushbutton when the sump pump needs to be started again.

2. Verify the pump has stopped.
3. Lock the appropriate lock switch.
4. If pump is to be out of service for an extended period of time, disconnect power source and close isolation valves.

Note: The sump pump will also automatically shut down on low liquid level or motor overload.

Belt Filter Presses

Shut down the belt filter presses according to the procedures listed below:

1. Place the belt filter press out of operation as follows:

Semi-Automatic Mode of Operation

- a. Press the Auto Stop pushbutton at the LCP-BFP.
- b. The BFP will automatically begin washdown cycle. Therefore, the polymer and sludge feed pumps, grinder (if no other sludge pumps are running), lime stabilization system, and sludge conveyors will automatically shut down after time delays.
- c. After washdown cycle is complete, the belt drives, hydraulic pump, and washwater pump will automatically shut down.

Manual Mode of Operation

- a. Verify that the sludge feed pumps, polymer feed pumps, grinder (if no other sludge pumps are running) lime stabilization system, BFP conveyors, and the truck-loading conveyor have been shut down.
- b. Allow the belt wash stations to run for a minimum of 45 minutes without any sludge or polymer feeding onto the belt press.
- c. Press the Stop pushbutton for the belt drive.
- d. Press the Stop pushbutton for the hydraulic pump.
- e. Press the Stop pushbutton for the washwater booster pumps.
2. Verify the BFP has stopped.
3. Place the HOA switch at the LCP-BFP to the “Off” position.
4. Washdown the auxiliary equipment of the BFP:
 - a. Lift the inlet distribution flap and wash down the gravity section. While working through the chicanes, raise the chicanes and wash.
 - b. Wash down the collection pans and neoprene slates.
 - c. Manually wash conveyor chutes and knife edges.
 - d. Wash down residuals into belt press sump.
 - e. Release knife edges after sludge flow has been cleared and cleaned.
5. Lock the appropriate ROT switches on the BFP equipment:
 - a. Hydraulic Unit Pump Motor
 - b. Washwater Booster Pump Motor
 - c. Upper Belt Drive
 - d. Lower Belt Drive
6. If the press is to be out of service for an extended period of time, disconnect power source and close the appropriate isolation valves.

Note: The BFP will also automatically shut down with or without a washdown mode based on BFP failures, feed failures, or lime stabilization failures as called for by the operational logic described in Section 4.8.1.4.

Emergency Generator

Standby Generator

Introduction:

In the event of a power outage from SDG&E, The IBWC – SBIWTP is equipped with an emergency standby generator. The following Document will guide you through the start-up and shut-down procedures for this generator.

Equipment Start-up Procedure

Generator start-up

Automatic Mode of Operation:

- i. For automatic sequenced MS1 VCB operation and start-up of the generator and plant equipment on loss of SDG&E power, the control switches and pushbutton must be in the positions indicated in Table below
- ii. On SDG&E power fail the following automatic sequence occurs:
 1. Time delay
 2. Generator starts
 3. “A” breaker opens
 4. “A2”, “A3”, “B2”, “B3” breakers open
 5. Generator reaches specified speed & voltage
 6. “G1” breaker closes
 7. MS1 bus is energized via “G1”, AGT and “A7” or BGT and B7
 8. “A2”, “A3”, “B2”, “B3” breakers close
 9. Specific equipment is energized in an automatic sequence to gradually increase load on the generator

**GENERATOR CONTROL SETTINGS FOR
AUTOMATIC MODE OF OPERATION**

Item No.	Switch/Pushbutton Type	Position	Location	Function
1	Auto/Manual Selector Switch	Auto	Structure #2 MS1 Bus B Line-up in Switchgear Bldg	Puts MS1 VCB Control on MS1-PLC Program
2	Generator Emergency Stop Pushbutton	Pulled Out	Front Door LCP-G1 in GEN-LCC	Locks out Generator (Trips Generator VCB-G1)
3	Generator Emergency Stop Pushbutton	Pulled Out	LCP-ENG in Generator Housing	Locks out Generator (Trips Gen. VCB-G1)
4	Engine Auto/Manual Selector Switch	Auto	Front Door LCP-G1 in GEN-LCC	Puts Engine in Auto Start Mode
5	AGT/BGT Selector Switch	Either	Front Door LCP-G1 in GEN-LCC	Selects Generator tie VCB feed to MS1 Bus "A" via VCB-B7
6	Synchronizing Selector Switch On/Off	Off	Front door of MCP-GEN in GEN-LCC	Enables Auto Synchronize between Generator & SDG&E
7	Synchronizing Mode Switch Off-Perm-Check-Run	Check	Inside LCP-G1 on Back Sheet	Enables Auto Synchronize Mode
8	Auto/Manual/Test/Maintenance Selector Switch	Auto	LCP-ENG in Generator Housing	Enables Auto Start of Engine

Manual Mode of Operation

- i. Confirm that MS1 VCB-A-B, A1, A2, A3, A4, A5, A6 and A7 are open. If closed, turn the VCB control switch to “TRIP” to open the circuit breakers. MS1 is located in the Main Switchgear Building.
- ii. Place the switches listed as Items 1, 4 and 8 in Table 4.12-1 in the “MANUAL” position.
- iii. Press the “GEN START” pushbutton on the front panel of LCP-G1. If the generator fails to start, use Item 8 switch in Table 4.12-1 to start the generator.
- iv. With the generator voltage and frequency up to normal, use the generator VCB-G1 control switch on LCP-G1 front panel to close VCB-G1.
- v. Verify that MS1 bus is energized, then close VCBs B1, B2, B3, B4, B7 and B8 using the VCB control switches on the respective front doors of MS1 switchgear.
- vi. Manually start-up equipment in order as listed in Emergency Response.

Diesel Fuel Storage Tank

- a. Fill diesel fuel oil storage tank according to the following procedures:
 - i. Energize the fill station panel FCP-FOST1.
 - ii. Attach fuel supply truck hose to the quick-connect located in the ground level spill containment box adjacent to the tank.
 - iii. Open the isolation valve.
 - iv. Pump the ordered amount of diesel fuel oil No. 2 into the storage tank. If tank is to be filled to full capacity, stop delivering the fuel when the high level alarm is activated at the field control panel.
 - v. When pumping is completed purge the feed pipe with air. Close the isolation valve. Disconnect the supply hose and cap the fill pipe.

WARNING: In case the high level alarm horn sounds, stop fuel pumping immediately; a high level alarm is designed to activate before the tank overflows. Silence the alarm by pressing the “Acknowledge” pushbutton. Alarm light will stay illuminated until the fuel level in the tank is below the high level.

- b. Start-up the diesel fuel storage tank according to the procedures listed below:
 - i. Verify that there is sufficient fuel in the tank.
 - ii. Verify that the diesel fuel oil storage tank fill station panel FCP-FOST1 is energized.

Diesel Fuel Transfer Pump Station

Start-up the diesel fuel transfer pump according to the procedures listed below:

- i. Verify that the suction and discharge isolation valves are opened.
- ii. Place the ROT switch in the “Remote” position.
- iii. Place the pump into operation as follows:

Automatic Mode of Operation

1. Place the appropriate HOA switch at the LCP-FOS1 in the “Auto” position.
2. The pump is now in standby mode and operates based on signals from the PLC-GEN located at the GEN-LCC. The transfer pump will start up when the level in the diesel fuel day tank reaches the “low” level. When the level in the day tank reaches the “high” level, the transfer pump stops.

Manual Mode of Operation

1. Place the appropriate HOA switch at the LCP-FOS1 in the “Hand” position.
 2. After a 0 to 180 second delay the transfer pump will operate continuously and will fill the 300 gallon day tank.
- iv. Visually verify that the pump is operating.

Diesel Fuel Return Pump

Start up the diesel fuel return pump according to the procedures listed below:

- i. Verify that the suction and discharge isolation valves are opened.
- ii. Place the ROT switch in the “Remote” position.
- iii. Place the pump into operation as follows:

Automatic Mode of Operation

1. Place the appropriate HOA switch at the LCP-FOS1 in the “Auto” position.
2. The pump is now in standby mode and operates based on signals from the PLC-GEN located at the GEN-LCC. The return pump will start up when the level in the diesel fuel overflow tank reaches the “high” level. When the level in the overflow tank reaches the “low” level, the return pump stops.

Manual Mode of Operation

3. Place the appropriate HOA switch at the LCP-FOS1 in the “Hand” position.
4. After a 0 to 180 second delay the transfer pump will operate continuously and will empty the 25 gallon overflow tank.

- iv. Visually verify that the pump is operating.

Equipment Shutdown Procedure

Generator Shutdown

- a. Automatic return to restored SDG&E power: the automatic sequence occurs:
 - i. Time delay.
 - ii. Main VCB-A closes in synchronization with SDG&E.
 - iii. VCB-G1 in SG-GDB opens within a few cycles to result in a step less re-transfer.
 - iv. Plant continues to operate.
 - v. Generator runs through cool down period.
- b. Manual Return to Restored SDG&E Power
 - i. Position all switches.
 - ii. Turn the VCB-A control switch located on the front of MCP-GEN to “Close”.
 - iii. Hold VCB-A control switch until breaker is closed by the synch check relay located in MS1 bus A lineup. The Circuit Breaker Closed light will illuminate at the MCP-GEN.
 - iv. VCB-G1 will automatically trip a few cycles after VCB-A is fully closed.

Diesel Fuel Storage Tank

Ensure the diesel fuel transfer pumps are shutdown.

Diesel Fuel Transfer Pump

- a. Turn the pump’s HOA switch at LCP-FOS1 to the “Off” position.
- b. Verify the pump is stopped.
- c. Lock the appropriate ROT switch.
- d. If the pump is to be out of service for an extended period of time, disconnect power source and close the isolation valves on the pump suction line.

Notes: For normal operation, the diesel transfer pump should be placed in standby mode ready for automatic operation if plant power fails. The pumps will also automatically shut down on motor overload. Additionally, the pumps will automatically shut down as called by the PLC-GEN operational logic

Diesel Fuel Return Pumps

- a. Turn the pump’s HOA switch at LCP-FOS1 to the “Off” position.
- b. Verify the pump is stopped.
- c. Lock the appropriate ROT switch.
- d. If the pump is to be out of service for an extended period of time, disconnect power source and close the isolation valves on the pump suction line.

Notes: For normal operation, the diesel transfer pump should be placed in standby mode ready for automatic operation if plant power fails. The pumps will also automatically shut down on motor overload. Additionally, the pumps will automatically shut down as called by the PLC-GEN operational logic.

Power Outage Equipment Reset

Introduction and Purpose:

The South Bay International Wastewater Treatment Plant experiences power glitches and outages periodically. After power glitches and outages, plant equipment must be reset to return to operation. Resetting equipment takes place in the field and on SCADA. This procedure provides guidance for resetting all plant equipment proceeding power glitches and outages.

Foreword:

- If there are signs that a power outage or glitch has occurred, notify all plant personnel via the radio transmitters, and verify the outage via SCADA.
- Power outages typically generate many alarms on SCADA, and certain major equipment turn off and need to be reset and placed back online.
- SCADA will also provide guidance on what specific equipment needs to be reset: pieces of equipment that need to be reset are not always the same.
- Equipment can be reset in the following way:
 - Main Breaker / Knife Switch
 - VFD reset buttons (for variable speed pumps)
 - Reset buttons on equipment panels
 - Reset buttons on annunciator panels
 - SCADA: in Operations Control Room, AST MCC, SST MCC, and DAFT MCC (must be logged on to reset equipment).
- If you are unsure where the equipment needs to be reset (e.g. Main Breaker, VFD, SCADA), then go through the above sequence until it's back online.

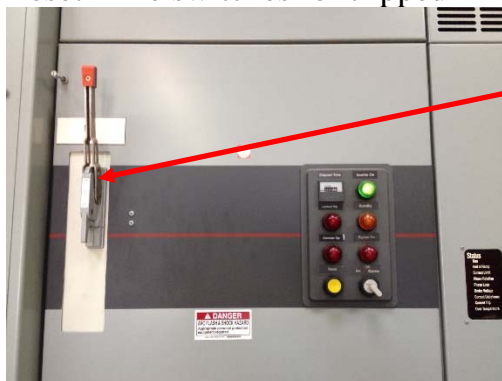
Procedure:

1. The first person available goes to reset the Non-Potable Water System Pumps: it is critical that this system is running immediately because it provides seal water to all plant pumps.
 - a. SST MCC:
 - i. Check all five (5) Non-Pot Pumps' VFD's to see if they need to be reset. If they do, then press the STOP/RESET buttons.
 - ii. Check SCADA to make sure that the pumps are in AUTO and that they're achieving their psi setpoint.
 - iii. If the pumps are still not working, then go through the full reset sequence, starting with the Main Breaker.





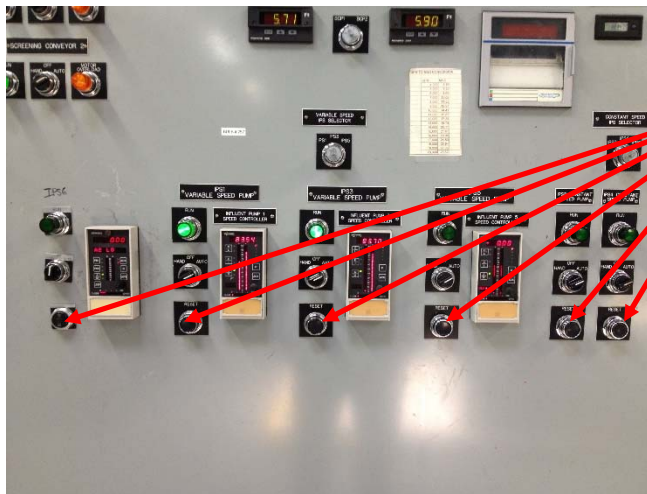
2. The second person goes to Headworks to reset the Influent Pumps: this is also critical to keep water flowing through the plant.
 - a. Headworks MCC:
 - i. Influent Pumps:
 1. Reset knife switches for tripped influent pumps.



2. Then reset their VFD's.



3. Then reset their “Reset” buttons on the Annunciator Panel.



- ii. While you're in the Headworks MCC, the following equipment may also be reset once the Influent Pumps are up and running
 1. Grit Classifiers
 2. Headworks Odor Control
 3. Check Facilities Gates for proper operation
3. The remainder of equipment should be reset in the following locations:
 - a. PST MCC
 - i. Grit Blowers
 - ii. Grit Pumps
 - iii. Ferric Pump
 - iv. Anionic Polymer Skid
 - v. Sludge Collectors
 - vi. Sludge Pumps
 - vii. PST Odor Control
 - b. AST MCC (Blower Building MCC)

- i. Process Air Blowers reset takes place at the following locations:
 1. If the orange emergency strobe light is flashing in the Blower Room, then the big orange reset button at the middle-right side of the blower's panel (attached to the blower) will need to be reset.
 2. If not, check the main panel with the main breaker to see if tripped:



3. Press the small red Reset button referred to in the picture below:



4. After that, press the big red button that says “PUSH OFF”, and then the big green button that says “PUSH ON”.



ii. Finally, the reset button below may need to be reset:



1. After an outage, the PAB's program automatically sets PAB 1 as Lead, PAB 2 as Lag, and PAB 3 as standby, regardless of the sequence before the outage.
 2. The PAB's don't start automatically; there is a pre-lube cycle that lasts a few minutes to prepare the blower for operation, so use the wait time to reset the Mixers, IMLR Pumps and SCAB's.
- iii. SCAB's: these need to be reset using the RESET button located on their corresponding main breaker panels.

- iv. AST Mixers and IMLR Pumps
- c. SST MCC
 - i. SST Sludge Collectors
 - ii. RAS Pumps
 - iii. WAS Pump
- d. DAFT MCC
 - i. DAFT Collector
 - ii. Pressurization Pump
 - iii. Polymer mixing tank mixer
- e. Solids Processing MCC
 - i. Reset the USST and Solids Processing Odor Control Units
 - ii. Check on BFP's when all other, more urgent systems have been reset.
 - iii. Reset the Bulk Polymer Transfer Pump.
- 4. When all pieces of equipment have been reset on SCADA and in the field, go through all SCADA screens to ensure that everything is running properly.
- 5. Finally, perform a plant walk-through and inspect all processes to make sure everything is operating properly.

Emergency Conditions:

Emergency conditions can include, but are not limited to: smoke, a burning smell or a fire being present at a panel.

1. Do not approach the panel.
2. If safe to do so and you know where the breaker panel for the equipment is located, turn off the breaker.
3. Secure the area and call emergency services if needed.
4. Inform your Coworkers and Supervisor.