CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/01/08	All	New Procedure
1	10/08/09	3, 5	Revisions
2	4/29/10		Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) contains instructions for cleaning the wet end of the extraction well pumps.

1.2 Scope and Applicability

This DOP applies to extraction well pump wet end cleaning at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cat A and B.

2.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent access to the extraction wells. If issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that DOP-LOTO-003, "Well Pumps P101-P110" has been completed for the specific extraction well pump to be serviced. If not, exit this procedure and perform DOP-LOTO-003.

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 Equipment Required

Leather work gloves, safety goggles, face shield, nitrile gloves, neoprene apron, neoprene sleeves (located in the cabinet containing personal protective equipment [PPE]), flathead screwdriver, ½-inch wrench, small Philips head screwdriver (located in

the tool cabinet), vault key (located in the key box attached to the PPE cabinet), safety cones, 5-gallon bucket with a lid, plastic sheeting, spare Grundfos pump wet end (located in the Conex box), polyethylene beaker (located in the acid cabinet), measuring cup.

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

3.1 _____ SO: Verify that DOP-LOTO-003, "Well Pumps P-101 through P-110" has been completed to lock and tag out the desired disconnect.

3.2 _____ SO: Complete DOP-015, "Extraction Well Vault Access" for access to the desired vault.

3.3 _____ SO: Perform DOP-016, "Extraction Well Pump Pull" to pull the extraction well pump out of the well. Stop at Step 3.17 in DOP-016, "Extraction Well Pump Pull" and proceed to the next step of this DOP.

3.4 _____ SO: Remove the wire guard on the side of the pump using the small Philips head screwdriver. Using the wrench, remove the ½-inch bolts on top of the pump, and remove the wet end. Exercise care not to allow groundwater to spill on the ground or pavement.

3.5 _____ SO: Place the wet end in the 5-gallon bucket for transport to the process sink.

3.6 _____ SO: Install a clean spare Grundfos wet end pump on the extraction well motor. Return ½-inch bolts to the top of the pump. Reinstall the wire guard. DO NOT use an impact driver for this task.

3.7 _____ SO: Return to DOP-016, "Extraction Well Pump Pull" Step 3.18 to return the extraction well pump with the newly installed wet end back down the well. Continue from Step 3.18 and complete DOP-016, "Extraction Well Pump Pull." Record this maintenance event in the logbook.

3.8 _____ SO: The ultrasonic cleaner consists of a holding tank and a basket. **If the ultrasonic cleaner tank is empty:** don goggles, a face shield, a neoprene apron, neoprene sleeves and nitrile gloves. Use caution: The descaler is a dilute organic acid. Using the measuring cup, add 64 ounces of Omega Descaler to the ultrasonic tank. Perform this step over the ultrasonic cleaner's dual containment pallet. Use a clean five gallon bucket and fill the ultrasonic cleaner tank to one inch below the top of the tank with potable water. **If the cleaner already contains the solution** (Omega Descaler and water mixture), **skip to the next step.**

3.9 _____ SO: Check the ultrasonic cleaning log for the solution start date. The solution should be changed out at least once a month. **If the solution start date is in range, continue with this step of the procedure. If the solution date is out of range, the solution must be replaced with fresh solution. Skip to the next step.** Solution level MUST be filled to one inch from the top of the tank. Use a five gallon bucket to fill to one inch below the top of the cleaner tank with potable water if needed. Ensure that the fluid level is one inch below the top of the tank and proceed to the step 3.11.

3.10 _____ SO: **If the solution in the ultrasonic cleaner's tank is new or its date is within range, skip this step of the procedure**. **To replace the solution with fresh solution follow this step.** To drain the ultrasonic cleaner tank, don goggles, nitrile gloves, neoprene sleeves, a neoprene apron, and a face shield. Place a bucket inside the yellow containment pallet underneath the ultrasonic cleaner drain valve. Slowly open the drain valve. When the bucket is half full, close the drain valve, and carefully empty the drained solution into a plastic 55 gallon drum. Continue this process until the tank is empty. Label the drum "process water" with a non-hazardous waste label. Use caution: The descaler is a dilute organic acid. Using the measuring cup, add 64 ounces of Omega Descaler to the ultrasonic tank. Perform this step over the ultrasonic cleaner's dual containment pallet. Use a clean five gallon bucket and fill the ultrasonic cleaner tank to one inch below the top of the tank with potable water.

3.11 _____ SO: Don nitrile gloves. Bring the bucket containing the soiled Grundfos pump to the process sink Caution: The pump contains small parts that are easily lost. Remove the pump from the bucket and hold it over the sink. Remove the screen from the top of the pump and the check valve from the bottom. Remove the ½-inch bolt from the pump and disassemble the pump. Place all parts back into the bucket. Rinse the parts one by one in the process sink, and then transfer them to the ultrasonic cleaner located inside the Conex Box. Place the pump parts in the ultrasonic cleaner basket. The basket must be in the ultrasonic cleaner to proceed. Do not stack the pump parts in the basket. Caution: Never use ultrasonic cleaner without the basket. This will lead to equipment failure.

3.12 _____ SO: Turn on unit power on the lower left hand side of the cleaner. Set the heat to the "75" setting and set the sound timer to 30 minutes. Place the lid securely on the top of the unit.

3.13 _____ SO: Remove PPE and dispose of used PPE in the drum labeled "Used PPE" in the Conex box.

3.14 _____ SO: After the timer has stopped (30 minutes), turn the unit power off. Don nitrile gloves. Slowly remove the stainless steel basket from the ultrasonic cleaner and place it in a bucket. Allow residual solution to drain into the tank from the basket. Caution: Water is hot and acidic.

3.15 _____ SO: Bring the bucket to the process sink and rinse the parts. Inspect for iron scaling. Thoroughly rinse the bucket with tap water. **If the pump parts are not clean**: Return the parts to the ultrasonic cleaner basket, ensure solution level is one inch from the top of the tank, and restart procedure at step 3.12. Repeat these steps until clean. **If the pump parts are clean, proceed to the next step.**

3.16 _____ SO: Reassemble the pump and place it in the storage box. .

3.17 _____ SO: Unplug the ultrasonic cleaner. **If the ultrasonic cleaning solution is now out of range proceed to the next step to drain the unit**. **If the solution date is still within range, skip the next step and end the procedure.**

3.18 _____ SO: To drain the cleaner, allow solution to cool for 30 minutes. Place a five gallon bucket inside the yellow containment pallet underneath the ultrasonic cleaner drain valve. Don nitrile gloves, an apron, goggles, sleeves, and a face shield. Slowly open the drain valve. When the bucket is half full, close the valve and carefully empty the bucket into a plastic 55 gallon drum. Continue this process until the cleaner reservoir is empty. Label the drum "process water" with a non-hazardous waste label.

3.19 _____ SO: Remove PPE and return tools and supplies to their original location.

4. COMPLETION

4.1 _____ SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- DOP-LOTO-003 "Well Pumps P-101 through P-110"
- DOP-015 "Extraction Well Vault Access"
- DOP-016 "Extraction Well Pump Pull"
- DOP-FT-006 "Cleaning and Decontaminating Equipment"
- DOP-FT-003 "Trash Procedures"

Ultrasonic Cleaner

Drain Valve

Containment Pallet

Basket

Tank

Controls

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/03/08	All	New Procedure
1	10/09/09		Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for checking and replacing Photo-Cat fuses.

1.2 Scope and Applicability

This DOP applies to checking and replacing Photo-Cat fuses associated with the Purifics Photo-Cat located inside the treatment center building at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Only trained staff donning the appropriate personal protective equipment (PPE) may check and replace the Photo-Cat fuses. Staff working with the fuses must wear safety glasses.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of the "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cat A and B.

3.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent checking and replacing the Photo-Cat fuses. If issues are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ SO: Verify that no emergency stops are in effect (e.g. hurricane, flood). If in effect, exit this procedure.

3.1.4 _____ SO: Perform DOP-003, "Short-Term System Shutdown" prior to initiating this procedure.

3.2 Planning and Coordination

3.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure,
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

3.3 **Equipment Required**

PPE: Safety glasses, steel-toed boots, safety vest

10, 20 or 30 amp fuses (located in the supply cabinet)

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

4.1 _____ SO: With the Treatment System operating, open the desired cabinet and visually scan the various fuse blocks for a yellow indicator light at the bottom of each fuse block. If the yellow indicator light is on, the fuse is blown and must be replaced. Make a note of the position of the blown fuse inside the fuse block (1^{st}, 2^{nd}, 3^{rd}).

4.2 _____ SO: Open the fuse block containing the blown fuse.

4.3 _____ SO: Turn off the Photo-Cat unit before removing any blown fuse. Refer to SOP-003 “Short Term Treatment System Shutdown.” Then turn of the power to the individual Photo-Cat unit or VFD cabinet by going to the disconnect for the unit with the blown fuse, and switching the disconnect to the off position. The disconnects are located on the east side of Photo-Cat A, on the west side of Photo-Cat B, and on the front of the VFD cabinet. **Caution:** This will shut off the power to the fuse blocks inside the individual units, but the large power feed wires will still be powered. Use caution to not come into contact with these wires.

4.4 _____ SO: Remove the blown fuse. Pay close attention to the type of fuse being removed as it must be replaced with the same type (10, 20 or 30 amp).

4.5 _____ SO: Insert a new fuse. These are located in the supply cabinet. Close the fuse block.

4.6 _____ SO: Turn on the Photo-Cat by closing the cabinet and switching the disconnect lever on the respective cabinet to the “on” position.

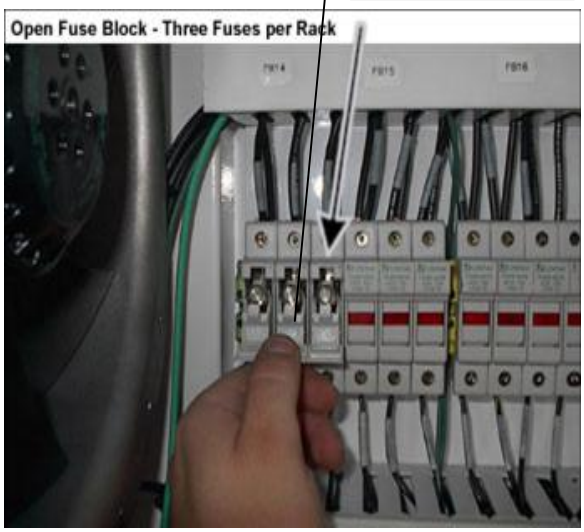
5. COMPLETION

5.1 _____ SO: Verification of completion.

SO Signature _____ Date _____

6. REFERENCES

- SOP-003 “Short-Term Treatment System Shutdown”



Indicator light (shown in red).

Photo-Cat disconnect in the “off” position.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/03/08	All	New Procedure
1	7/30/09	All	Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for checking and replacing Photo-Cat lamps. Photo-Cat lamps and ballasts are not to be replaced when powered. This procedure has several provisions to ensure that a suspect lamp or ballast is not powered when being replaced. To de-energize the UV lamps, pull the associated fuse block. To de-energize the ballasts, shut down the system. If at any time you feel uncomfortable performing any part of this procedure, notify the lead operator for additional instruction.

1.2 Scope and Applicability

This procedure applies to checking and replacing Photo-Cat lamps and ballasts associated with the Purifics Photo-Cat located inside the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Appropriately trained staff using the appropriate personal protective equipment (PPE) may check and replace the Photo-Cat lamps. Staff working with the lamps must wear long sleeves, UV protected safety glasses, nitrile gloves and a full plastic face shield for UV protection. (Located in the PPE cabinet) In addition, the operator must be NFPA-70E trained and de-energize the lamps and ballasts prior to disconnecting or connecting any electrical source.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

3.1.2 _____ SO: Refer to the "Operations Log" to ensure that there are no operational issues reported/ recorded that would prevent checking and replacing the Photo-Cat lamps. If such are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

3.2 Planning and Coordination

3.2.1 SO: IF any of the following events occur,
THEN exit this procedure
AND go to the following procedure in the Contingency Plan.

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

3.3 Equipment Required

PPE: Long sleeves, nitrile gloves, UV protected safety glasses and a full plastic face shield (can be found in the PPE cabinet).

Task-specific equipment: box of UV lamps, spare ballasts (can be found in the Conex box); brightly colored electrical tape (can be found in the supply cabinet); snap ring pliers and flashlight (located in the tool cabinet).

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

4.1 _____ SO: Retrieve the items listed in Step 3.3 of this procedure and stage them next to Photo-Cat A.

4.2 _____ SO: Turn off the treatment building lights and turn on flashlight.

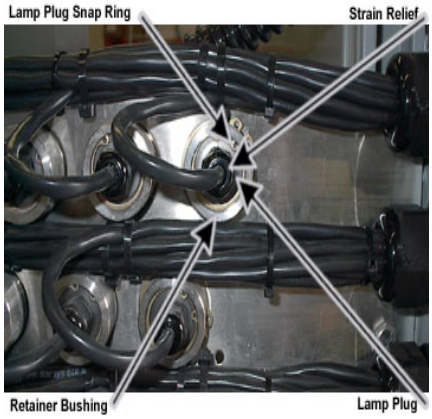
4.3 _____ SO: Visually inspect the lamps on the north and south sides of Photo-Cat A and Photo-Cat B. A bright purple light should be seen through the clear plastic plug that holds the lamps in the stainless steel tubes. Mark with the electrical tape any lamps whose bright purple light cannot be seen.

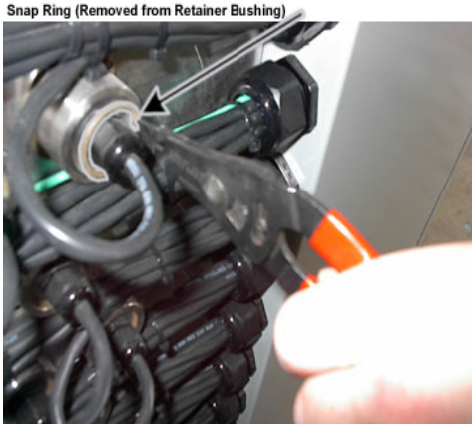
4.4 _____ SO: Turn on the building lights and don all required PPE, which is located in the PPE cabinet (nitrile gloves, long sleeves, safety glasses and face shield).

CAUTION: The lamps produce UV light which can damage your eyes. Plastic effectively limits UV light from passing through it, glass does not. Therefore, all safety glasses and shields used in this procedure must be plastic. UV glasses are available in the PPE cabinet.

4.5 _____ SO: If any of the necessary PPE cannot be located, exit this procedure until it is located.

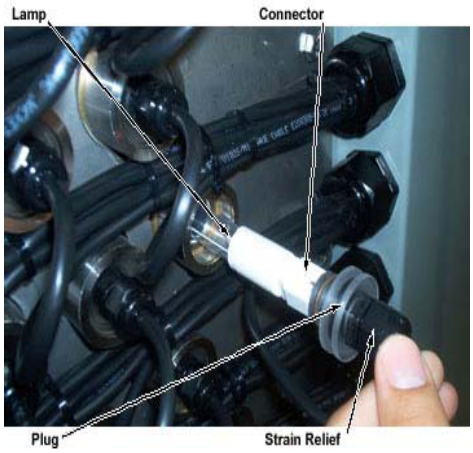
4.6 _____ SO: Select two lamps marked with electrical tape.





4.7 _____ SO: Using the diagram located in each ballast cabinet, locate the associated fuse blocks and pull towards you. **Caution: Electrical equipment inside cabinets is energized. Do not touch or allow any tools near energized electric.** This will de-energize the associated lamps and ballasts. Remove these lamps from the stainless steel tube by removing the retainer ring with the snap ring pliers**.**

4.8 _____ Pull the retainer bushing out of the stainless steel tube, pulling on the strain relief bushing only (DO NOT PULL ON THE WIRE). Remove a small portion of the lamp from the quartz tube. Take caution to avoid touching the lamp with dirty gloves or bare hands, as smudges on the lamps will cause hot spots on the lamp and premature failure.



4.9 _____ SO: Re-energize the associated fuse block. Without looking directly at the lamp, check to verify whether or not it lights.

4.10 _____ SO: **If the lamp does light**, reinstall the lamp, move to another suspect lamp and repeat this procedure. **If the lamp does not light**, follow step 4.7 and remove the plug from a working, adjacent lamp and connect it to the non-working lamp. This will clarify whether the lamp or the ballast needs to be replaced.

4.10.1 _____ SO: **If the suspect lamp now lights, skip to the next step**. If the suspect lamp still does not light, the lamp is spent. De-energize the associated fuse block and replace the spent lamp with a new lamp located in the Conex box. Carefully place the spent lamp in the universal storage area in the box marked “spent UV lamps.” Re-energize the fuse block, and verify that the new lamp works. Make note of this replacement in the Lamp Replacement binder and reinstall the electrical plug and snap ring.

4.10.2 _____ SO: If the first lamp now lights when attached to an adjacent plug, the ballast may need to be replaced. Attach the plug from the first lamp to an adjacent test lamp (which is known to be working).

4.10.3 _____ SO: **If the test lamp will not light**, the ballast needs to be replaced. Use the diagram located in the ballast cabinet to locate the correct ballast.

4.11 _____ SO: Use the chart in the ballast cabinet to determine the position of the ballast that needs to be replaced. Mark the defective ballast for replacement and proceed by performing this procedure on all suspect lamps.

4.12 _____ SO: When all suspect lamps have been inspected, shut down the system per SOP-003 “Short Term Treatment System Shutdown.”

4.13 _____ SO: Remove the wire harness from the ballast, removing the grounds last and then unscrewing the ground screw.

4.14 _____ SO: Remove the ballast with your right hand and set it aside in a safe place. Handle the ballast as little as possible for at least thirty seconds after shutdown.

4.15 _____ SO: Insert a new ballast into the rack, noting its position on the table below and writing the date and time of replacement on the ballast itself using a permanent marker.

4.16 _____ SO: Attach ground screw and grounds first, followed by the rest of the wire harness.

4.17 _____ SO: Restart system according to SOP-002 “Routine System Start-Up.”

4.18 _____ SO: Once the UV lamps are back on, check lamps controlled by the replaced ballast to ensure that they now light properly. If lamp does not light with “new” ballast, recheck position of the ballast using lamp/ ballast chart in the ballast cabinet. Notify the Lead Operator.

4.19 _____ SO: Repeat steps 4.6 through 4.18 until all lamps are functioning properly.

Table 4.1 Photo-Cat A North (Ballast Cabinet 1A)

RACK	1	2	3	4	5	6	7	8
R8B								
R8A								
R7B								
R7A								
R6B								
R6A								
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.2 Photo-Cat A North (Ballast Cabinet 2A)

RACK	9	10	11	12	13	14	15	16
R8B								
R8A								
R7B								
R7A								
R6B								
R6A								
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.3 Photo-Cat A South (Ballast Cabinet 3A)

RACK	1	2	3	4	5	6	7	8
R8B								
R8A								
R7B								
R7A								
R6B								
R6A								
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.4 Photo-Cat A South (Ballast Cabinet 4A)

RACK	9	10	11	12	13	14	15	16
R8B								
R8A								
R7B								
R7A								
R6B								
R6A								
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.5 Photo-Cat B North (Ballast Cabinet 1B)

RACK	1	2	3	4	5	6	7	8
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.6 Photo-Cat B North (Ballast Cabinet 2B)

RACK	9	10	11	12	13	14	15	16
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.7 Photo-Cat B South (Ballast Cabinet 3B)

RACK	1	2	3	4	5	6	7	8
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

Table 4.8 Photo-Cat B South (Ballast Cabinet 4B)

RACK	9	10	11	12	13	14	15	16
R5B								
R5A								
R4B								
R4A								
R3B								
R3A								
R2B								
R2A								
R1B								
R1A								

5. COMPLETION

5.1 _____ SO: Verification of completion.

SO Signature _____ Date _____

6. REFERENCES

- Purifics ES Inc. Operation & Maintenance Support Information Manual Model: Photo-Cat, Serial: 5P1203.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/03/08	All	New Procedure
1	04/28/09		Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for filling the 100-gallon acid tank located in the northwest corner of the treatment center building. The tank should not be filled with more than 90 gallons of acid at one time. The volume of acid is measured with an ultrasonic sensor and can be verified by the red line identifying the 90-gallon level on the tank. When the level of acid has decreased to approximately 20 gallons, the tank must be refilled following the procedures presented in this DOP. The acid used is 93% sulfuric acid.

1.2 Scope and Applicability

This DOP applies to filling the acid tank inside of the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Only staff certified in the handling of acids and caustics are allowed to clean up spills of acids/caustics up to 5 gallons. Spills of up to 5 gallons will be cleaned up using the on-site spill response kit located outside the treatment center on the east side of the building inside the green plastic shed. Certified staff responding to a spill must don a Level C respirator with acid gas cartridges, chemical-resistant Tyvek® coveralls and chemical-resistant gloves. Chemical response PPE is located in the locker room. *Note: Use only the respirator with which you were fit tested. A respirator will not be worn without the concurrence of both the Project Manager and the Health and Safety Manager named in the Health and Safety Plan (HASP).*

2.2 Spills estimated to be larger than 5 gallons will be handled by the waste disposal contractor "SWS First Response" (800.852.8878) for 24-hour emergency response. Use the contact list in Table 1 of the Contingency Plan (located in the OMM Manual located in the ARCADIS office, or in the east side door of the treatment system building) to notify the site Emergency Coordinator or their designee.

2.3 If the SWS First Response team is required to access the site, follow DOP-FT-010, "Subcontractor Access."

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ LO/SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

3.1.2 _____ LO/SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent filling the acid

tank. If such issues are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ LO/SO: Verify that the acid tank contains 35 gallons or less.

3.1.4 _____ LO/SO: Verify that the DOP-FT-010 has been completed to allow subcontractor access to the site. If not, perform DOP-FT-010.

3.1.5 _____ LO/SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.1.6 _____ LO/SO: Verify that there are no visible leaks coming from the acid tank by checking the bottom of the yellow "Saf-Tainer." If liquids are present, exit this procedure and call the OM.

3.1.7 _____ LO/SO: Test the eyewash/shower combo to ensure that the safety eyewash and shower are operational.

3.2 Planning and Coordination

3.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown: refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown: refer to "Hurricane Preparation" in the Contingency Plan.

3.3 Equipment Required

PPE: Two sets of each: disposable nitrile inner gloves, neoprene outer gloves, neoprene apron, neoprene sleeves, safety goggles, face shield (located in the cabinet labeled "PPE" on the east wall inside the treatment center building).

PPE in case of spill: chemical-resistant Tyvek® coveralls, Level C respirator with acid gas cartridges, chemical-resistant rubber boots (located in the locker room), spill response kit (located in the green plastic shed on the east side of the treatment center building).

Task-specific equipment: Lutz transfer pump (this pump will be clearly labeled "Acid Transfer Pump" and located in the grey plastic shed on the west side of the treatment center building.); Chemical transfer hose (this hose will be clearly labeled "Acid Transfer Hose" and located in the plastic shed on the west side of the treatment center building); containment trays (located next to the shed on the west side of the treatment center building); and plastic garbage bags, pH strips, extension cord, 6 foot ladder, spill pads, small container of baking soda (located in the supply cabinet Photo-Cats A and B).

3.4 Approvals and Notifications

Approval to perform this procedure has been obtained from the OM.

Lead Operator Signature _____ Date _____

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO Operator _____

SO Operator _____

4.1 _____ LO/SO: Retrieve and stage the following items outside the treatment building:

- All required PPE is located in the cabinet labeled PPE inside the treatment center building (nitrile inner gloves, neoprene outer gloves, neoprene sleeves, neoprene apron, safety goggles, face shield). If any of the necessary PPE cannot be located, exit this procedure until it is located.
- Stage all other task specific equipment next to the access door on the northwest side of the building labeled "ACID." Verify that transfer hose and transfer pump are both clearly labeled "ACID."

4.2 _____ LO/SO: Direct the chemical delivery truck driver to back up to the small door labeled "Acid." Spot the driver as they back up. Stop the driver when they are about 5 feet from the small door labeled "Acid." Inspect the label on the drum to ensure it reads "93% or 98% Sulfuric Acid." If it does not, exit this procedure and refuse delivery of the chemical and contact lead operator.

4.3 _____ LO/SO: Instruct the delivery driver to unload the drum to rest on top of the dual containment pad using the lift gate on the truck. CAUTION: NEVER allow the use of any rolling object on the lift gate (pallet jacks, hand trucks, etc.) Drums must be unloaded very carefully by hand.

4.4 _____ LO/SO: Escort the delivery driver to the security gate. Driver must observe speed limit.

4.5 _____ LO/SO: Verify that that the eyewash/shower combo has been tested.

4.6 _____ LO/SO: Don nitrile gloves. Using the pH strips located in the supply cabinet, verify the pH of the acid in the drum by following these steps: Remove the bung. Hold the strip over the drum for approximately 30 seconds. Following the instructions on the pH strips bottle, read the pH of the acid vapors. Acid pH is extremely low and the strip must indicate a low pH. If the strip indicates a high pH, DO NOT transfer this chemical. Call the vendor immediately.

4.7 _____ LO/SO: Slowly place the transfer pump into the bung hole. Connect the dedicated acid transfer hose to the dedicated acid transfer pump. Connect the other end of the dedicated acid transfer hose to BV-702. (Connect hose to the transfer point by opening the small grey door labeled "Acid" and connecting the male cam lock on the hose to the female cam lock on the transfer point.) Hose and pump will be clearly labeled "Acid Transfer Hose" and "Acid Transfer Pump."

4.8 _____ LO/SO: Don all needed PPE (nitrile inner gloves, neoprene outer gloves, neoprene apron, neoprene sleeves, safety goggles, face shield).

4.9 _____ LO/SO: One operator will remain at the transfer pump until the transfer process is complete. The other operator will remain at the transfer point (BV-702) until the transfer is complete.

4.10 _____ LO/SO: Open BV-702 at the transfer point, both valves on the dedicated acid transfer hose and the valve on the acid transfer pump.

4.11 _____ LO/SO: Using an extension cord, plug in the electrical cord on the acid transfer pump and turn on the pump. Remain at the pump during transfer. Be ready to turn off the pump immediately if any leaks are noted.

If leaks are noted in the acid tank or in the transfer point fittings, turn off and unplug the transfer pump and close the valve on the pump. Disconnect the dedicated hose from the pump and drain the hose by lifting the end that was connected to the pump toward the sky. When the hose is drained, close valves on the hose and repair any leaks. Be sure to repair leaks over the containment pallet. For instruction on handling spills, see Section 2 of this procedure. Continue only after leak has been repaired. If the leak cannot be fixed at the time, exit this procedure until this issue has been resolved.

4.12 _____ LO/SO: Turn off the acid transfer pump when acid tank has been filled within approximately 0.5 inches below the red line on the acid tank. **Do not fill past the red line**.

4.13 _____ LO/SO: Stage a spill pad underneath the fittings, as they will drip chemical when disconnected. Close the valve on the acid transfer pump, remove the acid transfer hose from pump by disconnecting the cam lock fitting. Wipe the fitting thoroughly with the spill pad to catch any chemical that may remain. Replace the cam lock cover. Drain the acid transfer hose by lifting the end that was connected to the pump higher than the acid transfer point (BV-702) to allow any remaining acid to drain into the acid tank. You must climb the staged 6 foot ladder to accomplish this.

4.14 _____ LO/SO: Close both valves on the acid transfer hose and the valve on the acid transfer point (BV-702).

4.15 _____ LO/SO: Slowly remove acid pump from the acid drum and wipe the remaining chemical residue off of the pump stem using spill pads. Wipe the residue off of the stem as it is lifted from the drum. Place the pump inside the lined garbage can, and dispose of the spill pads and any contaminated PPE in a plastic garbage bag. Pour baking soda into the plastic garbage bag to neutralize the acid residue on the spill pads. Seal the plastic bag.

4.16 _____ LO/SO: Disconnect the transfer hose cam lock from the BV-702 transfer point. Hold a spill pad underneath the fitting to capture chemical drips. Replace cam lock cover to BV-702.

4.17 _____ LO/SO: Coil up the acid transfer hose and place it in the heavy duty trash bag. Return the hose to the grey plastic shed on the west side of the building. Return the acid transfer pump to the grey storage shed on the west side of the building.

4.18 _____ LO/SO: Remove PPE.

4.19 _____ LO/SO: Close the chemical transfer point access door.

4.20 _____ LO/SO: Return containment tray to the west side of the building in the fenced area, next to the grey storage shed.

4.25 _____ LO/SO: Follow DOP-FT-003, "Trash Procedures" for proper handling of trash. Place garbage bag that contains contaminated spill pads and PPE in the drum labeled "PPE" located inside the Conex box.

4.26 _____ LO/SO: Return all equipment, PPE and supplies to their proper designated storage locations.

5. COMPLETION

5.1 _____ LO/SO: Verification of completion.

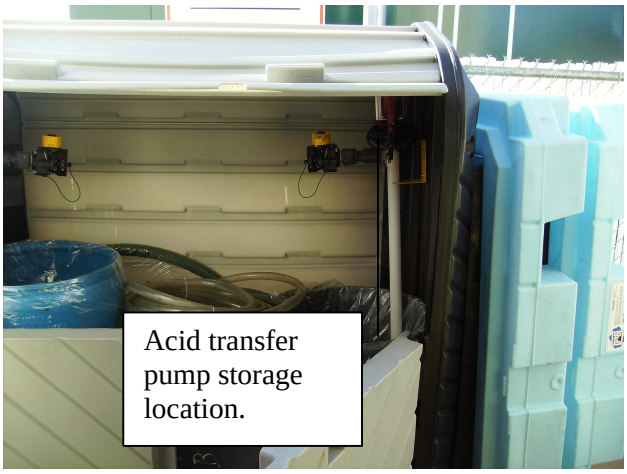
LO Signature _____ Date _____

6. REFERENCES

- DOP-FT-010 "Subcontractor Access"
- DOP-008 "Safety Eyewash Stations"
- DOP-FT-003 "Trash Procedures"


Acid transfer access door.
ACID


BV-702 transfer point.


Acid transfer pump storage location.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/03/08	All	New Procedure
1	04/28/09		Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for filling the 100-gallon caustic tank located in the northeast corner of the treatment center building. The tank should never be filled with more than 75 gallons of caustic at one time. The volume of caustic is measured with an ultrasonic sensor and can be verified by the red line identifying the 75-gallon level on the tank. When the level of caustic has decreased to approximately 20 gallons, the tank must be refilled following the procedures presented in this DOP. The caustic used is 50% sodium hydroxide.

1.2 Scope and Applicability

This DOP applies to filling the caustic tank inside of the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Only staff certified in the handling of acids and caustics are allowed to clean up spills of acids/caustics up to 5 gallons. Spills of up to 5 gallons will be cleaned up using the on-site spill response kit located outside the treatment center on the east side of the building inside the green plastic shed. Certified staff responding to a spill must don a Level C respirator with appropriate cartridges, chemical-resistant Tyvek® coveralls, chemical resistant boots and chemical-resistant gloves. Chemical response PPE is located in the locker room. *Note: Use only the respirator with which you were fit tested. A respirator will not be worn without the concurrence of both the Project Manager and the Health and Safety Manager named in the Health and Safety Plan (HASP).*

2.2 Spills estimated to be larger than 5 gallons will be handled by the waste disposal contractor "SWS First Response" (800.852.8878) for 24-hour emergency response. Use the contact list in Table 1 of the Contingency Plan (in the OMM Manual located in the ARCADIS office, or in the east side door of the treatment system building) to notify the site Emergency Coordinator or their designee.

2.1 If the SWS First Response team is required to access the site, follow DOP-FT-010, "Subcontractor Access."

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ LO/SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

3.1.2 _____ LO/SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent filling the

caustic tank. If such issues are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ LO/SO: Verify that the caustic tank contains 20 gallons or less.

3.1.4 _____ LO/SO: Verify that the DOP-FT-010 has been completed to allow subcontractor access to the site. If not, perform DOP-FT-010.

3.1.5 _____ LO/SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.1.6 _____ LO/SO: Verify that there are no visible leaks coming from the caustic tank by checking the bottom of the yellow "Saf-Tainer." If liquids are present, exit this procedure and call the OM.

3.1.7 _____ LO/SO: Test the eyewash/shower combo to ensure that the safety eyewash and shower are operational.

3.2 Planning and Coordination

3.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown: refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown: refer to "Hurricane Preparation" in the Contingency Plan.

3.3 Equipment Required

PPE: Two sets of each: disposable nitrile inner gloves, neoprene outer gloves, neoprene apron, neoprene sleeves, safety goggles, face shield (located in the cabinet labeled "PPE" on the east wall inside the treatment center building).

PPE in case of spill: chemical-resistant Tyvek® coveralls, Level C respirator with appropriate cartridges, chemical-resistant rubber boots (located in the locker room), spill response kit (located in the green plastic shed on the east side of the treatment center building).

Task-specific equipment: Lutz transfer pump (this pump will be clearly labeled "Caustic Transfer Pump" and located in the grey plastic shed on the west side of the treatment center building.); Chemical transfer hose (this hose will be clearly labeled "Caustic Transfer Hose" and located in the plastic shed on the west side of the treatment center building); containment trays (located next to the shed on the west side of the treatment center building); and plastic garbage bags, pH strips, extension cord, 6 foot

ladder, spill pads, and a small container of vinegar (located in the cabinet marked "supply" between Photo-Cats A and B).

3.4 Approvals and Notifications

Approval to perform this procedure has been obtained from the OM.

Lead Operator Signature _____ Date _____

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO Operator _____

SO Operator _____

4.1 _____ LO/SO: Retrieve and stage the following items at the northeast corner of the treatment building:

- All required PPE is located in the cabinet labeled PPE inside the treatment center building (nitrile inner gloves, neoprene outer gloves, neoprene sleeves, neoprene apron, safety goggles, face shield). If any of the necessary PPE cannot be located, exit this procedure until it is located.
- Stage all other task specific equipment next to the access door on the northeast side of the building labeled "CAUSTIC." Verify that transfer hose and transfer pump are both clearly labeled "CAUSTIC."

4.2 _____ LO/SO: Direct the chemical delivery truck driver to back up to the small door labeled "Caustic." Spot the driver as they back up. Stop the driver when they are about 5 feet from the small door labeled "Caustic." Inspect the label on the drum to ensure it reads "50% Sodium Hydroxide." If it does not, exit this procedure and refuse delivery of the chemical and notify lead operator.

4.3 _____ LO/SO: Instruct the delivery driver to unload the drum to rest on top of the dual containment pad using the lift gate on the truck. CAUTION: NEVER allow the use of any rolling object on the lift gate (pallet jacks, hand trucks, etc.) Drums must be unloaded very carefully by hand.

4.4 _____ LO/SO: Escort the delivery driver to the security gate. Driver must observe speed limit.

4.5 _____ LO/SO: Verify that that the eyewash/shower combo has been tested.

4.6 _____ LO/SO: Don nitrile gloves. Using the pH strips located in the supply cabinet, verify the pH of the caustic in the drum by following these steps: Remove the bung. Hold the strip over the drum for approximately 30 seconds. Following

the instructions on the pH strips bottle, read the pH of the caustic vapors. Caustic pH is extremely high and the strip must indicate a high pH. If the strip indicates a low pH, DO NOT transfer this chemical. Call the vendor immediately.

4.7 _____ LO/SO: Slowly place the transfer pump into the bung hole. Connect the dedicated caustic transfer hose to the dedicated caustic transfer pump. Connect the other end of the dedicated caustic transfer hose to BV-701. (Connect hose to the transfer point by opening the small grey door labeled “Caustic” and connecting the male cam lock on the hose to the female cam lock on the transfer point.) Hose and pump will be clearly labeled “Caustic Transfer Hose” and “Caustic Transfer Pump.”

4.8 _____ LO/SO: Don all needed PPE (nitrile inner gloves, neoprene outer gloves, neoprene apron, neoprene sleeves, safety goggles, face shield).

4.9 _____ LO/SO: One operator will remain at the transfer pump until the transfer process is complete. The other operator will remain at the transfer point (BV-701) until the transfer is complete.

4.10 _____ LO/SO: Open BV-701 at the transfer point, both valves on the dedicated caustic transfer hose and the valve on the caustic transfer pump.

4.11 _____ LO/SO: Using an extension cord, plug in the electrical cord on the caustic transfer pump and turn on the pump. Stay at the pump and be ready to shut the pump off if any leaks are seen.

If leaks are noted in the caustic tank or in the transfer point fittings, turn off and unplug the transfer pump and close the valve on the pump. Disconnect the dedicated hose from the pump and drain the hose by lifting the end that was connected to the pump toward the sky. When the hose is drained, close valves on the hose and repair any leaks. Be sure to repair leaks over the containment pallet. For instruction on handling spills, see Section 2 of this procedure. Continue only after leak has been repaired. If the leak cannot be fixed at the time, exit this procedure until this issue has been resolved.

4.12 _____ LO/SO: Turn off the caustic transfer pump when caustic tank has been filled within approximately 0.5 inches below the red line on the caustic tank. **Do not fill past the red line**.

4.13 _____ LO/SO: Stage a spill pad underneath the fittings, as they will drip chemical when disconnected. Close the valve on the caustic transfer pump, remove the caustic transfer hose from pump and disconnect the cam lock fitting. Wipe the fitting thoroughly with the spill pad to catch any chemical that may remain. Drain the caustic transfer hose by lifting the end that was connected to the pump higher than the caustic transfer point (BV-701) to allow any remaining

caustic to drain into the caustic tank. You must climb the staged 6 foot ladder to accomplish this.

4.14 _____ LO/SO: Close both valves on the caustic transfer hose and the valve on the caustic transfer point (BV-701).

4.15 _____ LO/SO: Hold spill pad underneath BV-701. A small amount of chemical will drip from the cam lock fitting when disconnected. Disconnect transfer hose from BV-701. Replace cam lock cap on transfer hose cam lock fitting and BV-701.

4.16 _____ LO/SO: Slowly remove caustic pump from the caustic delivery drum and wipe the remaining chemical residue off of the pump as the stem is lifted out of the drum using spill pads. Place the pump inside the lined garbage can, and dispose of the spill pads and any contaminated PPE in a plastic garbage bag. Pour vinegar into the plastic garbage bag to neutralize the caustic residue on the spill pads. Seal the plastic bag.

4.17 _____ LO/SO: Coil up the caustic transfer hose and place it in the heavy duty trash bag. Return the hose to the grey plastic shed on the west side of the building. Return the caustic transfer pump to the grey storage shed on the west side of the building.

4.18 _____ LO/SO: Remove PPE.

4.19 _____ LO/SO: Close the chemical transfer point access door.

4.20 _____ LO/SO: Return containment tray to the west side of the building in the fenced area, next to the grey storage shed.

4.21 _____ LO/SO: Follow DOP-FT-003, “Trash Procedures” for proper handling of trash. Place garbage bag that contains contaminated spill pads and PPE in the drum labeled “PPE” located inside the Conex box.

4.22 _____ LO/SO: Return all equipment, PPE and supplies to their proper designated storage locations.

5. COMPLETION

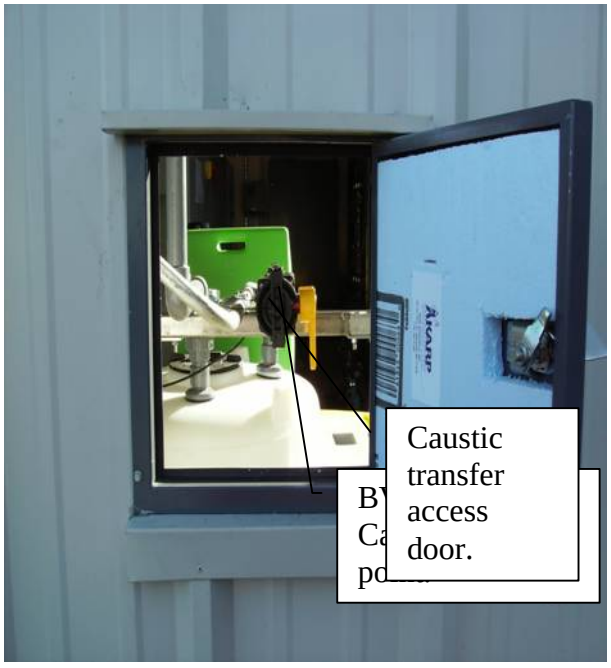
5.1.1 LO/SO: Verification of completion.

LO Signature _____ Date _____

6. REFERENCES

- DOP-FT-010 “Subcontractor Access”

- DOP-008 "Safety Eyewash Stations"
- DOP-FT-003 "Trash Procedure Procedures"



CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	11/15/08	All	New Procedure
1	7/31/09	All	Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for removing and replacing the granular activated carbon (GAC) in the liquid-phase GAC vessels. This procedure also details the liquid phase GAC reconfiguration. Follow steps 4.1 - 5.14 to reconfigure the GAC vessels. Follow steps 5.14.1 - 5.18 to drain the vessel. Follow steps 5.18.1 – 5.35 to change out the GAC vessel. The draining, reconfiguration, and change-out will most likely occur on different days.

1.2 Scope and Applicability

This DOP applies to the operation and maintenance of the IRAP Treatment System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

Wet activated carbon removes oxygen from air, causing a hazard to workers inside carbon vessels and enclosed or confined spaces. Do not get in eyes. Do not breathe dust.

3. EQUIPMENT REQUIRED

3.1 Tools and Equipment

Flashlight, two $^{15}/_{16}$-inch wrenches, garden hose attached to potable water source, 5-gallon bucket, Shop-Vac, ladder, clear drain hose, drum dolly, drum vacuum, eight empty 55-gallon drums, thirty 50-pound bags of acid-washed granular activated coconut carbon, nitrile gloves, neoprene apron, dust mask, impact driver.

4. PREREQUISITES FOR LIQUID PHASE GAC RECONFIGURATION

4.1 Field Preparations

4.1.1 _____ LO/SO: Obtain current working edition of “Operations Log” located in the supply cabinet.

4.1.2 _____ LO/SO: Refer to “Operations Log” to ensure that there are no operational issues reported/recorded that would prevent reconfiguration of the GAC vessels. If issues are noted, then exit this procedure until resolution is obtained.

4.1.3 _____ LO/SO: This is a two-person operation and cannot be performed by any one individual. Verify that someone is on site to assist. If there is no one available, exit this procedure until someone is available to assist.

4.1.4 _____ LO/SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

4.2 Planning and Coordination

4.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

4.3 Approvals and Notifications

4.3.1 _____ Approval to perform this procedure has been obtained from the LO.

LO's Signature _____ Date _____

5. LIQUID PHASE GAC RECONFIGURATION AND CHANGE OUT STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

Liquid Phase GAC Reconfiguration

5.1 _____ LO/SO: Shut down the treatment system following SOP-003, "Short-Term System Shutdown"

5.2 _____ LO/SO: The vessel labeled "Primary" before the change out will now be the "Offline-Spent" vessel. The vessel labeled "Secondary" will now be the "Primary" vessel. The vessel labeled "Offline" will now be the "Secondary" vessel. Change the signs on the vessels to reflect these changes.

5.3 _____ LO/SO: Close the main GAC vessel effluent valves on the bottom of each GAC vessel. These valves are labeled BV-330, BV-329 and BV-328.

5.4 _____ LO/SO: Close the valves on the effluent piping of the GAC vessels. These valves are labeled BV-331, BV-332 and BV-333.

5.5 _____ LO/SO: Close BV-334 on the effluent manifold on the east side of the building.

5.6 _____ LO/SO: Retrieve the Shop-Vac and one 5-gallon bucket (located in the Conex box) to contain and clean up any spilled water resulting from performance of the next several steps in this procedure.

5.7 _____ LO/SO: Don the following personal protective equipment (PPE): Neoprene apron, nitrile gloves, safety goggles (located in the PPE cabinet on the east side of the building).

5.8 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, remove the blind flanges (Figure 3) from the effluent piping of the GAC vessel now labeled "Secondary." Place the bolts, nuts and washers in a clean 5-gallon bucket. Instruct the second person assisting in this procedure to be ready with the Shop-Vac and bucket to evacuate and contain any water in the piping that will flow out as a result of removing these blind flange pieces.

5.9 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, remove the spool piece (Figure 3) from the effluent piping of the GAC vessel now labeled "Primary." Instruct the second person assisting in this procedure to be ready with the Shop-Vac and bucket to evacuate and contain any water in the piping that will flow out as a result of removing this spool piece.

5.10 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, install the spool piece on the effluent line of the GAC labeled "Secondary." Do not over-tighten these bolts.

5.11 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, install the blind flanges on the effluent line of the GAC vessel now labeled "Primary." Do not over-tighten these bolts.

5.12 _____ LO/SO: Using the table below, select the proper valve configuration to reflect the new GAC configuration.

Location	Device	Device #	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels
			301/302	**302/303**	**303/301**
Under 301	Drain Valve	DV-301	CLOSED	CLOSED	CLOSED
Under 302	Drain Valve	DV-302	CLOSED	CLOSED	CLOSED
Under 303	Drain Valve	DV-303	CLOSED	CLOSED	CLOSED
Top of 301	Sample Port	SP-302	CLOSED	CLOSED	CLOSED
Top of 302	Sample Port	SP-303	CLOSED	CLOSED	CLOSED
Top of 303	Sample Port	SP-304	CLOSED	CLOSED	CLOSED
Under 301 air release	Ball Valve	BV-340	OPEN	OPEN	OPEN
Under 302 air release	Ball Valve	BV-341	OPEN	OPEN	OPEN
Under 303 air release	Ball Valve	BV-342	OPEN	OPEN	OPEN
GAC manifold	Ball Valve	BV-320	CLOSED	CLOSED	OPEN

Location	Device	Device #	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels
GAC manifold	Ball Valve	BV-321	CLOSED	OPEN	CLOSED
GAC manifold	Ball Valve	BV-322	OPEN	CLOSED	CLOSED
GAC manifold	Ball Valve	BV-323	CLOSED	CLOSED	CLOSED
Above 301	Ball Valve	BV-324	CLOSED	CLOSED	OPEN
Above 302	Ball Valve	BV-325	OPEN	CLOSED	CLOSED
Valve attached to pressure gauge	Ball Valve	BV-326	OPEN	OPEN	OPEN
Above 303	Ball Valve	BV-327	CLOSED	OPEN	CLOSED
Bottom 301	Ball Valve	BV-328	OPEN	CLOSED	OPEN
Bottom 302	Ball Valve	BV-329	OPEN	OPEN	CLOSED
Bottom 303	Ball Valve	BV-330	CLOSED	OPEN	OPEN
Effluent 301	Ball Valve	BV-331	OPEN	CLOSED	CLOSED
Effluent 302	Ball Valve	BV-332	CLOSED	OPEN	CLOSED
Effluent 303	Ball Valve	BV-333	CLOSED	CLOSED	OPEN
Effluent Manifold	Ball Valve	BV-334	OPEN	OPEN	OPEN
Top of 301	Vent Valve	BV-337	OPEN	OPEN	OPEN
Top of 302	Vent Valve	BV-338	OPEN	OPEN	OPEN
Top of 303	Vent Valve	BV-339	OPEN	OPEN	OPEN
	Spool Piece		GAC-302 Effluent	GAC-303 Effluent	GAC-301 Effluent

5.13 _____ LO/SO: Open BV-334 on the system effluent manifold on the east side of the building.

5.14 _____ LO/SO: The treatment system may be restarted at this time. If no conditions exist that would prevent the normal start up of the system, follow SOP-002, "Routine System Start Up."

Prerequisites for the draining of the Offline-Spent GAC Vessel

5.14.1 _____ SO: Draining of the GAC vessel to be changed-out must be performed before the carbon subcontractor arrives to perform change out of the vessel. This may be performed the day/night before or the morning of the change out if time allows.

Draining the Offline-Spent GAC Vessel

5.15 _____ LO/SO: Use the table below to isolate, lock out and tag out the "Offline-Spent" vessel. Do not lock out the drain valve or the vent valve on the "Offline-Spent" vessel. You will need access to these valves to drain the GAC vessel before the

spent carbon is removed. After isolating the vessel, continue to the next step before draining the vessel.

5.16 _____ LO/SO: Retrieve the clear drain hose with the 1" cam lock connection (located in the Conex box) and connect it to the drain valve of the "Offline-Spent" vessel. Bring the other end of the drain hose to the sump. Using zip ties (located in the supply cabinet), tie down the drain hose to the sump grate so that when draining the vessel, water will drain into the sump and not onto the floor.

5.17 _____ LO/SO: Caution: This step must be performed in the order in which it is written. Using the following table as a guide, FIRST ensure that the vent valve on top of the vessel labeled "Offline-Spent" is closed. Remove the vacuum breaker attached to the vent valve by unthreading the union on the effluent side of the vent valve. Leave the valve body in place. Unthread the union that attaches the vacuum breaker drain line to the main drain line. Now that the vacuum breaker and drain line are detached, set the assembly aside. Retrieve a 5 gallon bucket to catch the water that will drain out of the vent valve when it is opened. Climb the ladder and position the bucket underneath the vent valve. Open the vent valve. Allow water to fully drain. Then open the drain valve on the bottom of the "Offline-Spent" vessel (Figure 4) approximately half way. The vessel will take about 45 minutes to fully drain. The operator must stay in the building for the entire duration of this step of the procedure. If leaving the building is necessary, close the drain valve before leaving. Make sure the sump pump continues to operate during this step of the procedure by visually inspecting the water level in the sump every 2 to 3 minutes. The drain valve may need to be adjusted so that the sump does not fill too quickly.

Vessel	Location	Valve Identification	Action
GAC-301	Effluent of GAC-301	BV-328	Close and Lock/Tag Out
	Influent of GAC-301	BV-322	Close and Lock/Tag Out
	Above GAC-301	BV-324	Close and Lock/Tag Out
	Vent Valve of GAC-301	BV-337	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-301	DV-301	Open second to drain

Vessel	Location	Valve Identification	Action
GAC-302	Effluent of GAC-302	BV-329	Close and Lock/Tag Out
	Influent of GAC-302	BV-321	Close and Lock/Tag Out
	Above GAC-302	BV-325	Close and Lock/Tag Out
	Vent Valve of GAC-302	BV-338	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-302	DV-302	Open second to drain

Vessel	Location	Valve Identification	Action
GAC-303	Effluent of GAC-303	BV-330	Close and Lock/Tag Out
	Influent of GAC-303	BV-320	Close and Lock/Tag Out
	Above GAC-303	BV-327	Close and Lock/Tag Out
	Vent Valve of GAC-303	BV-339	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-303	DV-303	Open second to drain

5.18 _____ LO/SO: After the "Offline-Spent" vessel is fully drained, close the drain valve that was opened on the vessel labeled Offline-Spent. Drain this hose by disconnecting the cam lock fitting from the drain valve. Elevate the cam lock fitting to chest height, and walk the hose to the sump. Wrap up the clear drain hose and return it to the Conex box.

Prerequisites for GAC Change Out

5.18.1 _____ LO/SO: Obtain current working edition of "Operations Log" located in the supply cabinet.

5.18.2 _____ LO/ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent change out of the GAC vessels. If issues are noted, then exit this procedure until resolution is obtained.

5.18.3 _____ LO/SO: This is a two-person operation and cannot be performed by any one individual. Verify that someone is on site to assist. If there is no one available, exit this procedure until someone is available to assist.

5.18.4 _____ LO/SO: Verify that the subcontractor has thirty 50-pound bags of acid-washed granular activated coconut carbon on site. If there is no carbon on site, exit this portion of the procedure until carbon arrives. Inspect the delivery bill of lading to ensure that the correct type (Acid-Washed Granular Activated Coconut Shell Carbon) and amount (1,500 pounds or thirty 50-pound bags) of GAC is being delivered. Inspect the GAC material to ensure that it is dry and free flowing.

5.18.5 _____ LO/SO: Verify that the subcontractor has eight empty, open-top 55-gallon drums on site. If not, exit this portion of the procedure until the drums arrive.

5.18.6 _____ LO/SO: Verify that the waste contractor has been scheduled to remove 8 drums of spent carbon from the site after the change out has been performed.

GAC Vessel Change Out

5.19 _____ SO: Stage the 6 foot ladder next to the vessel labeled "Offline-Spent". Remove the 90-degree spool piece at the top of the vessel by removing the bolts ($^{15}/_{16}$-inch wrench) on the top and bottom of the spool. Store the bolts and spool piece in a clean bucket (located in the Conex box).

5.20 _____ SC: Remove the manway cover (Figure 2) on top of the vessel labeled "Offline-Spent." Use an impact driver with a $^{15}/_{16}$-inch socket and a $^{15}/_{16}$-inch wrench (located in the tool cabinet). Place the nuts, bolts and washers in a clean 5-gallon bucket. Disconnect the air release valve on top of the manway cover by unscrewing the union. Set the manway cover and air release valve aside.

5.21 _____ SC: Remove the lid on an empty 55-gallon drum; connect the drum vacuum to the empty 55-gallon drum.

5.22 _____ SC: Don nitrile gloves, turn on the vacuum, climb the ladder and begin removing the spent carbon from the GAC vessel.

5.23 _____ SC: When the first drum is full, have the person assisting remove the vacuum from the drum and connect it to the second drum. Continue this process until all of the spent carbon has been removed from the vessel. As you approach the bottom of the vessel, vacuum gently so that none of the internal parts are damaged.

5.24 _____ LO: Visually inspect the GAC vessel for damage, including all fittings and seals prior to adding the virgin carbon. Climb ladder. Using a PVC rod, gently tap on the laterals to ensure structural integrity. If any of the laterals is loose or broken, stop this procedure and contact Carbon Services to schedule a confined space entry to replace the broken lateral. Record conditions in the log book located in the supply cabinet. If any damage is noted, use the digital camera and photograph the inside of the empty GAC vessel. If repairs are needed, exit this procedure.

5.25 _____ SC: Stage the virgin carbon inside the building. Using the garden hose, fill the vessel with potable water to 1 foot above the top of the laterals. Do not leave hose unattended.

5.26 _____ SC: Don nitrile gloves, a neoprene apron and a dust mask (located in the PPE cabinet).

5.27 _____ SC: One person will now climb the ladder and get into position to receive the bags of virgin carbon from the person assisting on the ground. The person

assisting will lift the bags of virgin carbon and walk them to the person on the ladder.

5.28 _____ SC: Spread the virgin carbon to the walls of the vessel, making a circular motion counter-clockwise to ensure an even fill. Hand the empty bags down to the person assisting. Dispose of these bags in a lined garbage can.

5.29 _____ SC: After the GAC vessel is full, level off the top. The dust mask may now be removed.

5.30 _____ SC: Using an impact driver with a $^{15}/_{16}$-inch socket, replace the GAC vessel manway cover. Use caution when lifting the manway cover. Do not over-tighten these bolts. Ensure that the white markers on the manway cover lid and the vessel's top flange line up. This is essential to guarantee proper reinstallation of the vacuum breaker system.

5.31 _____ Reinstall vacuum breaker and vacuum breaker drain line by reconnecting the vent valve 1" threaded union and the drain valve union. This step will connect the vacuum breaker drain line to the main drain line. Open the vent valve.

5.32 _____ LO/SO: Using the garden hose, fill the GAC vessel to the top with potable water. Two people must oversee this activity to prevent overfilling the GAC vessel. One person will stand on the ladder and man the hose, and the other person will stand at the hose bib and be ready to shut off the water when the GAC vessel is full. This step will take approximately 30 minutes. Note: The virgin carbon must be soaked for 24 hours before the GAC vessel can be brought back online.

5.33 _____ SO: After the GAC vessel is full, using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, reinstall the 90-degree spool piece.

5.34 _____ SO: Label the drums "Spent Carbon" with the green nonhazardous labels (located in the supply cabinet). Ensure that the waste contractor is prepared to remove the drums containing spent carbon from the site.

5.35 _____ SO: Return any tools used during this procedure to the tool cabinet. Dispose of the used PPE using DOP-FT-003, "Trash Procedures."

5.36 _____ SO: Thoroughly clean/sweep the GAC vessel and the surrounding area.

6. COMPLETION

6.1 LO/SO: Verification of completion.

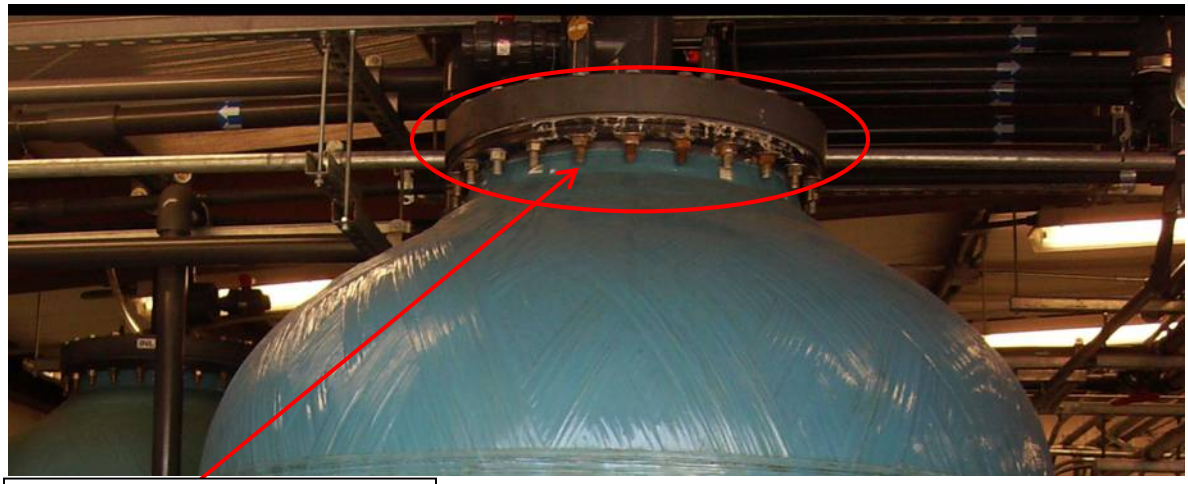
Signature _____ Date _____

7. REFERENCES

- SOP-003 “Short-Term Treatment System Shutdown”
- DOP-FT-003 “Trash Procedures”
- DOP-FT-010 “Subcontractor Access”

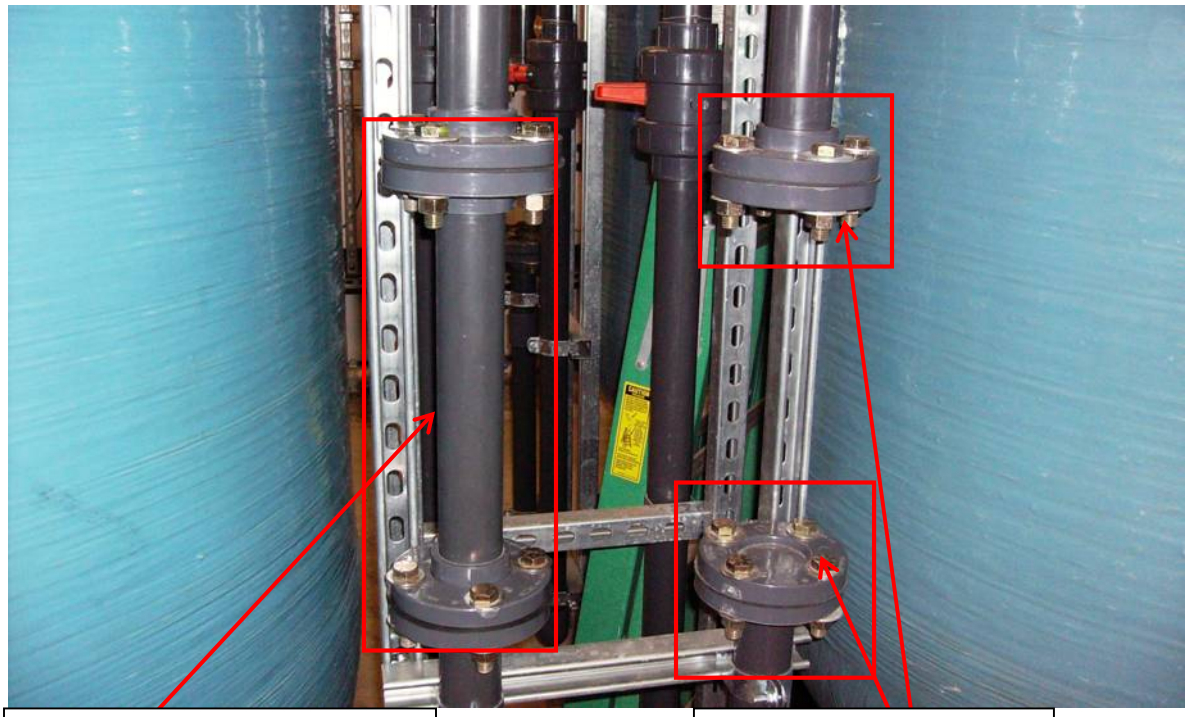
Figure 1: GAC vessel.

Figure 2: Manway on GAC vessel.



GAC VESSEL MANWAY

Figure 3: Spool piece assembly and dead-end flange.



SPOOL PIECE

BLIND FLANGE

Figure 4: Drain valves and effluent ball valve.

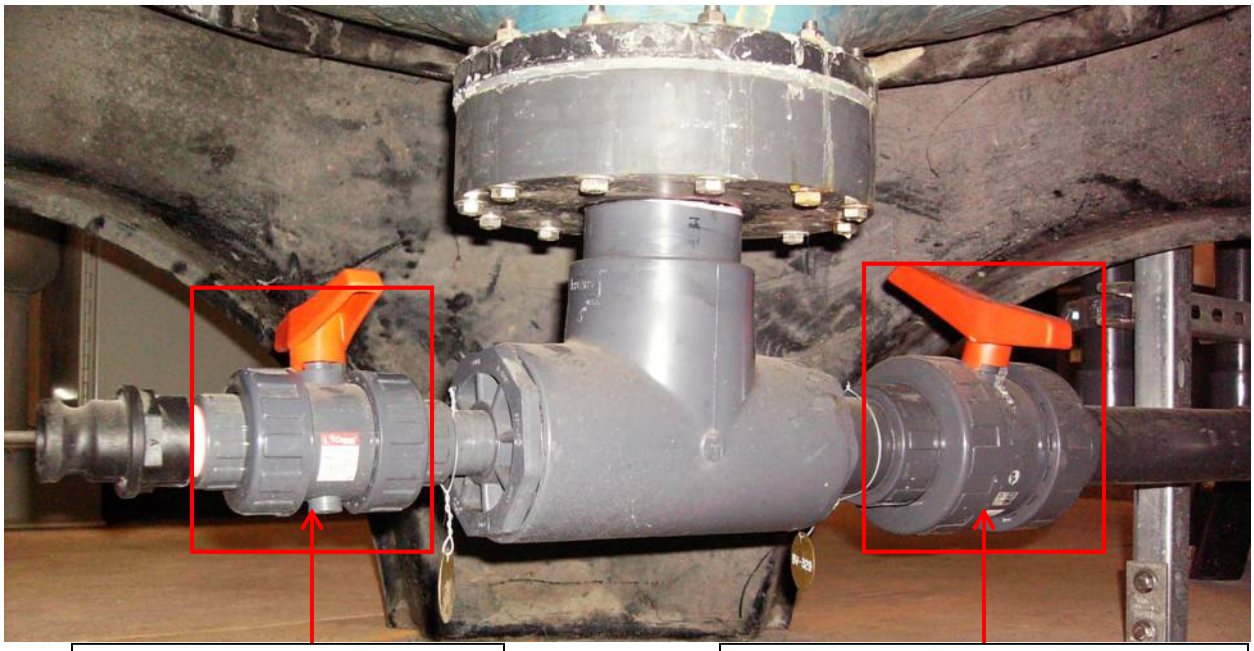


Figure 5: 90-degree spool piece.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	11/15/08	All	New Procedure
1	7/31/09	All	Revisions
2	8/13/09	All	Alternate for DOP-023

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for removing and replacing the granular activated carbon (GAC) in the liquid-phase primary vessel without an available offline vessel. This procedure also details the liquid phase GAC reconfiguration change.

1.2 Scope and Applicability

This DOP applies to the operation and maintenance of the IRAP Treatment System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

Wet activated carbon removes oxygen from air, causing a hazard to workers inside carbon vessels and enclosed or confined spaces. Do not get in eyes. Do not breathe dust.

3. EQUIPMENT REQUIRED

3.1 Tools and Equipment

Flashlight, two $^{15}/_{16}$-inch wrenches, garden hose attached to potable water source, 5-gallon bucket, Shop-Vac, ladder, clear drain hose, drum dolly, drum vacuum, eight empty 55-gallon drums, thirty 50-pound bags of acid-washed granular activated coconut carbon, nitrile gloves, neoprene apron, dust mask, impact driver.

4. PREREQUISITES FOR LIQUID PHASE GAC CHANGE OUT AND RECONFIGURATION

4.1 Field Preparations

4.1.1 _____ LO/SO: Obtain current working edition of “Operations Log” located in the supply cabinet.

4.1.2 _____ LO/SO: Refer to “Operations Log” to ensure that there are no operational issues reported/recorded that would prevent change out and reconfiguration of the GAC vessels. If issues are noted, then exit this procedure until resolution is obtained.

4.1.3 _____ LO/SO: This is a two-person operation and cannot be performed by any one individual. Verify that someone is on site to assist. If there is no one available, exit this procedure until someone is available to assist.

4.1.4 _____ LO/SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

4.2 Planning and Coordination

4.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure,
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

4.3 Approvals and Notifications

4.3.1 _____ Approval to perform this procedure has been obtained from the LO.

LO's Signature _____ Date _____

5. LIQUID PHASE GAC CHANGE OUT AND RECONFIGURATION STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

Prerequisites for the draining of the Offline-Spent GAC Vessel

5.1.1 _____ SO: Draining of the GAC vessel to be changed-out must be performed before the carbon subcontractor arrives to perform change out of the vessel. This must be performed the morning of the change out if time allows.

Draining the Offline-Spent GAC Vessel

5.2 _____ LO/SO: Shut down the system as per SOP-002. Use the table below to isolate, lock out and tag out the "Primary" vessel. Do not lock out the drain valve or the vent valve on the "Primary" vessel. You will need access to these valves to drain the GAC vessel before the spent carbon is removed.

5.3 _____ LO/SO: Retrieve the clear drain hose with the 1'' cam lock connection (located in the Conex box) and connect it to the drain valve of the "Primary" vessel. Bring the other end of the drain hose to the sump. Using zip ties (located in the supply cabinet), tie down the drain hose to the sump grate so that when draining the vessel, water will drain into the sump and not onto the floor.

5.4 _____ LO/SO: Caution: This step must be performed in the order in which it is written. Using the following table as a guide, FIRST ensure that the vent valve on top of the vessel labeled "Primary" is closed. Remove the vacuum breaker attached to the vent valve by unthreading the union on the effluent side of the vent valve. Leave the valve body in place. Unthread the union that attaches the vacuum breaker drain line to the main drain line. Now that the vacuum breaker and drain line are detached, set the assembly aside. Retrieve a 5 gallon bucket to catch the water that will drain out of the vent valve when it is opened. Climb the ladder and position the bucket underneath the vent valve. Open the vent valve. Allow water to fully drain. Then open the drain valve on the bottom of the "Primary" vessel (Figure 4) approximately half way. The vessel will take about 45 minutes to fully drain. The operator must stay in the building for the entire duration of this step of the procedure. If leaving the building is necessary, close the drain valve before leaving. Make sure the sump pump continues to operate during this step of the procedure by visually inspecting the water level in the sump every 2 to 3 minutes. The drain valve may need to be adjusted so that the sump does not fill too quickly.

Primary Vessel	Location	Valve Identification	Action
GAC-301	Effluent of GAC-301	BV-328	Close and Lock/Tag Out
	Influent of GAC-301	BV-322	Close and Lock/Tag Out
	Above GAC-301	BV-324	Close and Lock/Tag Out
	Vent Valve of GAC-301	BV-337	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-301	DV-301	Open second to drain

Primary Vessel	Location	Valve Identification	Action
GAC-302	Effluent of GAC-302	BV-329	Close and Lock/Tag Out
	Influent of GAC-302	BV-321	Close and Lock/Tag Out
	Above GAC-302	BV-325	Close and Lock/Tag Out
	Vent Valve of GAC-302	BV-338	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-302	DV-302	Open second to drain

Primary Vessel	Location	Valve Identification	Action
GAC-303	Effluent of GAC-303	BV-330	Close and Lock/Tag Out
	Influent of GAC-303	BV-320	Close and Lock/Tag Out
	Above GAC-303	BV-327	Close and Lock/Tag Out
	Vent Valve of GAC-303	BV-339	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-303	DV-303	Open second to drain

5.5 _____ LO/SO: After the "Primary" vessel is fully drained, close the drain valve that was opened on the vessel labeled Offline-Spent. Drain this hose by disconnecting the cam lock fitting from the drain valve. Elevate the cam lock fitting to chest height, and walk the hose to the sump. Wrap up the clear drain hose and return it to the Conex box.

Prerequisites for GAC Change Out

5.5.1 _____ LO/SO: Verify that the subcontractor has thirty 50-pound bags of acid-washed granular activated coconut carbon on site. If there is no carbon on site, exit this portion of the procedure until carbon arrives. Upon arrival of the GAC, request a copy of the certificate of analysis for the GAC. Inspect the delivery bill of lading to ensure that the correct type (Acid-Washed Granular Activated Coconut Shell Carbon) and amount (1,500 pounds or thirty 50-pound bags) of GAC is being delivered. Inspect the GAC material to ensure that it is dry and free flowing.

5.5.2 _____ LO/SO: Verify that the subcontractor has eight empty, open-top 55-gallon drums on site. If not, exit this portion of the procedure until the drums arrive.

5.5.3 _____ LO/SO: Verify that the waste contractor has been scheduled to remove 8 drums of spent carbon from the site after the change out has been performed.

GAC Vessel Change Out

5.6 _____ SO: Stage the 6 foot ladder next to the vessel labeled "Primary." Remove the 90-degree spool piece at the top of the vessel by removing the bolts ($^{15}/_{16}$-inch wrench) on the top and bottom of the spool. Store the bolts and spool piece in a clean bucket (located in the Conex box).

5.7 _____ SC: Remove the manway cover (Figure 2) on top of the vessel labeled "Primary." Use an impact driver with a $^{15}/_{16}$-inch socket and a $^{15}/_{16}$-inch wrench (located in the tool cabinet). Place the nuts, bolts and washers in a clean 5-gallon

bucket. Disconnect the air release valve on top of the manway cover by unscrewing the union. Set the manway cover and air release valve aside.

5.8 _____ SC: Remove the lid on an empty 55-gallon drum; connect the drum vacuum to the empty 55-gallon drum.

5.9 _____ SC: Don nitrile gloves, turn on the vacuum, climb the ladder and begin removing the spent carbon from the GAC vessel.

5.10 _____ SC: When the first drum is full, have the person assisting remove the vacuum from the drum and connect it to the second drum. Continue this process until all of the spent carbon has been removed from the vessel. As you approach the bottom of the vessel, vacuum gently so that none of the internal parts are damaged.

5.11 _____ LO: Visually inspect the GAC vessel for damage, including all fittings and seals prior to adding the virgin carbon. Gently tap the laterals with a PVC rod to determine their structural integrity. Record conditions in the log book located in the supply cabinet. If any damage is noted, use the digital camera and photograph the inside of the empty GAC vessel. If repairs are needed, exit this procedure.

5.12 _____ SC: Fill the vessel with water to 1 foot above the laterals. Stage the virgin carbon inside the building.

5.13 _____ SC: Don nitrile gloves, a neoprene apron and a dust mask (located in the PPE cabinet).

5.14 _____ SC: One person will now climb the ladder and get into position to receive the bags of virgin carbon from the person assisting on the ground. The person assisting will lift the bags of virgin carbon and walk them to the person on the ladder.

5.15 _____ SC: Spread the virgin carbon to the walls of the vessel, making a circular motion counter-clockwise to ensure an even fill. Hand the empty bags down to the person assisting. Dispose of these bags in a lined garbage can.

5.16 _____ SC: After the GAC vessel is full, level off the top. The dust mask may now be removed.

5.17 _____ SC: Using an impact driver with a $^{15}/_{16}$-inch socket, replace the GAC vessel manway cover. Use caution when lifting the manway cover. Do not over-tighten these bolts. Ensure that the white markers on the manway cover lid and the vessel's top flange line up. This is essential to guarantee proper reinstallation of the vacuum breaker system.

5.18 _____ Reinstall vacuum breaker and vacuum breaker drain line by reconnecting the vent valve 1" threaded union and the drain valve union. This step will connect the vacuum breaker drain line to the main drain line.

5.19 _____ LO/SO: Using the garden hose, fill the GAC vessel to the top with potable water. Two people must oversee this activity to prevent overfilling the GAC vessel. One person will stand on the ladder and man the hose, and the other person will stand at the hose bib and be ready to shut off the water when the GAC vessel is full. This step will take approximately 30 minutes. Note: The virgin carbon must be soaked for 24 hours before the GAC vessel can be brought back online. After filling the vessel with potable water, record the time in the log book.

5.20 _____ SO: After the GAC vessel is filled with potable water, log the time in the operations log book. Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, reinstall the 90-degree spool piece. Do not over tighten these bolts.

5.21 _____ SO: Label the drums "Spent Carbon" with the green nonhazardous labels (located in the supply cabinet). Ensure that the waste contractor is prepared to remove the drums containing spent carbon from the site.

5.22 _____ SO: Return any tools used during this procedure to the tool cabinet. Dispose of the used PPE using DOP-FT-003, "Trash Procedures."

5.23 _____ SO: Thoroughly clean/sweep the GAC vessel and the surrounding area.

6. PREREQUISITES FOR LIQUID PHASE GAC RECONFIGURATION

Liquid Phase GAC Reconfiguration

6.1 _____ LO/SO: Rearrange signs on GAC vessels to reflect the following:

The vessel labeled "Primary" will now be the "Secondary" vessel. The vessel labeled "Secondary" will now be the "Primary" vessel. The vessel labeled "Offline-Damaged" remain offline until the damaged vessel is replaced.

Change the signs on the vessels to reflect these changes.

6.2 _____ LO/SO: Close the main GAC vessel effluent valves on the bottom of each GAC vessel. These valves are labeled BV-330, BV-329 and BV-328.

6.3 _____ LO/SO: Close the valves on the effluent piping of the GAC vessels. These valves are labeled BV-331, BV-332 and BV-333.

6.4 _____ LO/SO: Close BV-334 on the effluent manifold on the east side of the building.

6.5 _____ LO/SO: Retrieve the Shop-Vac and one 5-gallon bucket (located in the Conex box) to contain/clean up any spilled water resulting from performance of the next several steps in this procedure.

6.6 _____ LO/SO: Don the following personal protective equipment (PPE): Neoprene apron, nitrile gloves, safety goggles (located in the PPE cabinet on the east side of the building).

6.7 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, remove the blind flanges (Figure 3) from the effluent piping of the vessel now labeled "Secondary." Place the bolts, nuts and washers in a clean 5-gallon bucket. Instruct the second person assisting in this procedure to be ready with the Shop-Vac/ bucket to evacuate/contain any water in the piping that will flow out as a result of removing these blind flange pieces.

6.8 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, remove the spool piece (Figure 3) from the effluent piping of the vessel now labeled "Primary." Instruct the second person assisting in this procedure to be ready with the Shop-Vac and bucket to evacuate and contain any water in the piping that will flow out as a result of removing this spool piece.

6.9 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, install the spool piece on the effluent line of the GAC vessel now labeled "Secondary." Do not over-tighten these bolts.

6.10 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, install the blind flanges on the effluent line of the GAC vessel now labeled "Primary." Do not over-tighten these bolts.

6.11 _____ LO/SO: Using the table below, select the proper valve configuration to reflect the new GAC configuration. Check off each valve position as you reconfigure the valves.

Location	Device	Device #	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels
			301/302	**302/303**	**303/301**
Under 301	Drain Valve	DV-301	CLOSED	CLOSED	CLOSED
Under 302	Drain Valve	DV-302	CLOSED	CLOSED	CLOSED
Under 303	Drain Valve	DV-303	CLOSED	CLOSED	CLOSED
Top of 301	Sample Port	SP-302	CLOSED	CLOSED	CLOSED
Top of 302	Sample Port	SP-303	CLOSED	CLOSED	CLOSED
Top of 303	Sample Port	SP-304	CLOSED	CLOSED	CLOSED
Under 301 air release	Ball Valve	BV-340	OPEN	OPEN	OPEN
Under 302 air release	Ball Valve	BV-341	OPEN	OPEN	OPEN
Under 303	Ball Valve	BV-342	OPEN	OPEN	OPEN

Location	Device	Device #	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels
air release					
GAC manifold	Ball Valve	BV-320	CLOSED	CLOSED	OPEN
GAC manifold	Ball Valve	BV-321	CLOSED	OPEN	CLOSED
GAC manifold	Ball Valve	BV-322	OPEN	CLOSED	CLOSED
GAC manifold	Ball Valve	BV-323	CLOSED	CLOSED	CLOSED
Above 301	Ball Valve	BV-324	CLOSED	CLOSED	OPEN
Above 302	Ball Valve	BV-325	OPEN	CLOSED	CLOSED
Valve attached to pressure gauge	Ball Valve	BV-326	OPEN	OPEN	OPEN
Above 303	Ball Valve	BV-327	CLOSED	OPEN	CLOSED
Bottom 301	Ball Valve	BV-328	OPEN	CLOSED	OPEN
Bottom 302	Ball Valve	BV-329	OPEN	OPEN	CLOSED
Bottom 303	Ball Valve	BV-330	CLOSED	OPEN	OPEN
Effluent 301	Ball Valve	BV-331	OPEN	CLOSED	CLOSED
Effluent 302	Ball Valve	BV-332	CLOSED	OPEN	CLOSED
Effluent 303	Ball Valve	BV-333	CLOSED	CLOSED	OPEN
Effluent Manifold	Ball Valve	BV-334	OPEN	OPEN	OPEN
Top of 301	Vent Valve	BV-337	OPEN	OPEN	OPEN
Top of 302	Vent Valve	BV-338	OPEN	OPEN	OPEN
Top of 303	Vent Valve	BV-339	OPEN	OPEN	OPEN
	Spool Piece		GAC-302 Effluent	GAC-303 Effluent	GAC-301 Effluent

6.12 _____ The treatment system must remain off until the GAC in the new secondary vessel has soaked for 24 hours. Consult the operations log book to ensure the GAC has soaked for 24 hours before restarting the system. The treatment system will not be operated with a single vessel.

7. COMPLETION

7.1 LO/SO: Verification of completion.

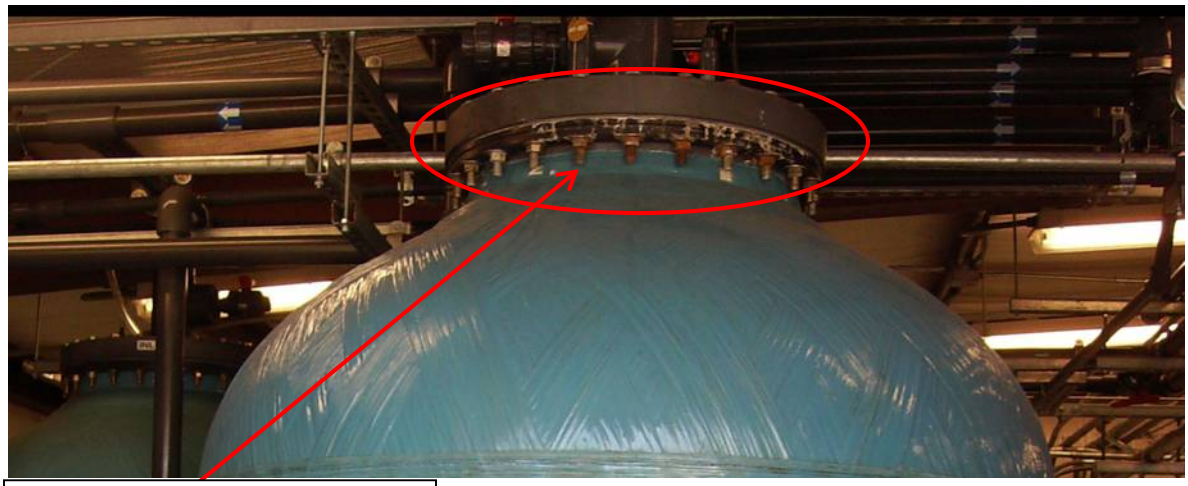
Signature _____ Date _____

8. REFERENCES

- SOP-003 “Short-Term Treatment System Shutdown”
- DOP-FT-003 “Trash Procedures”
- DOP-FT-010 “Subcontractor Access”

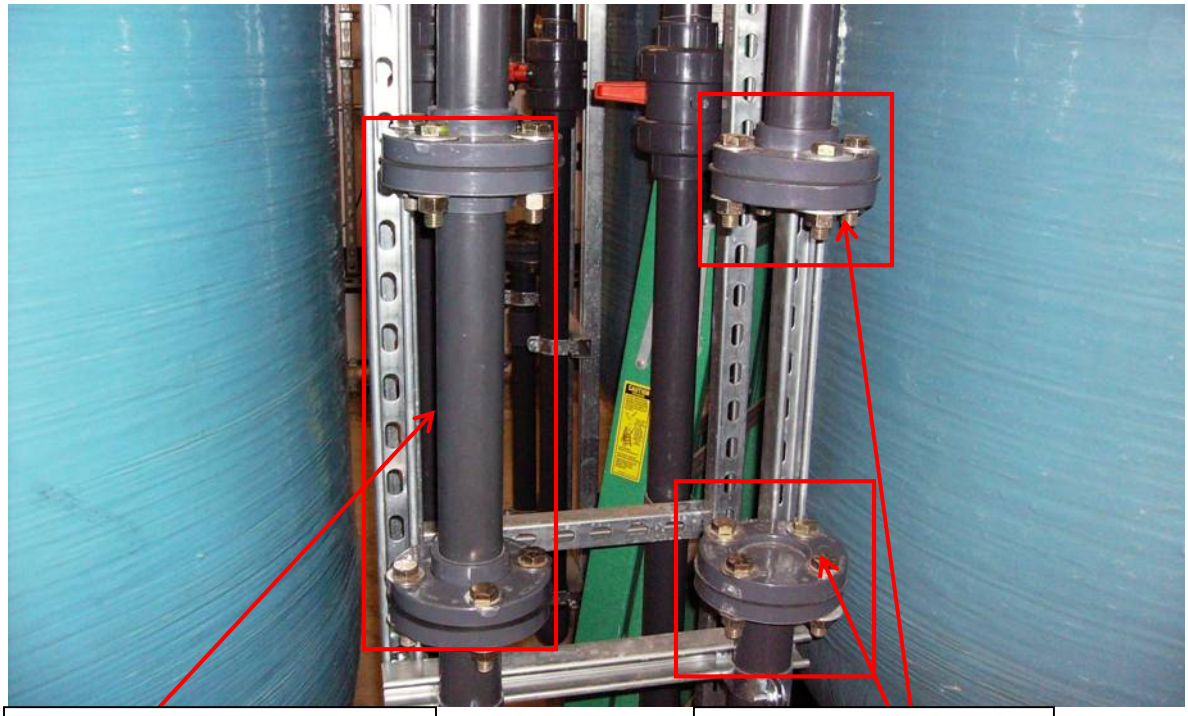
Figure 1: GAC vessel.

Figure 2: Manway on GAC vessel.



GAC VESSEL MANWAY

Figure 3: Spool piece assembly and dead-end flange.



SPOOL PIECE

BLIND FLANGE

Figure 4: Drain valves and effluent ball valve.

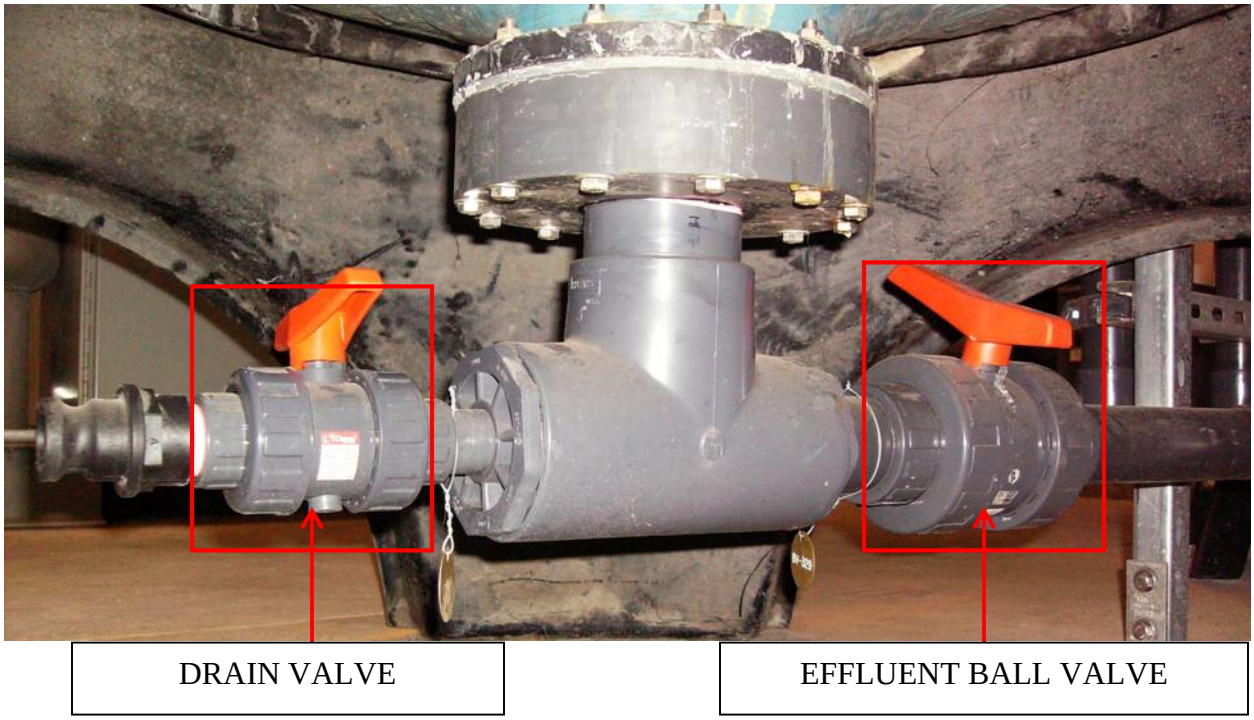


Figure 5: 90-degree spool piece.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	11/15/09	All	New Procedure
1	7/6/11		Procedural Improvements

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) provides instructions for calibrating the three pH sensors.

1.2 Scope and Applicability

This DOP applies to calibration of the system pH sensors at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log."

2.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent the calibration of the pH sensors. If such are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that SOP-003 has been completed and the system is shut down. If not, exit this procedure and perform SOP-003.

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g. hurricane, flood). If in effect, exit this procedure.

2.2 Approvals and Notifications

2.2.1 _____ Approval to perform this procedure has been obtained from the LO.

LO's Signature _____ Date _____

2.3 Equipment Required

Nitrile gloves, safety glasses (located in the PPE cabinet), 5-gallon bucket (located in the Conex box), one 4.00 and one 7.00 pH buffer solution and polyethylene beaker (located in the supply cabinet between Photo-Cat A and B).

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ _____

SO _____

3.1 _____ SO: Don all PPE described in Step 2.3 of this DOP titled, "Equipment Required" before completing any additional tasks.

3.2 _____ SO: Gather and stage all required equipment listed in Step 2.3 of this DOP.

3.3 _____ SO: If the acid side pH sensor is being calibrated, close valves BV-201, BV-202, BV-225 and BV-229.

3.4 _____ SO: If the caustic side pH sensors are being calibrated, close valves BV-334, BV-335 and BV-308.

3.5 _____ SO: Place 5-gallon bucket underneath the sensor to catch water that may spill from the sensor connection.

3.6 _____ SO: Unlock the pH sensor wire from the sensor by turning the connector piece counterclockwise and lifting up. The sensor wire should now separate from the sensor.

3.7 _____ SO: Unscrew the sensor by turning it in a counterclockwise direction and remove it from the holder. Reconnect the sensor wire to the sensor by twisting the connector piece in a clockwise direction. Remove the beaker from the supply cabinet and fill it up about half way with tap water. Put the sensor into the beaker.

3.8 _____ SO: Press the calibrate button on the pH meter, select code 22 by pressing the + button until the meter says "code 22" and press calibrate two times.

3.9 _____ SO: Open the of 4.00 pH buffer solution packet by tearing the top of the packet where it reads "open here." Remove the sensor from the beaker and place the sensor in the buffer solution. Press the calibrate button again on the pH meter. The pH value on the pH meter screen will at first change rapidly, and after approximately 2 minutes it will change very slowly. Once the pH value has settled, press calibrate again. When complete, the display will read "7.00 Buffer 2."

3.10 _____ SO: Open the 7.00 buffer solution packet by tearing where it reads "open here." Place sensor in the buffer solution and press the calibrate button on the pH meter. The pH value on the pH meter screen will at

first change rapidly, and after approximately 2 minutes it will change very slowly. Once the pH value has settled, press calibrate again twice. When complete, the display will read "Slope." Keep the pH sensor in buffer

3.11 _____ SO: Record the slope in the log book. Press the "E" button on the pH meter. The zero point will display. Record the zero point in the log book. Press the "E" button two more times on the pH meter until the pH meter display presents a pH reading of between 6.95 and 7.05.

3.12 _____ SO: Disconnect the sensor wire from the sensor and reinstall in the holder by turning clockwise until hand tight. Reinstall the sensor wire to the pH sensor by turning the connector clockwise.

3.13 _____ SO: If you are calibrating the acid side pH sensor, open valves BV-201, BV-202, BV-220, BV-225 and BV-229.

_____ SO: If you are calibrating the caustic side sensors, open valves BV-334, BV-305 and BV-308.

3.14 _____ SO: Install a lid on the 5-gallon bucket of process water that was generated during this procedure and walk it to the building sump. Slowly pour the water in the sump. Rinse the bucket with potable water and pour it into the sump.

3.15 _____ SO: Nitrile gloves may now be removed. Refer to DOP-FT-003 to properly dispose of used PPE and other trash

3.16 _____ SO: Refer to SOP-002 to restart the treatment system.

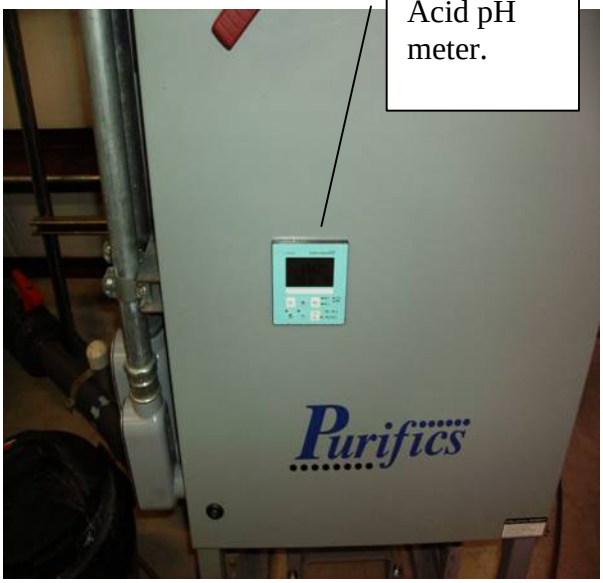
4. COMPLETION

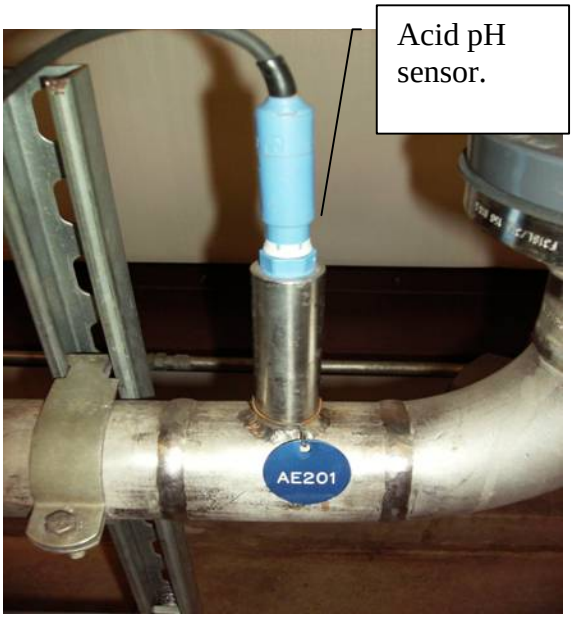
4.1 _____ LO/SO: Verification of completion. File in Log Book.

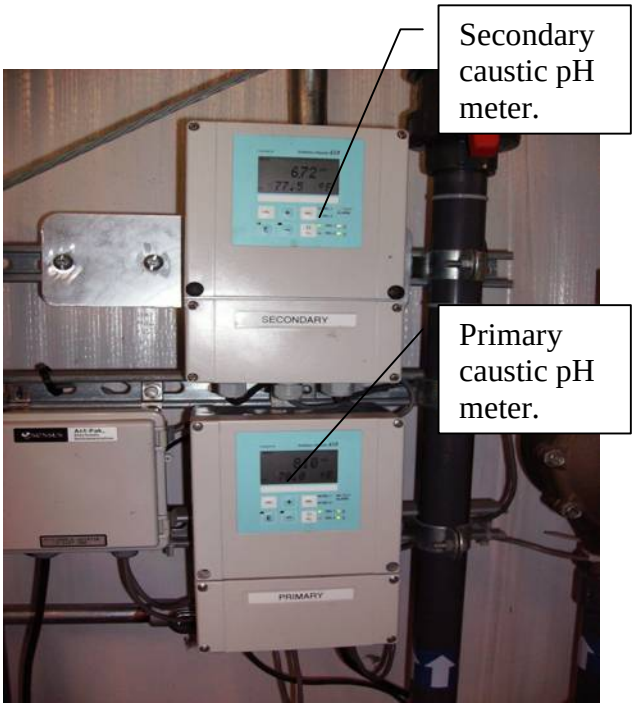
Signature _____ Date _____

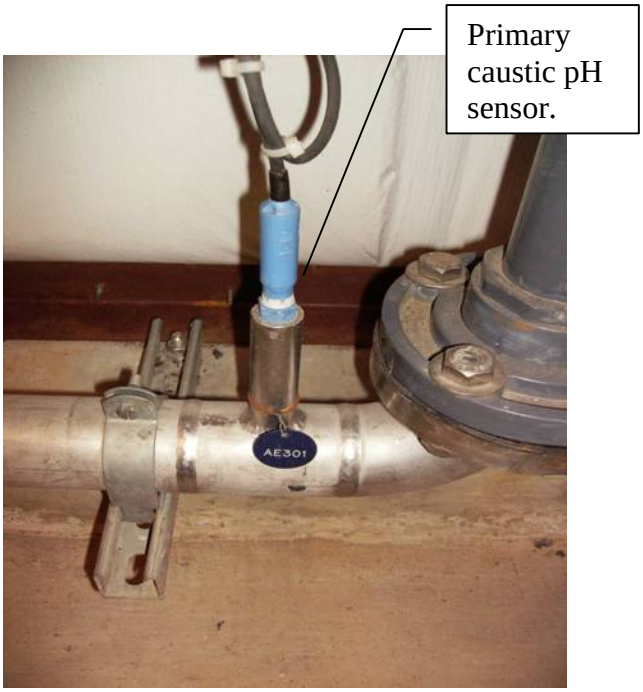
5. REFERENCES

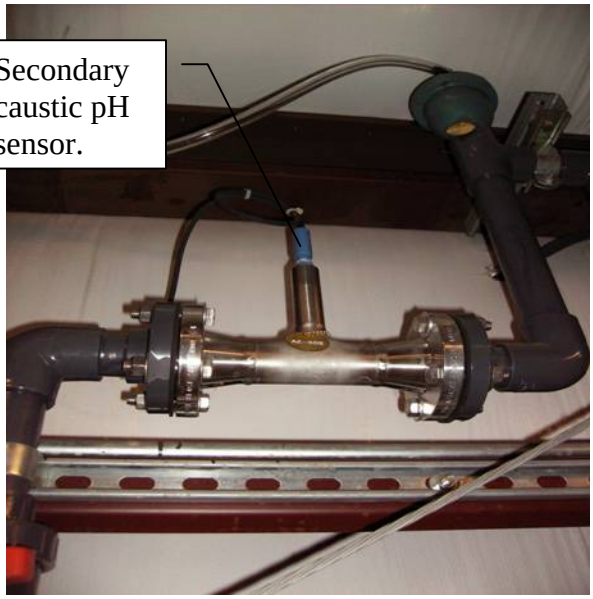
- SOP-003 "Routine System Startup"
- SOP-003 "Short Term Treatment System Shut Down"
- DOP-FT-003 "Trash Procedures"

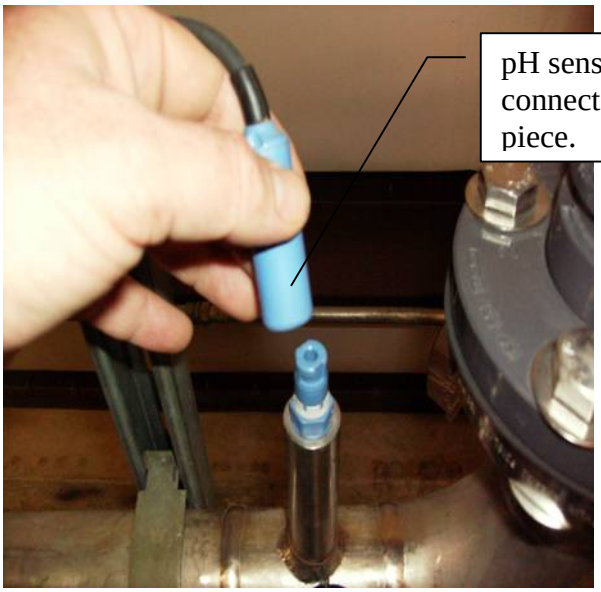

Acid pH meter.
Purifics


Acid pH sensor.
AE201


Secondary caustic pH meter.
Primary caustic pH meter.
SECONDARY
PRIMARY


Primary caustic pH sensor.
AE301


Secondary caustic pH sensor.


pH sensor connector piece.

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	05/28/09	All	Revised Procedure
2	12/13/10	Page 6	Valve schedule correction

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) presents procedures for cleaning the catalyst (titanium dioxide) in the Photo-Cat Treatment System. Due to the considerable amount of iron in the groundwater, the catalyst must be cleaned periodically. This procedure will be used in conjunction with DOP-010, "Checking Catalyst Color."

1.2 Scope and Applicability

This DOP applies to cleaning the catalyst in the Photo-Cat at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

2.1.2 _____ SO: Refer to the "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent cleaning of the catalyst. If issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that DOP-010, "Checking Catalyst Color" has been completed to determine if catalyst cleaning is needed.

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ SO: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 Equipment Required

Safety goggles, face shield, nitrile gloves, neoprene apron and neoprene sleeves (all located in the cabinet containing personal protective equipment [PPE]); sulfuric acid, polyethylene beaker, and the acid bottle dual containment (all located in the Conex box acid cabinet), ladder.

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

3.1 _____ SO: Complete SOP-003, "Short-Term Treatment System Shutdown" to shut down the system. Retrieve the log book from the supply cabinet and note the time and reason for the shut down.

3.2 _____ SO: Isolate the Photo-Cat by closing BV-207, BV-208, BV-320, BV-321, BV-322 and BV-323.

3.3 _____ SO: Retrieve a bottle of 93% sulfuric acid and the beaker from the acid cabinet located in the Conex box. Place the acid bottle in the designated dual containment. Transport the acid and beaker to the treatment system building. Place the bottle of acid in the process sink.

3.4 _____ SO: Turn on the Photo-Cat slurry loop pump in the manual mode. To do this, go to the HMI located on Photo-Cat A. Tap the "Admin" icon. Tap the "login" icon. Enter your password then hit "OK." Tap the "Offline" icon. Tap the "enable offline control" icon. This icon will turn green. Tap the "SLP" icon. The slurry loop pump should now be running in manual mode.

3.5 _____ SO: Stage the ladder in front of the accumulator.

3.6 _____ SO: Don PPE including safety goggles, nitrile gloves, neoprene sleeves, neoprene apron and a face shield. These items will protect you from any splashing of the acid. These items are located in the PPE cabinet located on the east wall of the treatment system building.

3.7 _____ SO: With the beaker in the process sink, slowly pour approximately 3/4 L of acid into the 1-liter beaker.

3.8 _____ SO: Remove the accumulator cap and slowly pour the acid into the top of the accumulator. Replace the accumulator cap.

3.9 _____ SO: Rinse the beaker thoroughly in the process sink**.**

3.10 _____ SO: Chemical-specific PPE may be removed for this portion of the procedure. Don safety glasses.

3.11 _____ SO: Note time now. Allow the slurry loop pump to operate in manual mode for one hour.

3.12 _____ SO: After operating in manual for 1 hour, disable the slurry loop pump in manual mode by tapping the "Admin" icon. Tap the "Login" icon. Enter your password, then hit "OK." Tap the "Offline" icon. Tap the "SLP" icon. Take the system out of "Offline" mode by tapping the "Enable Offline

Control" icon. This icon will turn red.

3.13 _____ SO: Bypass the carbon vessels. To do this, verify which carbon vessel has the spool piece on the effluent side.

- If the spool piece is on GAC-301, close BV-321, BV-320, BV-325, BV-328, BV-332, BV-333 and BV-327. Open BV-322, BV-324 and BV-331.
- If the spool piece is on GAC-302, close BV-322, BV-320, BV-324, BV-329, BV-333, BV-327 and BV-331. Open BV-321, BV-325 and BV-332.
- If the spool piece is on GAC-303, close BV-321, BV-322, BV-323, BV-330, BV-332 and BV-324. Open BV-320, BV-327 and BV-333.

This will allow for bypass of the carbon vessels. Acidic water must not be allowed to flow through the carbon vessels.

3.14 _____ SO: On the system effluent manifold located on the east side of the building, configure the system in recirculation mode. To do this, close BV-305 and open BV-307. This will allow the acidic water to re-circulate back into the Baker tank. Discharge of the acidic water is not permitted.

3.15 _____ SO: The acidic water must now be purged from the Photo-Cat System. To do this, open BV-207 and BV-208. When the system is turned back on in automatic mode, the pump will bring in water from the Baker tank to purge the Photo-Cat of the acidic water. This acidic water will now bypass the carbon vessels and be re-circulated back into the Baker tank. The volume of water in the Baker tank will raise the pH of the acidic water to an acceptable level.

3.16 _____ SO: With the carbon vessels bypassed, and the system in recirculation mode, turn the Photo-Cat back on in automatic mode. To do this, hit the power icon at the top right on any screen on the HMI. The icon will turn green and the system will power up in automatic mode.

3.17 _____ SO: Operate the system in automatic mode and in recirculation mode until the system effluent pH stabilizes to above 3.5. To verify this, watch the pH value on the primary effluent pH meter (located on the east wall of the treatment system building) climb from below 2 to above 3.5. This process should take approximately 10 to 15 minutes. Once the pH stabilizes to above 3.5, shut the Photo-Cat system off. Do this by tapping the "Power" icon on the top right of any screen on the HMI. The icon will turn red and the Photo-Cat will shut down.

3.18 _____ SO: Bring the GAC vessels back online using the following table.

Device	Device #	Correct Startup Configuration	Actual Configuration	Verification (Initial)
GAC Vessels (Primary 301- Secondary 302)				
Drain Valve	DV-301	CLOSED		
Drain Valve	DV-302	CLOSED		
Drain Valve	DV-303	CLOSED		
Sample Port	SP-302	CLOSED		
Sample Port	SP-303	CLOSED		
Sample Port	SP-304	CLOSED		
Ball Valve	BV-340	OPEN		
Ball Valve	BV-341	OPEN		
Ball Valve	BV-342	OPEN		
Ball Valve	BV-320	CLOSED		
Ball Valve	BV-321	CLOSED		
Ball Valve	BV-322	OPEN		
Ball Valve	BV-323	CLOSED		
Ball Valve	BV-324	CLOSED		
Ball Valve	BV-325	OPEN		
Ball Valve	BV-326	OPEN		
Ball Valve	BV-327	CLOSED		
Ball Valve	BV-328	OPEN		
Ball Valve	BV-329	OPEN		
Ball Valve	BV-330	CLOSED		
Ball Valve	BV-331	OPEN		
Ball Valve	BV-332	CLOSED		
Ball Valve	BV-333	CLOSED		
Ball Valve	BV-334	OPEN		

Device	Location	Actual Configuration	Verification (Initial)
Spool Piece	GAC-302		

Device	Device #	Correct Startup Configuration	Actual Configuration	Verification (Initial)
GAC Vessels (Primary 302- Secondary 303)				
Drain Valve	DV-301	CLOSED		
Drain Valve	DV-302	CLOSED		

Device	Device #	Correct Startup Configuration	Actual Configuration	Verification (Initial)
Drain Valve	DV-303	CLOSED		
Sample Port	SP-302	CLOSED		
Sample Port	SP-303	CLOSED		
Sample Port	SP-304	CLOSED		
Ball Valve	BV-340	OPEN		
Ball Valve	BV-341	OPEN		
Ball Valve	BV-342	OPEN		
Ball Valve	BV-320	CLOSED		
Ball Valve	BV-321	OPEN		
Ball Valve	BV-322	CLOSED		
Ball Valve	BV-323	CLOSED		
Ball Valve	BV-324	CLOSED		
Ball Valve	BV-325	CLOSED		
Ball Valve	BV-326	OPEN		
Ball Valve	BV-327	OPEN		
Ball Valve	BV-328	CLOSED		
Ball Valve	BV-329	OPEN		
Ball Valve	BV-330	OPEN		
Ball Valve	BV-331	CLOSED		
Ball Valve	BV-332	OPEN		
Ball Valve	BV-333	CLOSED		
Ball Valve	BV-334	OPEN		

Device	Location	Actual Configuration	Verification (Initial)
Spool Piece	GAC-303		

Device	Device #	Correct Startup Configuration	Actual Configuration	Verification (Initial)
GAC Vessels (Primary 303- Secondary 301)				
Drain Valve	DV-301	CLOSED		
Drain Valve	DV-302	CLOSED		
Drain Valve	DV-303	CLOSED		
Sample Port	SP-302	CLOSED		
Sample Port	SP-303	CLOSED		

Device	Device #	Correct Startup Configuration	Actual Configuration	Verification (Initial)
Sample Port	SP-304	CLOSED		
Ball Valve	BV-340	OPEN		
Ball Valve	BV-341	OPEN		
Ball Valve	BV-342	OPEN		
Ball Valve	BV-320	OPEN		
Ball Valve	BV-321	CLOSED		
Ball Valve	BV-322	CLOSED		
Ball Valve	BV-323	CLOSED		
Ball Valve	BV-324	OPEN		
Ball Valve	BV-325	CLOSED		
Ball Valve	BV-326	OPEN		
Ball Valve	BV-327	CLOSED		
Ball Valve	BV-328	OPEN		
Ball Valve	BV-329	CLOSED		
Ball Valve	BV-330	OPEN		
Ball Valve	BV-331	CLOSED		
Ball Valve	BV-332	CLOSED		
Ball Valve	BV-333	OPEN		
Ball Valve	BV-334	OPEN		

Device	Location	Actual Configuration	Verification (Initial)
Spool Piece	GAC-301		

3.19 _____ SO: Enable the system in automatic mode. To do this, hit the power icon at the top right on any screen on the HMI. The icon will turn green and the system will power up in automatic mode.

3.20 _____ SO: The system should still be in recirculation mode. Allow a few minutes in recirculation mode for the effluent pH to stabilize above 5.5.

3.21 _____ SO: With the acid bottle in proper secondary container, return it to the acid cabinet in the Conex box.

3.22 _____ SO: After the effluent pH has stabilized, first open BV-305 and then close BV-307 to resume discharging to the POTW (Publicly Owned Treatment Works).

4. COMPLETION

4.1 _____ SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- SOP-003 “Short-Term Treatment System Shutdown”
- SOP-002 “Routine System Startup”
- Contingency Plan

Spool piece.

Primary effluent pH meter.


Purifics
HMI screen.
Accumulator.


WORLDWIDE SUPPORT
Accumulator cap.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/01/08	All	New Procedure
1	04/29/09	All	Modified Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) will be followed when cleaning the Catalyst Recovery Unit (CRU). The purpose of this procedure is to evacuate tiny air bubbles and precipitate any metals, such as iron, that build up in the CRU over time. These air bubbles and metals restrict the amount of water that the slurry loop pump can push through the CRU. Through time, the differential pressure between the CRU and DPCV will rise and the Photo-Cat flow rate will decrease. The CRU cleaning is a two step process which utilizes a citric acid wash and a caustic / bleach cleaning. The citric acid has the effect of sequestering metals from the CRU which can effectively clean the CRU, while the caustic and bleach solution reduces the viscosity of the fluid to push entrained gas or bubbles out of the ceramic elements in the CRU and oxidizes remaining metals on the CRU so they can be removed during the rinse. Certain steps of this procedure require two people.

1.2 Scope and Applicability

This procedure applies to CRU cleaning at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of “Operations Log.” This is located in the cabinet labeled “Supply” between Photo-Cats A and B.

2.1.2 _____ SO: Refer to “Operations Log” to ensure that there are no operational issues reported/recorded that would prevent access to the extraction wells. If such issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that there is one empty 55-gallon drum on site. If not, exit this procedure and order the drums.

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g. hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ OM: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified Procedure:

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

2.3 Equipment Required

- pail of powdered citric acid
- 1-gallon jug of Clorox® bleach
- container of sodium hydroxide pellets
- 1-inch hose (located in the Conex box)
- 1-liter polyethylene pitcher
- high-range pH strips
- zip ties (located in the supply cabinet)
- nitrile gloves
- safety goggles
- face splash shield
- neoprene sleeves
- neoprene apron (located in the personal protective equipment [PPE] cabinet)
- garden hose (located on the southeast wall of the treatment building)
- 5-gallon bucket of titanium dioxide
- one empty 5-gallon bucket
- 1'' clear drain hose
- PVC stirring rod
- Ladder

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

3.1 _____ SO: Verify that SOP-003 "Short Term Treatment System Shutdown" was performed and the system is shut down.

3.2 _____ SO: Verify that DOP-027 "Titanium Dioxide Slurry Removal" up to Step 3.11 was performed to remove the slurry from the Photo-Cat. Place safety cones around sump area.

3.3 _____ SO: Retrieve and stage all necessary equipment and PPE identified in Step 2.3 of this procedure.

3.4 _____ SO/LO: Don PPE: nitrile gloves, safety goggles, splash shield, neoprene sleeves and neoprene apron

3.5 _____ SO: Using the sink, fill the 1 liter beaker to about half full with potable water. Measure 1/4 liter of the sodium hydroxide pellets into the 1-liter polyethylene pitcher and slowly pour into the beaker. Caution: Mixture will get hot. Slowly stir the mixture with the PVC stirring rod until the pellets are dissolved.

3.6 _____ SO: The photo-cat will be operated in recirculation mode during the sodium hydroxide cleaning. To obtain proper configuration for recirculation mode, follow these steps:

3.7 _____ SO: Close BV-207 and BV-208 on the effluent of the cartridge filters.

3.8 _____ SO: Close BV-320, BV-321, BV-322 and BV-323 on the influent of the GAC vessels.

3.9 _____ SO: Switch the Slurry Flow Control Valve (SFCV) to manual mode by tapping the "Reactor" icon on the top of any screen on the human-machine interface (HMI). Tap on the SFCV icon and put the SFCV in manual. This should close the SFCV valve when the SLP is enabled.

3.10 _____ SO: Manually turn on the "SLP Pump" by performing the following: Go to the HMI screen; tap the "Admin" icon; enter your password; tap the "Offline" icon; tap the "SLP Pump" icon; tap the "enable offline control" icon; the SLP icon will turn green and begin to operate. The Photo-Cat is now in recirculation mode.

3.11 _____ SO/LO: Remove the cap on top of the accumulator. Hang a five gallon bucket from the Y fitting on top of the accumulator to serve as containment in the event that chemical drips from the fitting as it is added. Stage the ladder in front of the accumulator. One person will hold the ladder and the other will add the chemical to the accumulator. Support the ladder on the side opposite to cup holder to stay out of way of the chemical. Set the sodium hydroxide filled pitcher on the top step of the ladder inside the cup holder. With one person supporting the ladder, carefully climb the ladder until in position just above the accumulator. Slowly pour the contents of the beaker into the accumulator. Allow the photo-cat to operate in the recirculation mode for approximately 40 minutes. Record the procedure start time in the log book. Rinse the bucket, pitcher, and stirring rod bar thoroughly in the process sink.

3.12 _____ SO/LO: Remove chemical specific PPE. Don safety glasses.

3.13 _____ SO: At the completion of the 40 minute operational period, shut off the SLP pump in the offline screen. To do this, tap the SLP icon until it turns red.

3.14 _____ SO: Attach the 1'' clear drain hose to the male camlock fitting at the base of the accumulator.

3.15 _____ SO: Secure the other end of the clear drain hose to the sump grate with a zip tie.

3.16 _____ SO: Drain the contents of the accumulator from the drain port at the base of the accumulator into the sump. The system will drain some remaining titanium dioxide slurry along with the high pH solution. The accumulator will drain approximately 30-40 gallons before empty.

3.17 _____ SO: Close the accumulator drain valve and fill the accumulator with potable water utilizing the plant hose. When the accumulator reaches approximately 90% turn on the SLP pump. The level in the accumulator will drop while the SLP pump is on, it is critical that the level remain above 40%, therefore keep the plant hose in the accumulator and continue to fill the accumulator with potable water until the water level in the accumulator is maintained at 80%. Allow the Photo-Cat to operate for approximately 2 minutes in recirculation mode with potable water. After the 2 minute recirculation period, turn off the SLP pump and drain the accumulator as described in section 3.16 above.

3.18 _____ SO: Use the pH strips located in the supply cabinet to determine the pH of the rinse water. If the pH is approximately 7.0, stop rinsing. If not, repeat the rinse cycle described in section 3.19 above until the pH of the water is approximately 7.0. This step may take an hour or more.

3.19 _____ SO: Fill the accumulator with potable water to approximately 80% with the garden hose.

3.20 _____ SO: Manually turn on the "SLP Pump" by performing the following: Go to the HMI screen; tap the "Admin" icon; enter your password; tap the "Offline" icon; tap the "SLP Pump" icon; tap the "enable offline control" icon; the SLP icon will turn green and begin to operate. The Photo-Cat is now in recirculation mode.

3.21 _____ SO/LO: Don PPE: nitrile gloves, safety goggles, splash shield, neoprene sleeves and neoprene apron

3.22 _____ SO: Using the sink, fill the pitcher to about half full with potable water. Measure 1/2 liter of the citric acid powder into the polyethylene pitcher. Slowly stir the mixture with the PVC stirring rod until the powder is dissolved.

3.23 _____ SO/LO: Remove the cap on top of the accumulator. Hang a five gallon bucket from the Y fitting on top of the accumulator to serve as containment in the event that chemical drips from the fitting. One person will support the ladder on the side opposite to where the chemical is placed as the other climbs. Stage the ladder in front of the accumulator. Place the chemical filled polyethylene pitcher into the cup holder on the top step of the ladder. Carefully climb the ladder and pour the contents of the pitcher into the accumulator. Allow this mixture to circulate through the slurry loop for approximately 40 minutes. Record start time in the log book. Thoroughly rinse the pitcher, bucket and stir rod in the process sink.

3.24 _____ SO: At the completion of the 40 minute operational period, shut off the SLP pump in the offline screen. To do this, tap the SLP icon until it turns red. Verify that the 1" hose is still attached to the male cam lock fitting at the base of the accumulator. Verify that the other end of the clear drain hose is secured to the sump grate with a zip tie. Drain the contents of the Photo-Cat from the drain port at the base of the accumulator into the sump. The system will drain some remaining titanium dioxide slurry along with the low pH solution. The accumulator will drain approximately 30-40 gallons before empty.

3.25 _____ SO: Close the accumulator drain valve and fill the accumulator with potable water utilizing the plant hose. When the accumulator reaches approximately 90% turn on the SLP pump. The level in the accumulator will drop while the SLP pump is on, it is critical that the level remain above 40%, therefore keep the plant hose in the accumulator and continue to fill the accumulator with potable water until the water level in the accumulator is maintained at 80%. Allow the photo-cat to operate for approximately 2 minutes in recirculation mode with potable water. After the 2 minute

recirculation period, turn off the SLP pump and drain the accumulator as described in section 3.24 above.

3.26 _____ SO: Use the pH strips to determine the pH of the rinse water. If the pH is approximately 7.0, stop rinsing. If not, repeat the rinse cycle described in section 3.10 above until the pH of the water is approximately 7.0.

3.27 _____ SO: When rinsing is completed, close the drain port at the bottom of the accumulator, and fill the accumulator with potable water to approximately 80% with the garden hose.

3.28 _____ SO: Return the SFCV to automatic mode by going to the "Reactor Screen" and tapping on the SFCV icon. A pop-up box will appear and allow you to set the valve to automatic.

3.29 _____ SO: From the 5-gallon bucket of titanium dioxide, add 28 grams of titanium dioxide to the measuring cup that is kept inside the bucket. Into the same cup, add a small amount of water. Add contents to the top of the accumulator. Allow 5 minutes for the titanium dioxide to circulate. Collect a sample of the catalyst in the Photo-Cat. Compare this to the catalyst standard located in the supply cabinet. The catalyst in the Photo-Cat needs to look like the standard. Add more catalyst if needed in order to accomplish this.

3.30 _____ SO: To remove the remaining iron from the lamp tubes, perform Catalyst Cleaning DOP-025.

4. COMPLETION

4.1 _____ SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- DOP-027 "Titanium Dioxide Slurry Removal"
- DOP-003 "System Alarm Response"
- DOP-025 "Catalyst Cleaning"

Slurry flow control valve (SFCV).

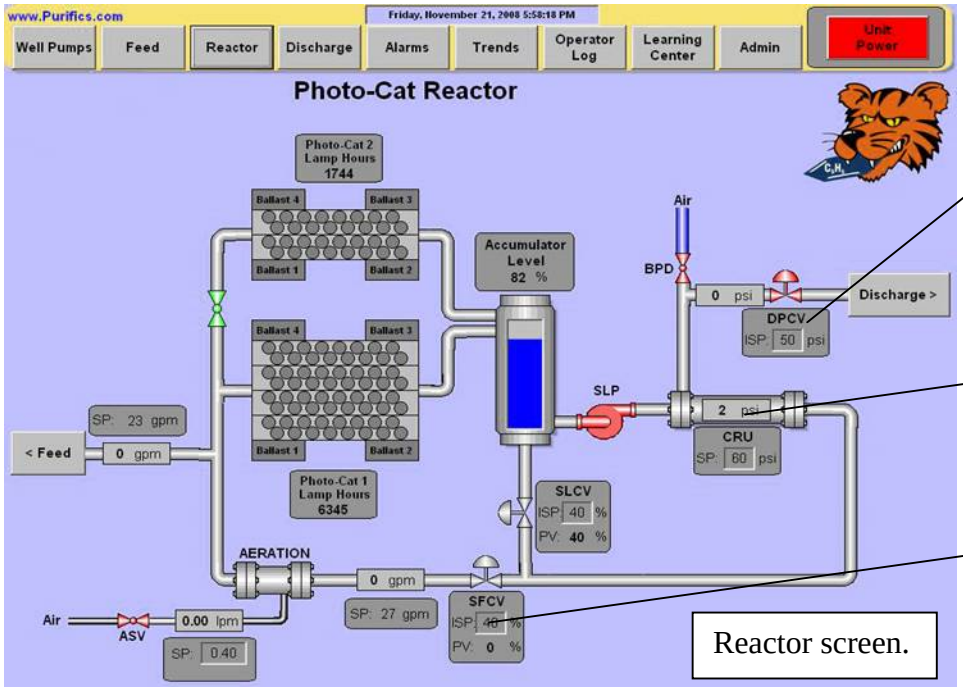
Differential pressure control valve (DPCV).

Accumulator cap.

HMI screen.

Accumulator.

CRU.

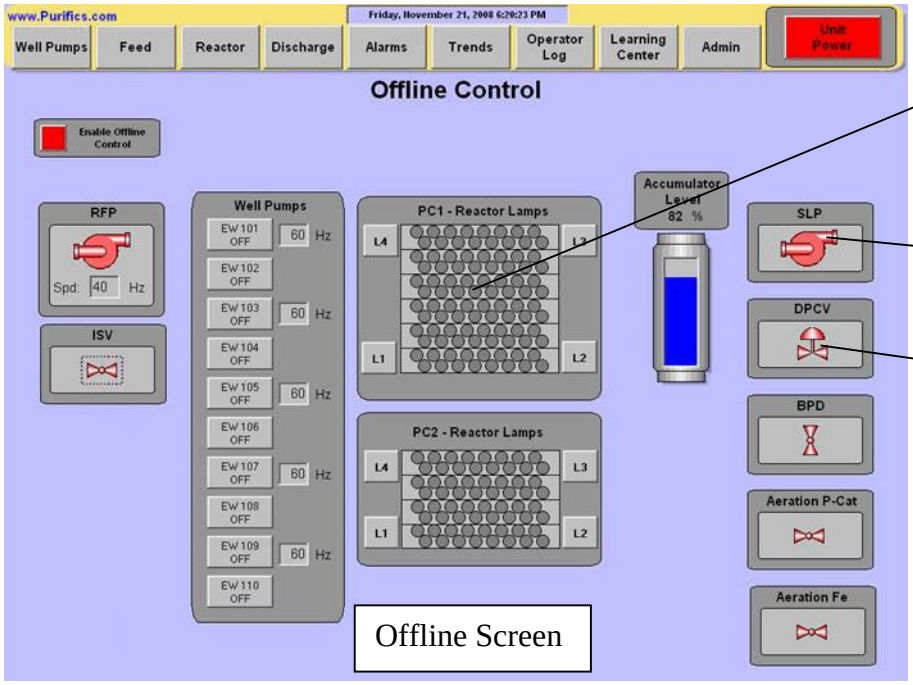


DPCV box.

CRU illustration.

SFCV box.

Reactor screen.

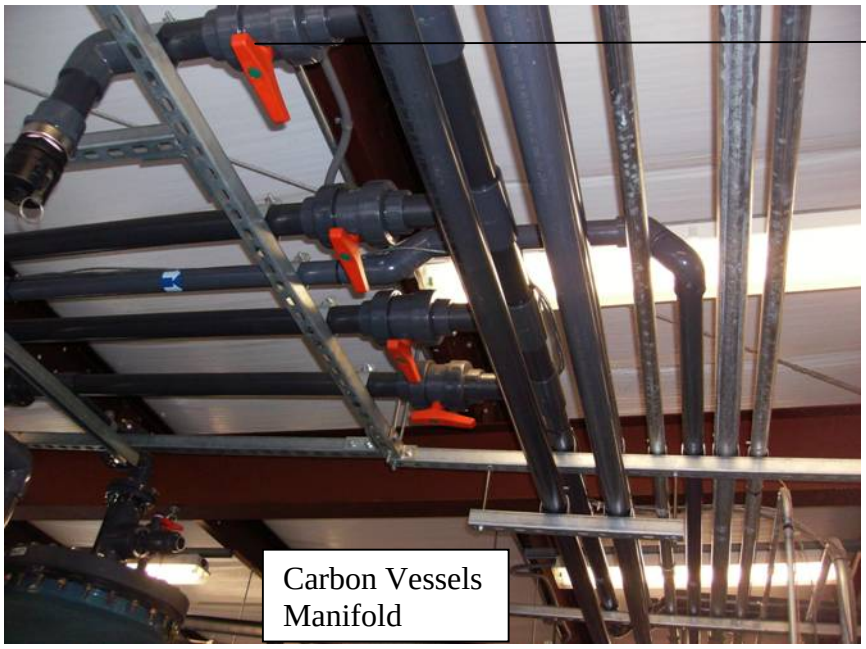


Offline Screen

Photo-Cat A reactor lamps illustration.

SLP icon.

DPCV icon.



Carbon Vessels Manifold

BV-307.

Primary effluent pH meter.

Spool piece.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) identifies the tasks to be followed for removing the titanium dioxide slurry from the Photo-Cat System.

1.2 Scope and Applicability

This DOP applies to the removal of titanium dioxide slurry from the Photo-Cat System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cat A and B.

2.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent the removal of the titanium dioxide slurry. If issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that no emergency stops are in effect (e.g. hurricane, flood). If in effect, exit this procedure.

2.1.4 _____ SO: Verify that there are six empty 50-gallon drums on site. If not, exit this procedure and order them.

2.1.5 _____ SO: Two people are required to perform this procedure. Verify that there is someone available on site to assist with this procedure. If not, exit this procedure until the required resources are available.

2.2 Planning and Coordination

2.2.1 _____ OM: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 **Equipment Required**

Nitrile gloves, safety glasses, $^{15}/_{16}$-inch socket wrench, 5-gallon bucket, six 55-gallon open-top drums, plastic sheeting, drum dolly.

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

3.1 _____ LO/SO: Verify that SOP-003 "Short Term Treatment System Shut Down," has been performed and the system is shut down.

3.2 _____ LO/SO: Isolate the Photo-Cat System. To do this, close BV-207 and BV-208 on the effluent side of the cartridge filters, and BV-320, BV-321, BV-322 and BV-323 on the manifold on the influent side of the carbon vessels.

3.3 _____ LO/SO: Lay down a 10-foot by 10-foot square of plastic sheeting just outside the north side of the treatment system bay door. Stage six 55-gallon open-top drums on top of the plastic sheeting. The sheeting will help contain any accidental splashing of the slurry as it is being transferred from the bucket to the drum. Using a $^{15}/_{16}$-inch socket wrench, remove the tops from the drums.

3.4 _____ LO/SO: Don safety glasses and nitrile gloves.

3.5 _____ LO/SO: Put the slurry feed control valve (SFCV) in manual. To do this, go to the HMI screen and tap the "Admin" icon. Tap the "Login" icon. Enter your password, and then tap "OK." Tap the "Offline" icon. Tap the "Enable Offline Control" icon. Tap the "SFCV" icon. Go to the pneumatic valve on Photo-Cat A labeled "SFCV." On the control pad, set to 30% open.

3.6 _____ LO/SO: Place a 5-gallon bucket underneath the Photo-Cat slurry drain valve located at the bottom of the accumulator, open the Photo-Cat slurry drain valve and begin draining the slurry into the buckets. After the bucket is about 75% full, close the drain valve and transport the bucket to the open 55-gallon drum. Carefully pour the contents of the bucket into the drum. Do not fill the drums more than 75%.

3.7 _____ LO/SO: Continue the previous step until no slurry drains from the slurry drain valve.

3.8 _____ LO/SO: Close the slurry drain valve.

3.9 _____ LO/SO: Use the garden hose to fill the accumulator to 80%. To see the level inside the accumulator, go to the HMI screen and tap the "Reactor" icon. One person will watch the accumulator level to ensure that, during the following step of this process, the level inside the accumulator does not exceed 90% and does not go below 40%. The other person will throttle the garden hose that is filling the accumulator. The goal during this part of the procedure is to enable operation of the Slurry Loop Pump (SLP), and to fill the accumulator with potable water at a rate that keeps the accumulator level stable at about 65%. This part of the procedure ensures proper rinsing of the spent catalyst inside of the Photo-Cat.

3.10 _____ LO/SO: The person at the HMI screen will now enable the SLP. To do this, tap the "Admin" icon. Tap the "Login" icon. Enter your password, and tap "OK." Tap the "Offline" icon. Tap the "Enable Offline Control" icon. This icon will turn green. Tap the "SLP" icon. The SLP will now be enabled. Instruct the person assisting to fully open the water valve to allow full flow through the garden hose. Watch the accumulator level on the HMI screen. The level will start rising. Instruct the person assisting at the water valve to slowly close the water valve until the level inside the accumulator stabilizes at about 65%. After the level inside the accumulator stabilizes, watch closely for a rise in the accumulator level. This rise will indicate that the Photo-Cat system has been filled. At this point, instruct the person assisting to turn off the water valve to the garden hose. The level inside the accumulator should remain the same. Allow the SLP to run for 2 minutes after the level stabilizes.

3.11 _____ LO/SO: Disable the SLP by tapping the "SLP" icon on the HMI screen.

3.12 _____ LO/SO: Perform Steps 3.5 through 3.9 until the water being drained from the accumulator is clear.

3.13 _____ LO/SO: With the Photo-Cat filled with clear, potable water, add the fresh catalyst (titanium dioxide). Retrieve the titanium dioxide. The titanium dioxide is stored in the Conex box in a 5-gallon bucket labeled "Purifics Titanium Dioxide." Retrieve the catalyst standard and the empty 40-milliliter (mL) vial from the supply cabinet. The standard is a 40mL vial labeled "catalyst standard."

3.14 _____ LO/SO: Enable the SLP by tapping the "SLP" icon. With the water inside the Photo-Cat circulating, add 56 grams of titanium dioxide. Remove the cap on the accumulator, and slowly pour the titanium dioxide into the top of the accumulator.

3.15 _____ LO/SO: Allow the titanium dioxide to circulate through the Photo-Cat for 5 minutes.

3.16 _____ LO/SO: Fill the empty 40mL vial by slowly opening the sample tap on the north side of Photo-Cat A (SP-301.) Pour the contents of this vial into the top of the accumulator. Perform this step three times to purge this line.

3.17 _____ LO/SO: Fill the empty vial by slowly opening the sample tap (SP-301.) Compare this sample to the catalyst standard. To do this, hold both the standard and the sample up to a light source, and determine whether or not the sample is more transparent than the standard.

3.18 _____ LO/SO: If the sample is more transparent than the standard, add 28 grams of titanium dioxide to the top of the accumulator. Repeat Steps 3.14 through 3.17. Repeat until the sample matches the catalyst standard. Replace the accumulator cap.

3.19 _____ LO/SO: Once the sample matches the catalyst standard, take the SLP out of manual mode by tapping the "SLP" icon.

3.20 _____ LO/SO: If conditions are such that the treatment system can be restarted, do so at this time by performing SOP-002 "Routine System Start-up" to ensure the system valves are in the correct position for normal operations.

3.21 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench, replace the lids on the six 55-gallon drums. Using the drum dolly located in the Conex box, place the drums inside the Conex box on top of the secondary containment pad.

3.22 _____ LO/SO: Place the plastic sheeting and the used personal protective equipment (PPE) in a 55-gallon drum located in the Conex box. This drum will be labeled "Used PPE."

3.23 _____ LO/SO: Return all tools to the tool cabinet, and return all other supplies to their original location.

3.24 _____ LO/SO: Arrange for removal of the 55-gallon drums. Call Eric at SWS at 727.224.6952. Complete DOP-FT-010 "Subcontractor Access" for this transaction.

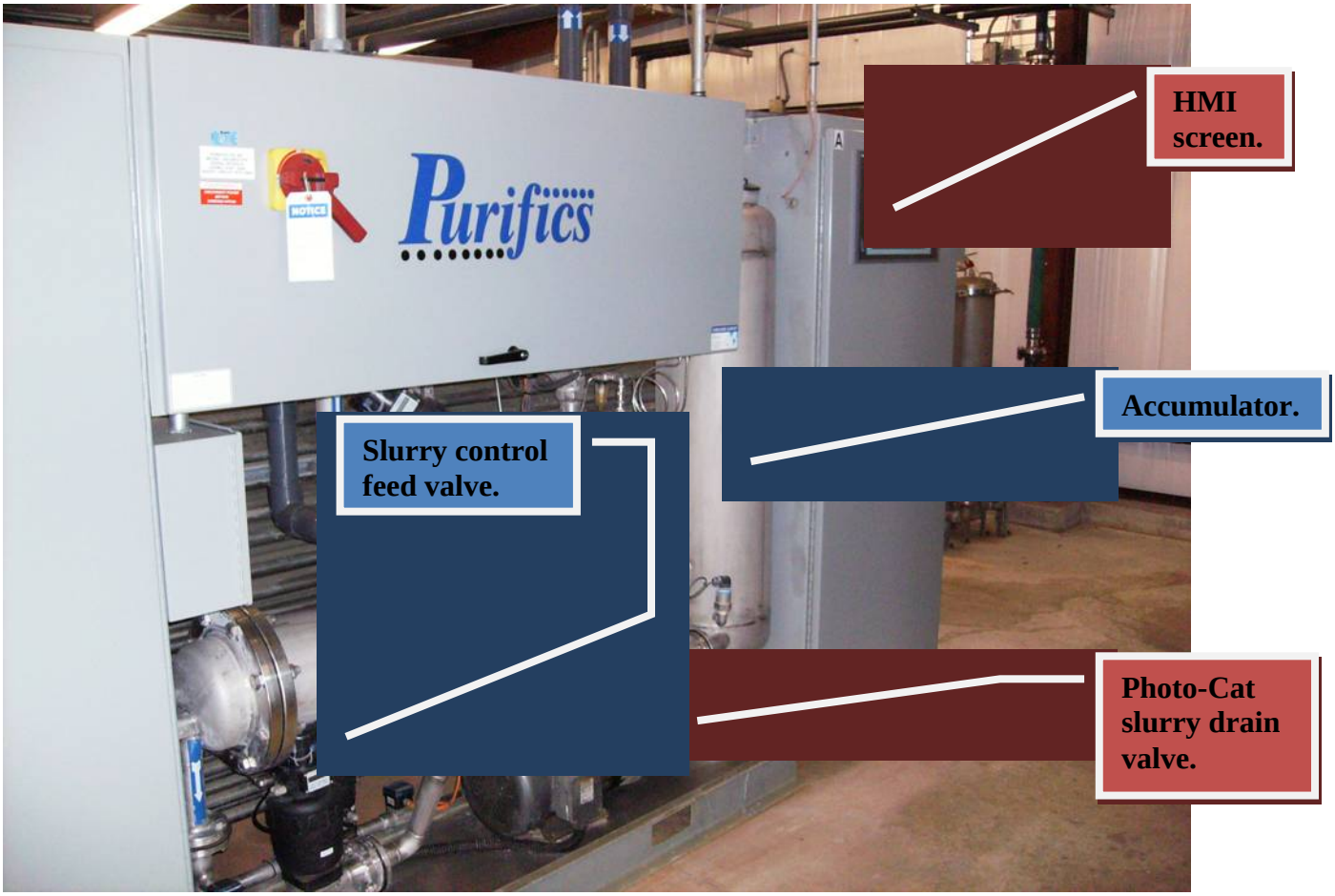
4. COMPLETION

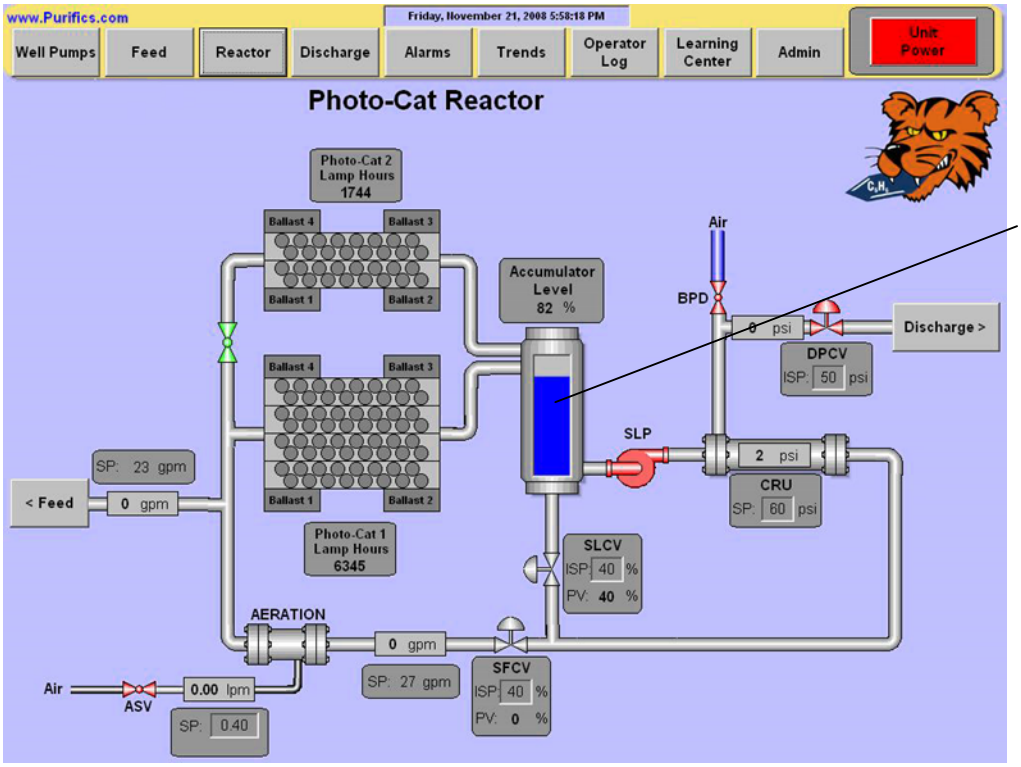
4.1 _____ SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- DOP-FT-010 "Subcontractor Access"
- SOP-002 "Routine System Start-up"


Purifics
HMI screen.
Accumulator.
Slurry control feed valve.
Photo-Cat slurry drain valve.



Accumulator level on the reactor screen.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/08/08	All	New Procedure
1	10/08/09	All	Revised Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for cleaning aerators A-400 and A-401. Aerators may require cleaning when the specified air flow cannot be maintained. When the aerator becomes fouled, the aeration system high air pressure alarm will be triggered and the aerators will need to be alternated. The fouled aerator will need to be cleaned.

1.2 Scope and Applicability

This DOP applies to cleaning aerators A-400 and A-401. These are located at the Lockheed Martin Treatment Facility in Tallevast, Florida. Aerators may require cleaning when the specified air flow cannot be maintained.

2. PRECAUTIONS AND LIMITATIONS

Only one aerator may be cleaned at a time.

2.1 Planning and Coordination

2.1.1 _____ SO: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.2 Equipment Required

Nitrile gloves, safety goggles, face shield, neoprene apron, neoprene sleeves, ¾-inch wrenches, • -inch wrench, 5-gallon bucket with lid, 93% sulfuric acid, crescent wrench, marker.

2.3 Approvals and Notifications

2.3.1 _____ Approval to perform this procedure has been obtained from the LO.

LO Signature _____ Date _____

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time: _____ Date: _____ SO _____

3.1 _____ SO: If A-400 requires cleaning, open BV-402 and BV-404 to bring the standby aerator (A-401) online. Isolate A-400 by closing BV-401 and BV-403.

3.2 _____ SO: If A-401 requires cleaning, open BV-401 and BV-403 to bring the standby (A-400) online. Isolate A-401 by closing BV-402 and BV-404.

3.3 _____ SO: Complete DOP-LOTO-007 to lock and tag out the desired aerator.

3.4 _____ SO: Don nitrile gloves.

3.5 _____ SO: Using two ¾ -inch wrenches, disconnect the airline and the check valve that is attached to the aerator.

3.6 _____ SO: Remove bolts and washers from flanges on influent and effluent sides of aerator to be cleaned. Store the hardware in a safe place.

3.7 _____ SO: Remove aerator and place in a 5-gallon plastic bucket.

3.8 _____ SO: Transport the aerator to the process sink and rinse it thoroughly.

3.9 _____ SO: Bring the aerator to the work bench and carefully disassemble it by removing the piece that holds the ceramic element in place. Store the hardware in a safe place.

3.10 _____ SO: Carefully place the ceramic element in the 5 gallon bucket and bring the bucket to the process sink.

3.11 _____ SO: Fill the 5-gallon bucket with water so that it covers the entire ceramic element.

3.12 _____ SO: Retrieve the 93% sulfuric acid and acid beaker from the acid cabinet in the Conex box. Carefully transport the dual contained acid bottle to the process sink.

3.13 _____ SO: Remove safety glasses. Don goggles, face shield, neoprene apron and neoprene sleeves before completing any additional tasks.

3.14 _____ SO: Carefully pour approximately 6 ounces of 93% sulfuric acid into the beaker. From this beaker, slowly pour the acid into the 5-gallon bucket that contains the aerator element and water. Hold the beaker near the surface of the water to pour and pour slowly enough to maintain a calm, steady stream of acid that enters the water without splashing. Keep head as high as ergonomically correct. Be sure that head and neck are positioned so that the face shield is between the acid and the face (i.e., do not have your chin directly above the acid).

3.15 _____ SO: Place the lid on the top of the 5-gallon bucket.

3.16 _____ SO: Using a marker, label the lid and the bucket "Sulfuric Acid Solution."

3.17 _____ SO: Transport the 5 gallon bucket holding the acid solution and ceramic element to the dual containment pallet inside the Conex box.

3.18 _____ SO: The aerator will soak in the acidic solution over night. The bucket in which it soaks will remain on the secondary containment pallet in Conex box.

3.19 _____ SO: After soaking the aerator over night, don all personal protective equipment (PPE) described in Step 3.13 of this DOP before proceeding.

3.20 _____ SO: Carefully transport the bucket containing the aerator element to the process sink. Remove the element from the acid solution. Rinse the element and your gloves thoroughly. Slowly pour the acid solution into the sink and rinse the sink several times. Rinse the bucket thoroughly and return it to the conex box.

3.21 _____ SO: Visually inspect gaskets. If gaskets appear worn, replace them with new gaskets. New gaskets can be found in the Conex box. Dispose of used gaskets in the used PPE drum. Refer to DOP-FT-003, "Trash Procedures."

3.22 _____ SO: Carefully reinstall the ceramic element into the aerator and replace the hardware as follows:

3.22.1 _____ Using a ¾ -inch wrench, replace nuts, bolts and washers on flanges on the influent and effluent sides of the aerator.

3.22.2 _____ Using a • -inch wrench, reconnect the air line and check the valve to the aerator.

3.22.3 _____ After the aerator is reinstalled, remove the lock and tag from the influent and effluent valves. Dispose of the tag and return the locks to the lock out station on the west side of the treatment center building.

4. COMPLETION

4.1 _____ LO/SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- DOP-LOTO-007 "Aerators A-400 and A-401"
- DOP-FT-003 "Trash Procedures

Aeration system (A-400 and A-401).

Aerator A-400.

Aerator A-401.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	01/08/09	All	New Procedure
1	06/17/09	All	Revised Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for cleaning an extraction well screen.

1.2 Scope and Applicability

This DOP applies to cleaning an extraction well screen of the Lockheed Martin Treatment System in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Groundwater at the facility is contaminated with volatile organic compounds and 1,4-dioxane. Therefore, it is EXTREMELY IMPORTANT that the operator use care to avoid contact with groundwater or any rinsates thereof.

2.2 This is a 2-day procedure. Therefore, do not begin this procedure on a Friday or the day prior to a holiday.

2.3 The equipment described in Step 3.2 of this procedure must be available for use. Gather all of the necessary equipment for this DOP before beginning the corresponding work.

2.4 Extraction well screen cleaning must not proceed without positive verification that the extraction well pump is disabled and locked out/ tagged out. Verify that the DOP-LOTO-003 "Well Pumps P101 – P110" has been completed for the specific extraction well pump to be serviced. If not, exit this procedure and perform DOP-LOTO-003.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

3.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent a well cleaning event. If such issues are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect or pending in the near term, exit this procedure.

3.1.4 _____ SO: Obtain and review DOP-015 "Extraction Well Vault Access" and DOP-016 "Extraction Well Pump Pull." Gather equipment listed in these DOPs.

3.1.5 _____ SO: Obtain and review DOP-FT-004 "Transportation and Storage of Groundwater and Solutions Thereof (Including Rinsates) – Large

Volume." Gather equipment listed in DOP-FT-004. Note that the 55-gallon drum to be used for Step 4.4 in this procedure must be constructed of polyethylene resin (plastic) with an open top. **A metal drum will not be used due to the potentially low pH of the water to be stored.**

3.1.6 _____ SO: Gather all of the necessary equipment listed in Step 3.2 of this procedure.

3.2 **Equipment Required**

- 5-gallon bucket (clean)
- Water level meter
- Calculator
- Cotey J200 tool with well brush attachment (5-inch or 6-inch diameter depending on diameter of extraction well)
- Stainless steel weight for J200 tool
- 50' stainless steel cable and cable clamps
- Grundfos SS submersible pump and controller
- 100-foot reel of • -inch ID poly tubing
- 12-volt battery(ies) (can use a vehicle's battery)
- pH probe
- Cotey dry acid (sulfamic acid) and Cotey bioplane (hydroxyacetic acid)
- 500 gallon poly tank or (4) 55 gallon poly drums
- Dual containment tray for poly tank/ Dual containment tray for poly drums
- 2'' Tremie pipe and funnel
- PVC stirring rod
- Sodium hydroxide pellets

3.3 **Planning and Coordination**

3.3.1 _____ SO: IF any of the following events occur, or are pending,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

4. EXTRACTION WELL CLEANING STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

4.1 Initial Cleaning – Day 1

4.1.1 _____ SC: Obtain DOP-15, "Extraction Well Vault Access" and complete the procedures outlined in DOP-15 for extraction well vault access.

4.1.2 _____ SC: With the extraction well vault open as directed in DOP-015, start gently pulling up the transducer by its cord, winding the cord neatly as the transducer is being removed from the well casing. Set the transducer in the extraction well vault. Complete removal of the extraction well pump from the well casing and set the extraction well pump and hose setup into the vault.

4.1.3 _____ SC: Make shift operator aware of availability of extraction well wet end. Operator will decide whether wet end needs to be cleaned.

4.1.4 _____ SO: If the extraction well wet end needs cleaning, this may occur concurrently with the extraction well cleaning. See DOP-017, "Extraction Well Pump Wet End Cleaning."

4.1.5 _____ SC: If the extraction well wet end does not require cleaning, store the pump and hose setup in the vault.

4.1.6 _____ SC: Use a water level meter to measure, in feet, the depth to water in the extraction well. Record the measurement in the table below. Measure the total depth of the extraction well by slowly lowering the water level meter probe until it reaches the bottom of the well. When the probe appears to be at the bottom, raise and lower the water level meter tape and "feel" for the well bottom. Put the water level meter tape against the northern side of the casing and read on the tape where the top of the casing is. Record the measurement in the table below.

4.1.7 _____ SC: Determine the current volume of water within the well using the attached table and data collected during Step 4.1.6. Using a calculator, subtract the depth-to-water measurement from the total depth of the well and then multiply the difference by appropriate well capacity conversion below. This volume calculation will be used in determining the amount of acid to be used later in this procedure.

Well ID	Well Diameter (inches)	Listed Total Depth (TD) (feet)	Actual Total Depth (TD) (feet)	Depth-to-Water (DTW) (feet)	TD – DTW (feet)	Gallons Per Foot Conv.	Well Volume (gallons)
EW-101	6	30				1.47	
EW-102	5	41				1.02	
EW-103	5	25				1.02	
EW-104	5	36				1.02	
EW-105	5	30				1.02	
EW-106	5	36				1.02	
EW-107	5	32				1.02	
EW-108	6	40.5				1.47	
EW-109	5	30				1.02	
EW-110	5	40				1.02	

4.1.8 _____ SC: Gently brush the well casing to remove gross fouling deposits from the inside of the screen with 5–inch- or 6-inch-diameter brushes attached to the weighted Cotey J200 tool, as appropriate. This brushing must be performed gently to avoid pushing the gross fouling material into the gravel pack. The objective is for these materials to fall to the bottom of the well. **Therefore, allow at least 30 minutes prior to starting Step 4.2.2.**

4.2 **Removal of Material from Bottom of Well Following Initial Cleaning – Day 1**

4.2.1 _____ SC: Stage an open-top steel 55-gallon drum or 500 gallon poly tank on top of a dual containment tray near the well being cleaned in accordance with DOP-FT-004 “Transportation and Storage of Groundwater (Large Quantity).”

4.2.2 _____ SC: Use a Grundfos SS submersible pump and controller to remove material from the bottom of the well. Connect one end of the • -inch ID tubing to the pump discharge barb. Slowly lower (to avoid disturbance of the settled material) the pump to the bottom of the well while feeding the discharge tubing concurrently. Obtain enough slack in the discharge tubing to secure the discharge tubing to a staged 55-gallon drum/500 gallon poly tank to ensure discharge into the vessel. Cut the discharge tubing from the reel and connect to a staged 55-gallon drum or 500 gallon poly tank. Connect motor leads to a 12-volt power supply (a vehicle battery may be used, as appropriate) and operate the pump in accordance with the manufacturer’s recommendations for pump operation. The pump discharge rate should be around 3 gallons per minute. Monitor the discharge for change in discharge water clarity. Discontinue

pumping when discharge becomes clear or when the vessel becomes 80% full, (whichever happens first).

4.3 Chemical Treatment Addition – Day 1

4.3.1 _____ SC: Use a pH probe to measure the pH of water in the 55-gallon drum and the pH of groundwater in the well within the first few feet below water surface. Record measurements in table below.

Well ID	pH of Drum Water (S.U.)	pH of Well Water (S.U.)			
	(Step 4.3.1)	Pre-treatment (Step 4.3.1)	Post-chemical addition (Step 4.3.2)	Post-brushing (Step 4.3.5)	Post-water/debris removal (Step 4.4.3)
EW-					
EW-					
EW-					
EW-					

4.3.2 _____ SC: Don the following PPE prior to adding chemicals: goggles, face shield, neoprene sleeves, neoprene apron, nitrile gloves, neoprene outer gloves. Using the well volume calculated during Step 4.1.3 of this procedure, add approximately 1 gallon of Cotey Bio-Clean per 40 gallons of well volume and approximately 0.75 lbs of Cotey Dry Acid per gallon of well volume to the well in accordance with the chemical manufacturer's recommendations. Use the 2'' tremie pipe and a funnel to assist with this process. Add approximately 10 gallons of potable water to the well to assist in mixing the dry chemical. Use the J-200 tool with the appropriate sized brush to mix the dry chemical in the well. Mix gently. After the chemical manufacturer's recommended wait time has elapsed, measure the pH of groundwater in the well within the first few feet below water surface. Record the measurements in the table included in Step 4.3.1.

4.3.3 _____ SC: Mechanically surge the well. The purpose of this step is to mechanically surge the well to work the chemicals into the filter pack and adjacent formation. This will be done using the brush as a plunger to force water into and out of the screen by operating the well brush up and down below the water table and within the well casing. The initial surging motion should be relatively gentle, allowing any material blocking the screen to break up, go into suspension and then move into the well. After several minutes,

move the well brush to the top of the screen and lengthen the stroking motion to impart more force. After several minutes, move progressively downward in 5-foot increments to within 5 feet of the bottom of the screen, and repeat the stroking motion. During this procedure, avoid any well water from spilling on land surface.

4.3.4 _____ SC: Close the extraction well vault and **allow chemicals to sit in the well overnight (8 hours minimum).**

4.3.5 _____ SC: Clean and decontaminate the equipment used in accordance with DOP-FT-006 "Cleaning and Decontaminating Equipment" and store appropriately.

4.3.6 _____ SC: Transfer the groundwater collected in the 55-gallon drum or 500 gallon poly tank to the treatment system sump. Drum or tank must remain on dual containment at all times. Using a zip tie, secure the discharge hose to the sump grate. ***Do not ever leave unattended while transfer is in process. Monitor sump operation periodically to ensure sump does not overflow.***

4.4 Removal of Material from Bottom of Well Following Cleaning with Chemical Treatment – Day 2

4.4.1 _____ SC: Measure the pH of groundwater in the extraction well within the first few feet below water surface. Record the measurements in the table included in Step 4.3.1.

4.4.2 _____ SC: The purpose of this step is to remove fines/material from the filter pack and adjacent formation. This will be done using the brush as a plunger to force water into and out of the screen by operating the well brush up and down below the water table and within the well casing. The initial surging motion should be relatively gentle, allowing any material blocking the screen to break up, go into suspension and then move into the well. After several minutes, move the well brush to the top of the screen and lengthen the stroking motion to impart more force. After several minutes, move progressively downward in 5-foot increments to within 5 feet of the bottom of the screen, and repeat the stroking motion. During this procedure, avoid any well water from spilling on land surface.

4.4.3 _____ SC: Stage the open-top **plastic** 55-gallon drums or 500 gallon poly tank near the well being cleaned in accordance with DOP-FT-004.

4.4.4 _____ SC: Use a Grundfos SS submersible pump and controller to remove material from the bottom of the well**.** Connect the appropriate discharge tubing to the pump discharge barb. Slowly lower (to avoid disturbance of the settled material) pump to the bottom of the

well and secure discharge tubing to the staged 55-gallon drum or 500 gallon poly tank to ensure discharge into the vessel. **Caution: Development water will be of a low pH. Avoid contact.** Connect motor leads to a 12-volt power supply (a vehicle battery may be used, as appropriate) and operate the pump in accordance with the manufacturer's recommendations for pump operation. The pump discharge rate should be around 3 gallons per minute. Monitor the discharge for change in discharge water clarity. Discontinue pumping when the discharge becomes clear or when the vessel becomes 80% full.

4.4.5 _____ SC: Measure the pH of groundwater in the well within the first few feet below water surface. Record the measurements in the table included in Step 4.3.1.

4.4.6 _____ SC: Clean and decontaminate the equipment used in accordance with DOP-FT-006 and store appropriately.

4.4.7 _____ SC: The purpose of this step is to neutralize the acidic water in the tank or drum and remove a large portion of the total iron in the water before transfer to the sump. Add 2 gallons of potable water to a 5 gallon bucket. Don the following PPE: goggles, neoprene apron, neoprene sleeves, face shield, nitrile gloves, and neoprene outer gloves. Add 0.25 liters of the sodium hydroxide pellets into the bucket. Stir with PVC stirring rod. Caution: This process will generate heat. Start by pouring approximately 0.25 gallons of the solution into the tank or drum. Stir with the stirring rod. Measure the pH of the process water with the pH probe. If the pH is below 11.0 standard units, add approximately 0.25 gallons of the solution until the pH of the water in the drum/tank is approximately 11.0. Allow about 25 minutes for the iron to settle to the bottom of the drum/tank.

4.4.8 _____ SC: Transfer the groundwater collected in the 55-gallon drum or 500 gallon poly tank to the treatment system sump. The drum or tank must remain on dual containment at all times. Stage the drum/tank as close to the treatment system building as possible. Attach the discharge hose to the sump pump. Position the sump pump so that it is not sitting on the bottom of the tank/drum. Use a zip tie to secure it in position. Using a zip tie, secure the discharge hose to the sump grate. One person must watch the system sump to ensure proper operation, and the other must attend to the tank or drum. **Do not ever leave unattended while transfer is in process.**

4.4.9 _____ SC: **If 500 gallon poly tank is used:** After the majority of the neutralized water has been transferred to the sump, remove the

discharge hose from the sump grate and secure it to a 55 gallon poly drum that is placed on a dual containment tray. Lower the sump pump to the bottom of the tank. Transfer the water and iron sludge from the tank into the 55 gallon poly drum. Rinse the tank and transfer the rinsate if needed.

4.5 **Returning Pumps to Service**

4.5.1 _____ SO: Reinstall the pump in accordance with DOP-016.

4.5.2 _____ SO: Follow DOP-FT-003 "Trash Procedures," place used plastic sheeting in the drum marked "Used PPE" and return supplies to the storage room. Appropriately secure drum lids and label drums.

5. COMPLETION

5.1 _____ SO: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- Health and Safety Plan
- DOP-015 "Extraction Well Vault Access"
- DOP-016 "Extraction Well Pump Pull"
- DOP-017 "Extraction Well Pump Wet End Cleaning"
- DOP-FT-002 "Reading Water Levels"
- DOP-FT-003 "Trash Procedures"
- DOP-FT-004 "Transportation and Storage of Groundwater (Large Quantity)"
- DOP-FT-006 "Cleaning and Decontaminating Equipment"
- DOP-LOTO-003 "Well Pumps P101-P110"

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	11/15/08	All	New Procedure
1	07/29/09		Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for removing and replacing the granular activated carbon (GAC) in the vapor phase GAC vessel located outside next to the influent tank (T-401).

1.2 Scope and Applicability

This DOP applies to the operation and maintenance of the treatment system located at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Wet activated carbon can remove oxygen from air, causing a hazard to workers inside carbon vessels and in enclosed or confined spaces. Do not get in eyes. Do not breathe dust.

3. EQUIPMENT REQUIRED

3.1 Tools and Equipment: Flashlight, two $^{15}/_{16}$-inch wrenches, 5-gallon bucket, Shop-Vac, ladder, drum dolly, drum vacuum, three empty 55-gallon drums, ten 50-pound bags of acid-washed granular activated coconut carbon, nitrile gloves, neoprene apron, dust mask, impact driver.

4. PREREQUISITES

4.1 Field Preparations

4.1.1 _____ SC: Stage equipment listed in the "equipment required" step next to the vapor phase GAC vessel.

4.1.2 _____ LO/SO: Obtain the current working edition of "Operations Log" located in the supply cabinet.

4.1.3 _____ LO/SO: Refer to the "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent a normal system startup. If issues are noted, then exit this procedure until resolution is obtained.

4.1.4 _____ LO/SO: This is a two-person operation and cannot be performed by any one individual.

4.1.5 _____ LO/SO: Verify that subcontractor has arrived and that ten 50-pound bags of acid-washed granular activated coconut carbon**.** If there is no carbon on site, exit this procedure. Inspect the delivery bill of lading to ensure that the correct type (Acid-Washed Granular Coconut Shell Carbon) and amount (500

pounds or ten 50-pound bags) of GAC is being delivered. Inspect the GAC material to ensure that it is dry and free flowing.

4.1.6 _____ SO: Verify that there are three empty open top 55-gallon drums on site. If not, complete DOP-FT-010 "Subcontractor Access" when ordering the drums from the vendor, then exit the procedure until the drums arrive.

4.1.7 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

4.2 Planning and Coordination

4.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan

4.3 Approvals and Notifications

4.3.1 Approval to perform this procedure has been obtained from the LO.

LO's Signature _____ Date _____

5. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

5.1 _____ SO: Shut down the treatment system following SOP-003, "Short-Term System Shutdown."

5.2 _____ SC: Set up the ladder next to the vapor phase GAC vessel. Remove the manway cover (Figure 1) on the top of the vessel. Use an impact driver with a $^{15}/_{16}$-inch socket and a $^{15}/_{16}$-inch wrench (located in the tool cabinet). Place the nuts, bolts and washers in a clean 5-gallon bucket. Set the manway cover aside.

5.3 _____ SC: Using a $^{15}/_{16}$-inch socket wrench, remove the lid on an empty 55-gallon drum, and connect the drum vacuum to the empty 55-gallon drum.

5.4 _____ SC: Don nitrile gloves, turn on the vacuum, climb the ladder and begin removing the spent carbon from the GAC vessel.

5.5 _____ SC: When the first drum is full, have the person assisting remove the vacuum from the drum and connect it to the second drum. Instruct the person assisting to secure the lid on the first drum. Continue this process until all of the spent carbon has been removed from the vessel. As you approach the bottom of the vessel, vacuum gently so that none of the internal parts are damaged.

5.6 _____ SO: Visually inspect the GAC vessel for damage prior to adding the virgin carbon, including all fittings and seals. Record conditions in the Operations Log book located in the supply cabinet. If any damage is noted, use the digital camera and photograph the inside of the empty GAC vessel. If repairs are needed, make the necessary repairs. Once repairs are made, return to this procedure for completion.

5.7 _____ SC: Stage the virgin carbon next to the vessel.

5.8 _____ SC: Don nitrile gloves, a neoprene apron and a dust mask.

5.9 _____ SC: One person will now climb the ladder and get into position to receive the bags of virgin carbon from the person assisting on the ground. The person assisting will lift the bags of virgin carbon and walk them to the person on the ladder.

5.10 _____ SC: Spread the virgin carbon to the walls of the vessel, making a circular motion counter-clockwise to ensure an even fill. Hand the empty bags down to the person assisting. Dispose of these bags in a lined garbage can.

5.11 _____ SC: After the GAC vessel is full, level off the top. The dust mask may now be removed.

5.12 _____ SC: Using an impact driver with a $^{15}/_{16}$-inch socket, replace the GAC vessel manway cover. Do not over-tighten these bolts.

5.13 _____ SO: Label the drums “Spent Carbon” with the green nonhazardous labels (located in the supply cabinet). Using the drum dolly, transport the 55-gallon drums of spent carbon to the containment pads inside the Conex box or arrange for a drum pick up by the waste removal contractor.

5.14 _____ SO: Return any tools used during this procedure to the tool cabinet. Dispose of the used PPE using DOP-FT-003, “Trash Procedures.”

5.15 _____ SO: Thoroughly clean the GAC vessel and sweep the surrounding area.

5.16 _____ SO: Complete SOP-002**, "**Routine Treatment System Startup" and restart the system.

6. COMPLETION

6.1 _____ SO: Verification of completion. .

Signature _____ Date _____

7. REFERENCES

- SOP-002 "Routine System Startup"
- SOP-003 "Short-Term Treatment System Shutdown"
- DOP-FT-003 "Trash Procedures"
- DOP-FT-010 "Subcontractor Access"

Vapor-phase GAC vessel.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	08/26/09	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for removing the granular activated carbon (GAC) from a damaged liquid-phase GAC vessel, and replacing the damaged vessel with the same type of vessel. Follow steps 5.17.1 through 5.22 to drain the vessel. Follow steps 5.21.1 through 5.30 to remove the GAC from the damaged vessel. Follow steps 5.31 through 5.44 to remove the damaged vessel and install the new vessel. Follow steps 5.45 through 5.55 to add virgin GAC to the new vessel. Follow steps 5.56 through 5.79 for removing carbon intended for reuse.

1.2 Scope and Applicability

This DOP applies to the operation and maintenance of the IRAP Treatment System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

Wet activated carbon removes oxygen from air, causing a hazard to workers inside carbon vessels and enclosed or confined spaces. Do not get in eyes. Do not breathe dust. Do not enter or stick your head inside the carbon vessel.

3. EQUIPMENT REQUIRED

3.1 Tools and Equipment

Flashlight, two $^{15}/_{16}$-inch wrenches, garden hose attached to potable water source, 5-gallon bucket, Shop-Vac, ladder, clear drain hose, drum dolly, drum vacuum, eight empty 55-gallon drums, thirty 50-pound bags of acid-washed granular activated coconut carbon, nitrile gloves, neoprene apron, dust mask, impact driver, forklift

4. PREREQUISITES FOR LIQUID PHASE GAC RECONFIGURATION

4.1 Field Preparations

4.1.1 _____ LO/SO: Obtain current working edition of “Operations Log” located in the supply cabinet.

4.1.2 _____ LO/SO: Refer to “Operations Log” to ensure that there are no operational issues reported/recorded that would prevent reconfiguration of the GAC vessels. If issues are noted, then exit this procedure until resolution is obtained.

4.1.3 _____ LO/SO: This is a two-person operation and cannot be performed by any one individual. Verify that someone is on site to assist. If there is no one available, exit this procedure until someone is available to assist.

4.1.4 _____ LO/SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

4.2 Planning and Coordination

4.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

4.3 Approvals and Notifications

4.3.1 _____ Approval to perform this procedure has been obtained from the LO.

LO's Signature _____ Date _____

5. LIQUID PHASE GAC RECONFIGURATION, CARBON REMOVAL, VESSEL REPLACEMENT, AND CARBON REPLACEMENT STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

Liquid Phase GAC Reconfiguration to Remove Damaged Vessel from Process

5.1 _____ LO/SO: Shut down the treatment system following SOP-003, "Short-Term System Shutdown"

5.2 _____ LO/SO: Verify that the "Offline" vessel is filled with virgin carbon.

5.2.1 _____ If not, exit this procedure, and perform DOP-023 "Liquid Phase GAC Change Out and Reconfiguration Deviation." This procedure will allow for change out of the carbon in the Offline-Spent" vessel before bringing the vessel back online in the "Secondary" position.

5.3 _____ LO/SO: Verify that the damaged vessel is not the "Offline" vessel.

5.3.1 _____ If the "Offline" vessel is the damaged vessel, exit this procedure and perform DOP-023 "Liquid Phase GAC Change Out and Reconfiguration

Deviation." This procedure will allow for change out of the carbon in the "Primary" vessel before bringing the vessel back online in the "Secondary" position.

5.4 _____ If the Primary vessel is the damaged vessel, then proceed with this step. If the Secondary vessel is the damaged vessel, proceed to the next step. The vessel labeled "Primary" before the change out will now be the "Offline-Damaged" vessel. The vessel labeled "Secondary" will now be the "Primary" vessel. The vessel labeled "Offline" will now be the "Secondary" vessel. Change the signs on the vessels to reflect these changes.

5.5 _____ If the secondary vessel is the damaged vessel, the vessel labeled "Secondary" will now be the "Offline-Damaged" vessel. The vessel labeled "Primary" will remain the "primary" vessel. The vessel labeled "Offline" will now be the "Secondary" vessel.

5.6 _____ LO/SO: Close the main GAC vessel effluent valves on the bottom of each GAC vessel. These valves are labeled BV-330, BV-329 and BV-328.

5.7 _____ LO/SO: Close the valves on the effluent piping of the GAC vessels. These valves are labeled BV-331, BV-332 and BV-333.

5.8 _____ LO/SO: Close BV-334 on the effluent manifold on the east side of the building.

5.9 _____ LO/SO: Retrieve the Shop-Vac and one 5-gallon bucket (located in the Conex box) to contain and clean up any spilled water resulting from performance of the next several steps in this procedure.

5.10 _____ LO/SO: Don the following personal protective equipment (PPE): Neoprene apron, nitrile gloves, safety goggles (located in the PPE cabinet on the east side of the building).

5.11 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, remove the blind flanges (Figure 3) from the effluent piping of the GAC vessel now labeled "Secondary." Place the bolts, nuts and washers in a clean 5-gallon bucket. Instruct the second person assisting in this procedure to be ready with the Shop-Vac and bucket to evacuate and contain any water in the piping that will flow out as a result of removing these blind flange pieces.

5.12 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, remove the spool piece (Figure 3) from the effluent piping of the GAC vessel now labeled "Primary." Instruct the second person assisting in this procedure to be ready with the Shop-Vac and bucket to evacuate and contain any water in the piping that will flow out as a result of removing this spool piece.

5.13 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, install the spool piece on the effluent line of the GAC labeled "Secondary." Do not over-tighten these bolts.

5.14 _____ LO/SO: Using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, install the blind flanges on the effluent line of the GAC vessel now labeled "Primary." Do not over-tighten these bolts.

5.15 _____ LO/SO: Using the table below, select the proper valve configuration to reflect the new GAC configuration.

Location	Device	Device #	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels
			301/302	**302/303**	**303/301**
Under 301	Drain Valve	DV-301	CLOSED	CLOSED	CLOSED
Under 302	Drain Valve	DV-302	CLOSED	CLOSED	CLOSED
Under 303	Drain Valve	DV-303	CLOSED	CLOSED	CLOSED
Top of 301	Sample Port	SP-302	CLOSED	CLOSED	CLOSED
Top of 302	Sample Port	SP-303	CLOSED	CLOSED	CLOSED
Top of 303	Sample Port	SP-304	CLOSED	CLOSED	CLOSED
Under 301 air release	Ball Valve	BV-340	OPEN	OPEN	OPEN
Under 302 air release	Ball Valve	BV-341	OPEN	OPEN	OPEN
Under 303 air release	Ball Valve	BV-342	OPEN	OPEN	OPEN
GAC manifold	Ball Valve	BV-320	CLOSED	CLOSED	OPEN
GAC manifold	Ball Valve	BV-321	CLOSED	OPEN	CLOSED
GAC manifold	Ball Valve	BV-322	OPEN	CLOSED	CLOSED
GAC manifold	Ball Valve	BV-323	CLOSED	CLOSED	CLOSED
Above 301	Ball Valve	BV-324	CLOSED	CLOSED	OPEN
Above 302	Ball Valve	BV-325	OPEN	CLOSED	CLOSED
Valve attached to pressure gauge	Ball Valve	BV-326	OPEN	OPEN	OPEN
Above 303	Ball Valve	BV-327	CLOSED	OPEN	CLOSED
Bottom 301	Ball Valve	BV-328	OPEN	CLOSED	OPEN
Bottom 302	Ball Valve	BV-329	OPEN	OPEN	CLOSED
Bottom 303	Ball Valve	BV-330	CLOSED	OPEN	OPEN
Effluent 301	Ball Valve	BV-331	OPEN	CLOSED	CLOSED
Effluent 302	Ball Valve	BV-332	CLOSED	OPEN	CLOSED
Effluent 303	Ball Valve	BV-333	CLOSED	CLOSED	OPEN
Effluent Manifold	Ball Valve	BV-334	OPEN	OPEN	OPEN

Location	Device	Device #	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels	Primary/Secondary GAC Vessels
Top of 301	Vent Valve	BV-337	OPEN	OPEN	OPEN
Top of 302	Vent Valve	BV-338	OPEN	OPEN	OPEN
Top of 303	Vent Valve	BV-339	OPEN	OPEN	OPEN
	Spool Piece		GAC-302 Effluent	GAC-303 Effluent	GAC-301 Effluent

5.16 _____ LO/SO: Open BV-334 on the system effluent manifold on the east side of the building.

5.17 _____ LO/SO: The treatment system may be restarted at this time. If no conditions exist that would prevent the normal start up of the system, follow SOP-002, "Routine System Start Up."

Prerequisites for the draining of the Offline-Damaged GAC Vessel

5.17.1 _____ SO: Draining of the GAC vessel to be changed-out must be performed before the carbon subcontractor arrives to perform change out and replacement of the vessel. This may be performed the day/night before or the morning of the change out if time allows.

Draining the Offline-Damaged GAC Vessel

5.18 _____ LO/SO: Use the table below to isolate, lock out and tag out the "Offline-Damaged" vessel. Do not lock out the drain valve or the vent valve on the "Offline-Damaged" vessel. You will need access to these valves to drain the GAC vessel before the carbon is removed.

5.19 _____ LO/SO: Retrieve the clear drain hose with the 1" cam lock connection (located in the Conex box) and connect it to the drain valve of the "Offline-Damaged" vessel. Bring the other end of the drain hose to the sump. Using zip ties (located in the supply cabinet), tie down the drain hose to the sump grate so that when draining the vessel, water will drain into the sump and not onto the floor.

5.20 _____ LO/SO: On the HMI, check the water level in the influent tank. Verify that the water level is below 3.9 feet.

5.21 _____ LO/SO: Caution This step must be performed in the order in which it is written. Using the following table as a guide, FIRST ensure that the vent valve on top of the vessel labeled "Offline-Spent" is closed. Remove the vacuum breaker attached to the vent valve by unthreading the union on the effluent side of the vent valve. Leave the valve body in place. Unthread the union that attaches the vacuum breaker drain line to the main drain line. Now that the vacuum breaker and drain line are detached, set the assembly aside. Retrieve a 5 gallon bucket to catch the water that will drain out of the vent valve when it is opened. Climb the ladder and position the bucket underneath the vent valve. Open the vent valve. Allow water to fully drain.

5.22 _____ Open the drain valve on the bottom of the "Offline-Damaged" vessel (Figure 4) approximately half way. The vessel will take about 45 minutes to fully drain. The operator must stay in the building for the entire duration of this step of the procedure. If leaving the building is necessary, close the drain valve before leaving. Make sure the sump pump continues to operate during this step of the procedure by visually inspecting the water level in the sump every 2 to 3 minutes. The drain valve may need to be adjusted so that the sump does not fill too quickly. The vent valve on top of the vessel must remain fully open during this procedure.

Vessel	Location	Valve Identification	Action
GAC-301	Effluent of GAC-301	BV-328	Close and Lock/Tag Out
	Influent of GAC-301	BV-322	Close and Lock/Tag Out
	Above GAC-301	BV-324	Close and Lock/Tag Out
	Vent Valve of GAC-301	BV-337	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-301	DV-301	Open second to drain

Vessel	Location	Valve Identification	Action
GAC-302	Effluent of GAC-302	BV-329	Close and Lock/Tag Out
	Influent of GAC-302	BV-321	Close and Lock/Tag Out
	Above GAC-302	BV-325	Close and Lock/Tag Out
	Vent Valve of GAC-302	BV-338	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-302	DV-302	Open second to drain

Vessel	Location	Valve Identification	Action
GAC-303	Effluent of GAC-303	BV-330	Close and Lock/Tag Out
	Influent of GAC-303	BV-320	Close and Lock/Tag Out
	Above GAC-303	BV-327	Close and Lock/Tag Out
	Vent Valve of GAC-303	BV-339	Remove vacuum breaker and open first to drain
	Drain Valve of GAC-303	DV-303	Open second to drain

5.23 _____ LO/SO: After the "Offline-Damaged" vessel is fully drained, close the drain valve that was opened on the vessel labeled "Offline-Damaged." Leave the drain

hose connected so that the vessel can be triple rinsed after the carbon is removed.

Prerequisites for Removal of GAC from Damaged Vessel

5.23.1 _____ LO/SO: Obtain current working edition of "Operations Log" located in the supply cabinet.

5.23.2 _____ LO/ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent change out of the GAC vessels. If issues are noted, then exit this procedure until resolution is obtained.

5.23.3 _____ LO/SO: This is a two-person operation and cannot be performed by any one individual. Verify that someone is on site to assist. If there is no one available, exit this procedure until someone is available to assist.

5.23.4 _____ LO/SO: If the carbon in the damaged vessel is not to be reused, verify that the carbon supply subcontractor has thirty 50-pound bags of acid-washed granular activated coconut carbon on site. If there is no carbon on site, exit this portion of the procedure until carbon arrives. Upon arrival of the GAC, request a copy of the certificate of analysis for the GAC. Inspect the delivery bill of lading to ensure that the correct type (Acid-Washed Granular Activated Coconut Shell Carbon) and amount (1,500 pounds or thirty 50-pound bags) of GAC is being delivered. Inspect the GAC material to ensure that it is dry and free flowing.

5.23.5 _____ LO/SO: Verify that the carbon supply subcontractor has eight new, empty, open-top 55-gallon drums on site. If not, exit this portion of the procedure until the drums arrive.

5.23.6 _____ LO/SO: If the GAC in the damaged vessel is determined to be good for reuse, and permission is given to reuse the carbon by the OM, skip to section 5.57.

5.23.7 _____ LO/SO: Verify that the spent carbon waste contractor has been scheduled to remove 8 drums of spent carbon from the site after the change out has been performed.

Removing Spent Carbon from the Damaged GAC Vessel

5.24 _____ SO: Stage the ladder next to the vessel labeled "Offline-Damaged". Remove the 90-degree spool piece at the top of the vessel by removing the bolts ($^{15}/_{16}$-inch wrench) on the top and bottom of the spool. Store the bolts and spool piece in a clean bucket (located in the Conex box).

5.25 _____ SC: Remove the manway cover (Figure 2) on top of the vessel labeled "Offline-Damaged." Use an impact driver with a $^{15}/_{16}$-inch socket and a $^{15}/_{16}$-inch wrench (located in the tool cabinet). Place the nuts, bolts and washers in a clean 5-gallon bucket. Disconnect the air release valve on top of the manway cover by unscrewing the union. Set the manway cover and air release valve aside.

5.26 _____ SC: Remove the lid on an empty 55-gallon drum; connect the drum vacuum to the empty 55-gallon drum.

5.27 _____ SC: Don nitrile gloves, turn on the vacuum, climb the ladder and begin removing the spent carbon from the GAC vessel. Do not stick your head inside of the vessel during this procedure.

5.28 _____ SC: When the first drum is full, have the person assisting remove the vacuum from the drum and connect it to the second drum. Continue this process until all of the carbon has been removed from the vessel.

5.29 _____ SC: Open the drain valve on the bottom of the vessel and make sure a hose is connected to the drain valve diverting water to the sump. Using the garden hose, thoroughly rinse the vessel three times. Allow this rinse water to fully drain to the sump. Close the drain valve. Drain this hose by disconnecting the cam lock fitting from the drain valve. Elevate the cam lock fitting to chest height, and walk the hose to the sump allowing water to drain out of the hose into the sump. Wrap up the clear drain hose and return it to the Conex box.

5.30 _____ LO: Visually inspect the interior and exterior of the GAC vessel for damage, including all fittings and seals prior to adding the new carbon. Record conditions in the log book located in the supply cabinet. If any damage is noted, use the digital camera and photograph the inside of the empty GAC vessel. Use a flashlight to see into the empty carbon vessel.

5.31 _____ SO: Label the drums "Spent Carbon" with the green nonhazardous labels (located in the supply cabinet) and today's date. Ensure that the waste contractor is prepared to remove the drums containing spent carbon from the site.

Removing the Damaged GAC Vessel and Installing the New GAC Vessel

5.32 _____ SO: Unbolt the vessel by removing the nuts from the floor mounted anchor bolts. Place these in a safe place for reuse.

5.33 _____ SO: Unthread the ball valve on the effluent (bottom) of the damaged vessel. Use a short container to catch any water that might leak as a result of disassembling this ball valve.

5.34 _____ SO: Unthread the 3' effluent tee fitting on the damaged vessel and set it aside.

5.35 _____ SO/LO/SC: Note: This step will require four people. This step requires a hard hat. Lift the empty vessel, tilt its top end slightly to the north, and carry it through the bay door on the north side of the building. The vessel will not fit through the bay door level. Place it outside and away from the treatment building so that it does not interfere with the remainder of this procedure.

5.36 _____ SC: This step requires a hard hat. Raise the forks on the forklift so they will be positioned underneath the base of the new vessel. Properly balance the load. Secure the vessel to the forklift with straps.

5.37 _____ SC: Slowly raise the forks and lift the new vessel above the bed of the truck. Using a spotter, put the forklift in reverse, and slowly drive in reverse until the vessel has cleared the bed of the truck. Lower the new vessel to the ground just north of the treatment system building. Remove straps and place the forklift out of the way.

5.38 _____ SO/LO/SC: Note: This step will require four people. This step requires a hard hat. Lift the new vessel, tilt the top end slightly to the north, and carry it through the bay door on the north side of the building. Place it so that the anchor bolts on the floor slide into the anchor points on the base of the vessel.

5.39 _____ SO: Remove the old thread tape from the 3” influent tee fitting and replace with new thread tape.

5.40 _____ SO: Bolt down the vessel by reinstalling the nuts onto the anchor bolts.

5.41 _____ SC: Secure the ladder to the vessel. One person will climb the ladder, and the other will pass the lid up to the person on the ladder. Caution: Lid is heavy. Place the lid from the damaged vessel on top of the new vessel. Without bolting down the lid, ensure that the 90 degree influent elbow fitting that attaches to the top of the vessel is in the correct position to attach to the current piping. Ensure that the 3” effluent tee fitting on the bottom of the vessel is at the proper level to attach to the existing piping.

5.42 _____ LO/SO: If the lid fittings, 3” effluent tee fitting, and current piping are in the correct position to be attached, continue with this procedure.

5.43 _____ LO/SO: Install the 3” effluent tee fitting onto the bottom of the vessel by threading it in a clockwise rotation.

5.44 _____ LO/SO: Reinstall the 2” effluent ball valve between the newly installed tee fitting and the existing 2” pipe.

5.45 _____ SC: Using the forklift, the subcontractor will place the damaged vessel in the bed of the truck.

Adding Virgin Carbon to New Vessel

5.46 _____ SC: Climb secured ladder. One person will remove the unfastened lid from the vessel manway and hand it down to the other person. Set lid aside.

5.47 _____ SC: Stage the virgin carbon inside the building.

5.48 _____ SC: Don nitrile gloves, a neoprene apron and a dust mask (located in the PPE cabinet).

5.49 _____ SC: One person will now climb the ladder and get into position to receive the bags of virgin carbon from the person assisting on the ground. The person assisting will lift the bags of virgin carbon and walk them to the person on the ladder.

5.50 _____ SC: Empty the bags of virgin carbon into the vessel and spread the virgin carbon to the walls of the vessel, making a circular motion counter-clockwise to ensure an even fill. Hand the empty bags down to the person assisting. Dispose of these bags in a lined garbage can.

5.51 _____ SC: Continue filling the carbon until 30 bags of virgin carbon have been added and the carbon level is approximately 12 inches from the top manway flange. After the GAC vessel is full, level off the top. The dust mask may now be removed and discarded in the trash can.

5.52 _____ SC: This is a two person step. Using an impact driver with a $^{15}/_{16}$-inch socket, replace the GAC vessel manway cover. Use caution when lifting the manway cover. Do not over-tighten these bolts. Hand tighten first by tightening in a star pattern (bolts across from each other) so the lid seats flat. Next, tighten using an impact wrench without over-tightening. Ensure that the white markers on the manway cover lid and the vessel's top flange line up. This is essential to guarantee proper reinstallation of the vacuum breaker system.

5.53 _____ Reinstall vacuum breaker and vacuum breaker drain line by reconnecting the vent valve 1" threaded union and the drain valve union. This step will connect the vacuum breaker drain line to the main drain line.

5.54 _____ LO/SO: Using the garden hose, fill the GAC vessel to the top with potable water Use the exposed flange that the 90 degree elbow piece will be attached to. Two people must oversee this activity to prevent overfilling the GAC vessel. One person will stand on the ladder and man the hose, and the other person will stand at the hose bib and be ready to shut off the water when the GAC vessel is full. This step will take approximately 30 minutes. Note: The virgin carbon must be soaked for 24 hours before the GAC vessel can be brought back online.

5.55 _____ SO: After the GAC vessel is full, using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, reinstall the 90-degree elbow piece.

5.56 _____ SO: Return any tools used during this procedure to the tool cabinet. Dispose of the used PPE using DOP-FT-003, "Trash Procedures."

5.57 _____ SO: Thoroughly clean/sweep the GAC vessel and the surrounding area. Remove any moisture from the floor. If you are not reusing carbon, then your procedure ends here.

Procedure for Removing Carbon from Damaged Vessel for Reuse

5.58 Approvals and Notifications

5.58.1 _____ Approval to perform this section of this procedure has been obtained from the OM.

OM's Signature _____ Date _____

5.59 _____ SO: Stage the 6 foot ladder next to the vessel labeled "Offline-Damaged". Remove the 90-degree spool piece at the top of the vessel by removing the bolts ($^{15}/_{16}$-inch wrench) on the top and bottom of the spool. Store the bolts and spool piece in a clean bucket (located in the Conex box).

5.60 _____ SC: This is a two person step. Remove the manway cover (Figure 2) on top of the vessel labeled "Offline-Damaged." Use an impact driver with a $^{15}/_{16}$-inch socket and a $^{15}/_{16}$-inch wrench (located in the tool cabinet). Place the nuts, bolts and washers in a clean 5-gallon bucket. Disconnect the air release valve on top of the manway cover by unscrewing the union. Hand the manway cover down to the person on the ground. Set the manway cover and air release valve aside.

5.61 _____ SC: Remove the lid on an empty 55-gallon drum; connect the drum vacuum to the empty 55-gallon drum.

5.62 _____ Label the drums 1 through 8 with permanent marker and tape. The drums will be filled in order, with "1" being first and "8" being last.

5.63 _____ SC: Don nitrile gloves, turn on the vacuum, climb the ladder and begin removing the spent carbon from the GAC vessel.

5.64 _____ SC: When the first drum is full, have the person assisting remove the vacuum from the drum and connect it to the second drum. Continue this process until all of the carbon has been removed from the vessel and placed in the 8 drums. Ensure that the drums of carbon are out of the work area so that the new vessel can be offloaded. After filling, move the drums if necessary to facilitate the installation of the new vessel. Move if necessary.

5.65 _____ SC: Verify that the drain hose is still connected to the drain valve. Open the drain valve on the bottom of the vessel. Using the garden hose, thoroughly rinse the vessel three times. Allow this rinse water to fully drain to the sump. Drain this hose by disconnecting the cam lock fitting from the drain valve. Elevate the

cam lock fitting to chest height, and walk the hose to the sump. Wrap up the clear drain hose and return it to the Conex box.

5.66 _____ LO: Visually inspect the interior and exterior of the GAC vessel for damage, including all fittings and seals prior to adding the virgin carbon. Record conditions in the log book located in the supply cabinet. If any damage is noted, use the digital camera and photograph the inside of the empty GAC vessel. Use a flashlight to better see the inside of the vessel.

Removing the Damaged GAC Vessel and Installing the New GAC Vessel

5.67 _____ SO: Unbolt the vessel by removing the nuts from the floor mounted anchor bolts. Place these in a safe place for reuse.

5.68 _____ SO: Unthread the ball valve on the effluent (bottom) of the damaged vessel. Use a short container to catch any water that might leak as a result of disassembling this ball valve.

5.69 _____ SO: Unthread the 3" effluent tee fitting on the damaged vessel and set it aside.

5.70 _____ SO/LO/SC: Note: This step will require four people. This step requires a hard hat. Lift the empty vessel, tilt its top end slightly to the north, and carry it through the bay door on the north side of the building. The vessel will not fit through the bay door level. Place it outside and way from the treatment center so that it does not interfere with the remainder of this procedure.

5.71 _____ SC: This step requires a hard hat. Raise the forks on the forklift so they will be positioned underneath the base of the new vessel. Properly balance the load. Secure the vessel to the forklift with straps.

5.72 _____ SC: Slowly raise the forks and lift the vessel above the bed of the truck. Using a spotter put the forklift in reverse, and slowly drive backwards until the vessel has cleared the bed of the truck. Lower the vessel to the ground just north of the treatment system building. Remove straps and place the forklift out of the way.

5.73 _____ SO/LO/SC: Note: This step will require four people. This step requires a hard hat. Lift the new vessel, tilt the top end slightly to the north, and carry it through the bay door on the north side of the building. Place it so that the anchor bolts on the floor slide into the anchor points on the base of the vessel.

5.74 _____ SO: Remove the old thread tape from the 3" effluent tee fitting and replace with new pink thread tape.

5.75 _____ SO: Bolt down the vessel by reinstalling the nuts onto the anchor bolts.

5.76 _____ SC: Secure the ladder to the vessel. One person will climb the ladder, and the other will pass the lid up to the person on the ladder. Caution: Lid is heavy. Place the lid from the damaged vessel on top of the new vessel. Without bolting

down the lid, ensure that the 90 degree influent elbow fitting that attaches to the top of the vessel is in the correct position to attach to the current piping. Ensure that the 3" effluent tee fitting on the bottom of the vessel is at the proper level to attach to the existing piping.

5.77 _____ If the lid fittings, 3" effluent tee fitting, and current piping are in the correct position to be attached, continue with this procedure.

5.78 _____ Install the 3" effluent tee fitting onto the bottom of the vessel by threading it in a clockwise rotation.

5.79 _____ Reinstall the 2" effluent ball valve between the newly installed tee fitting and the existing 2" pipe.

5.80 _____ SC: Using the forklift, the subcontractor will place the damaged vessel in the bed of the truck.

Adding Reused Carbon to New Vessel

5.81 _____ SC: Climb secured ladder. One person will remove the unfastened lid from the vessel manway and hand it down to the other person. Set lid aside.

5.82 _____ SC: Stage the drums of carbon just outside the building.

5.83 _____ SC: Don nitrile gloves (located in the PPE cabinet).

5.84 _____ SC: Use a 5 gallon bucket to add the carbon to the new vessel. One person will now climb the ladder and get into position to receive the buckets of carbon from the person assisting on the ground. The person assisting will fill buckets with carbon by dipping the bucket into the drum, then lift the buckets of carbon and walk them to the person on the ladder. Start removing carbon from the drum labeled "8" first, and then move on to "7." Continue through drum labeled "1" until all eight drums are empty.

5.85 _____ SC: Spread the carbon to the walls of the vessel, making a circular motion counter-clockwise to ensure an even fill. Hand the empty bucket down to the person assisting.

5.86 _____ SC: After the GAC vessel is full (approximately 12 inches from the top manway flange), level off the top. If vessel is not full add one 50 pound bag of virgin acid washed coconut shell carbon and determine if the vessel requires more. If so, add more.

5.87 _____ SC: Using an impact driver with a $^{15}/_{16}$-inch socket, replace the GAC vessel manway cover. Use caution when lifting the manway cover. Do not over-tighten these bolts. Hand tighten first by tightening in a star pattern (bolts across from each other) so the lid seats flat. Next, tighten using an impact wrench without over-tightening. Ensure that the white markers on the manway cover lid and the

vessel's top flange line up. This is essential to guarantee proper reinstallation of the vacuum breaker system.

5.88 _____ Reinstall vacuum breaker and vacuum breaker drain line by reconnecting the vent valve 1" threaded union and the drain valve union. This step will connect the vacuum breaker drain line to the main drain line.

5.89 _____ LO/SO: Using the garden hose, fill the GAC vessel to the top with potable water. Use the exposed flange that the 90 degree elbow piece will be attached to. Two people must oversee this activity to prevent overfilling the GAC vessel. One person will stand on the ladder and man the hose, and the other person will stand at the hose bib and be ready to shut off the water when the GAC vessel is full. This step will take approximately 30 minutes. Note: The virgin carbon must be soaked for 24 hours before the GAC vessel can be brought back online.

5.90 _____ SO: After the GAC vessel is full, using a $^{15}/_{16}$-inch socket wrench and a $^{15}/_{16}$-inch wrench, reinstall the 90-degree elbow piece.

5.91 _____ SO: Return any tools used during this procedure to the tool cabinet. Dispose of the used PPE using DOP-FT-003, "Trash Procedures."

5.79 _____ SO: Thoroughly clean/sweep the GAC vessel and the surrounding area. Ensure there is no moisture on the floor.

6. COMPLETION

6.1 LO/SO: Verification of completion.

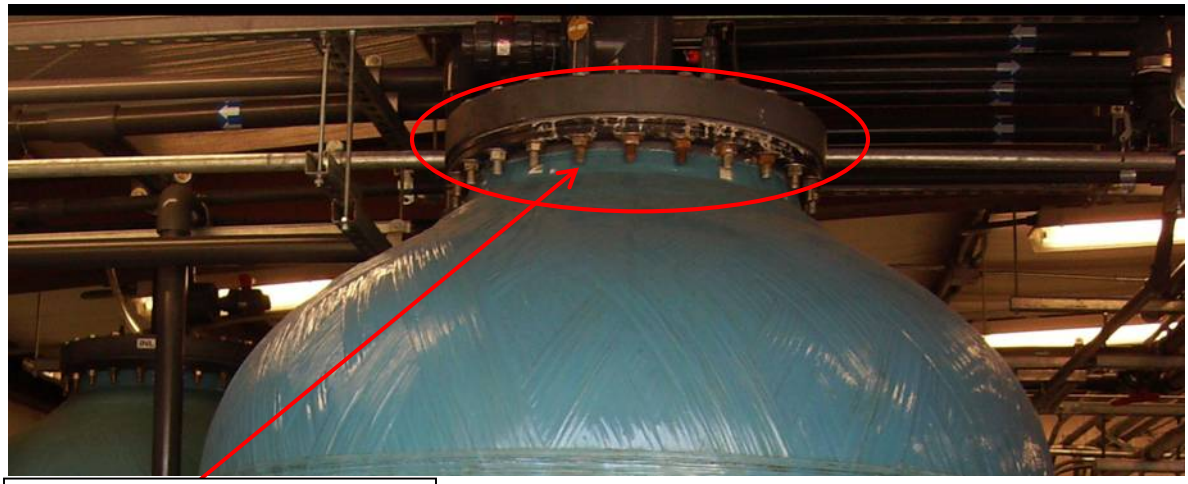
Signature _____ Date _____

7. REFERENCES

- SOP-003 "Short-Term Treatment System Shutdown"
- DOP-FT-003 "Trash Procedures"
- DOP-FT-010 "Subcontractor Access"

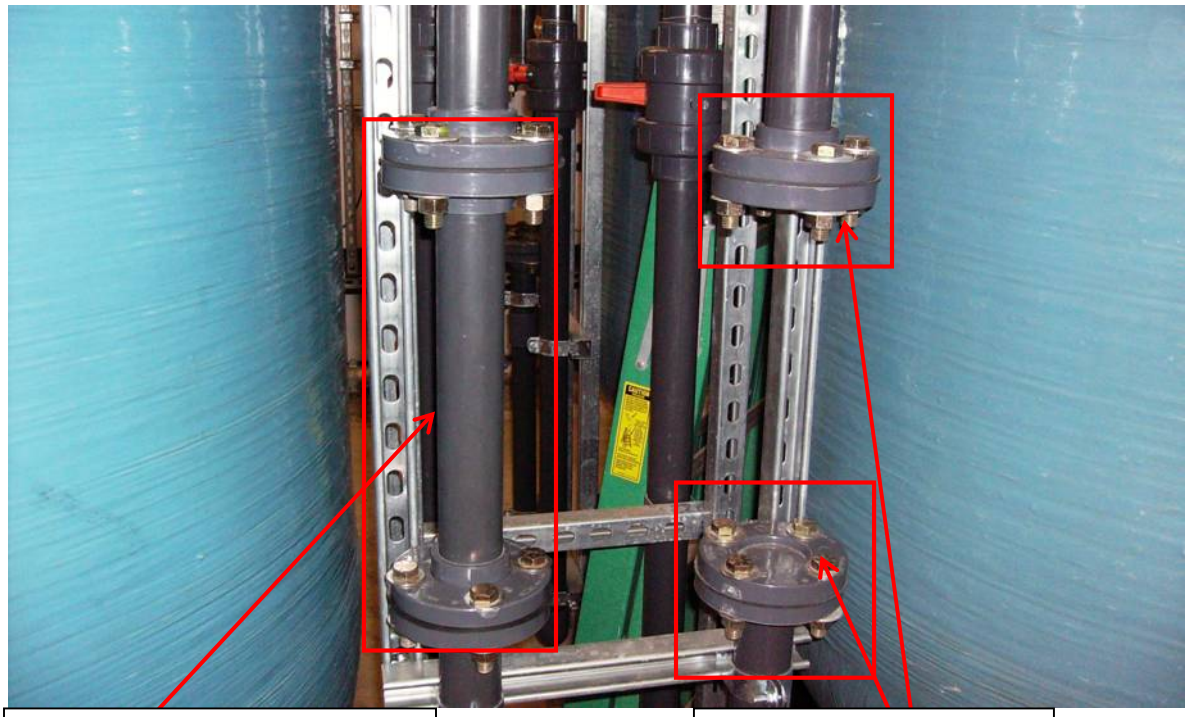
Figure 1: GAC vessel.

Figure 2: Manway on GAC vessel.



GAC VESSEL MANWAY

Figure 3: Spool piece assembly and dead-end flange.



SPOOL PIECE

BLIND FLANGE

Figure 4: Drain valves and effluent ball valve.

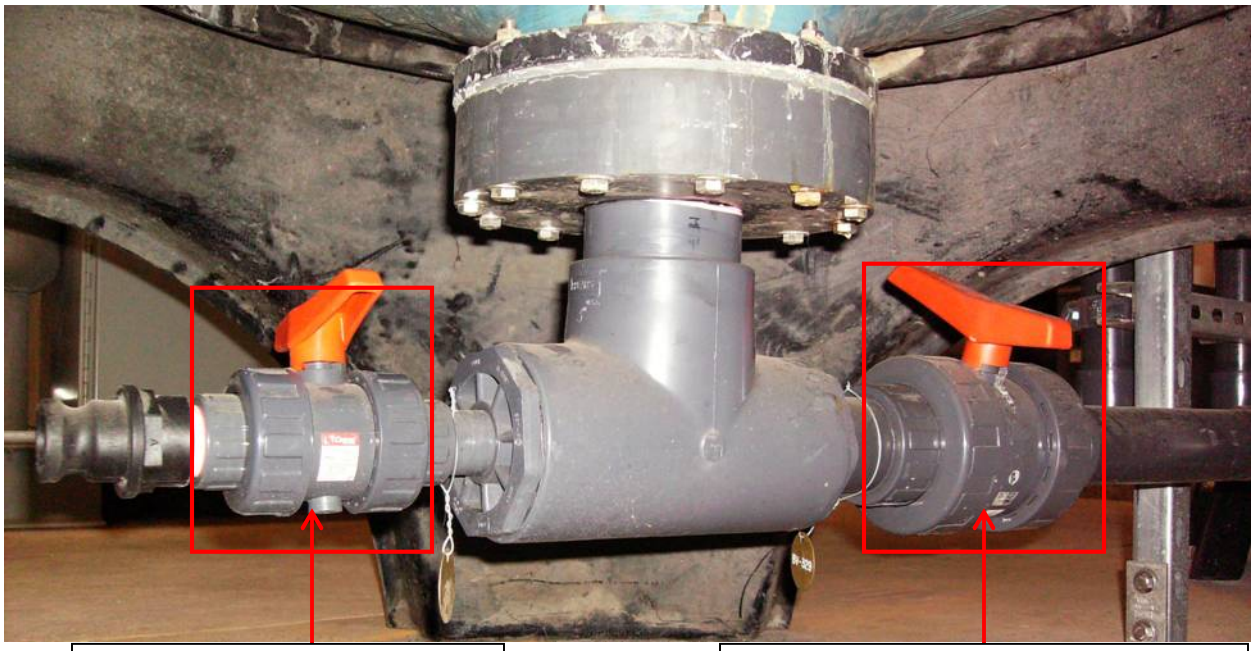


Figure 5: 90-degree spool piece.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST

Rev.	Date	Affected Pages	Revision Description
0	07/01/10	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) presents procedures for removing the settled iron sediment/sludge from the influent tank (T-401). The tank water level will need to be reduced to one foot before the waste contractor arrives to remove the iron sediment with a vacuum truck.

1.2 Scope and Applicability

This DOP applies to removing iron sediment from the influent tank at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain the current working edition of the "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

2.1.2 _____ SO: Refer to the "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent the operation of the Photo-Cat. If issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that a minimum of one foot of iron sediment/sludge was measured using the "Sludge Judge" or similar equipment.

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.1.5 _____ LO: Verify that SWS or a similar waste contractor has been scheduled to remove the iron sediment with a vacuum truck. A second vacuum truck should be on stand-by in the event that the tank level cannot be reduced to the 1.3' target level due to Photo-Cat influent iron concentrations above 10mg/l.

2.2 Planning and Coordination

2.2.1 _____ OM: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 **Equipment Required**

3,000 gallon vacuum truck with suction hose (provided by subcontractor), garden hose with high pressure nozzle and potable water source

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO: _____

3.1 _____ SO: Perform DOP-013 "Filter Change" on the iron filters.

3.2 _____ LO: On the Photo-Cat HMI screen, press the "Admin" button. Enter password. Press the "Tank Configuration Screen."

3.3 _____ LO: On the Tank Configuration screen, temporarily change the "Photo-Cat Off" set point from 3 feet to 1.3 feet.

3.4 _____ LO: On the Tank Configuration Screen, temporarily change the "Low Level Alarm" set point from 2 feet to 1.2 feet.

LO: Safety Check – during the course of the following procedures ensure that no person enters the influent tank.

3.5 _____ SO/LO: Don nitrile gloves. Open the influent tank southern man way on top of the tank. Temporarily remove the LALL-401 float switch (low-low tank level switch).This switch will be in the water. Place bricks under the man way cover to prevent damage to the float switch wire. Rest the switch upside down on top of the tank in a stable place so that it remains upside down.

3.6 _____ SO: Disable the well pumps. On the Photo-Cat HMI screen, press the "Well Pumps" icon and then press the icon that reads "enabled." The icon should turn red and read "disabled."

3.7 _____ SO: With the Photo-Cat operating, determine the Photo-Cat influent iron concentration at SP-203 located on the effluent side of the sediment filters with the HACH iron test kit. Note the concentration on this sheet and use it as a baseline.

3.8 _____ SO: If the Photo-Cat is currently operating, allow it to operate until the tank water level reaches 1.3 feet, or the Photo-Cat influent iron concentration reaches 10 mg/l. If the Photo-Cat is currently off, press the icon on any HMI screen that reads "Unit Power" to start up the system.

Using the HACH kit, test the iron concentration every 15 minutes until the tank level has reached 1.3 feet to ensure that the water entering the Photo-Cat does not exceed 10 mg/l. If at any time, the iron concentration exceeds 10 mg/l, shut down the system, and instruct the subcontractor to remove the remaining water in the tank with the vacuum truck. This may require more than one vacuum truck.

3.9 _____ SO: Perform DOP-FT-010 "Subcontractor Access" to allow waste subcontractor into the site.

3.10 _____ SC/SO: Assist subcontractor with positioning of the vacuum truck on the west side of the influent tank (T-401).

3.11 _____ SC: Attach hose to vacuum truck. Position a bucket or other plastic container underneath the hose connection point on the vacuum truck to catch any drips.

3.12 _____ SO: Ensure that the extraction wells and Photo-Cat are shut down. Lock and tag out Photo-Cat A at the disconnect handle. Ensure that the vacuum truck tank is empty.

3.13 _____ SO: Remove the tank air release valve from the influent tank and set aside.

3.14 _____ SC: Feed the vacuum truck suction hose into the air release valve port until it touches the bottom of the tank. (Tank low spot)

3.15 _____ SC/SO: Place a spill kit next to vacuum truck. Be prepared to respond if there are any leaks in the hose or at connection points.

3.16 _____ SC: Start removing the iron sediment from the tank by having the subcontractor operate the vacuum. Watch for leaks from the vacuum truck. If any are noted, shut the vacuum off, and make necessary repairs. Periodically check the vacuum truck tank level to ensure it does not overflow.

3.17 _____ SC: When the tank is relatively empty or the vacuum truck's tank is full, shut the vacuum off.

3.18 _____ SC: Using a garden hose with a high pressure nozzle, rinse the bottom of the tank to the extent possible. Do not enter the tank.

3.19 _____ SC: Vacuum remaining water.

3.20 _____ SC: When the 3,000 gallon vacuum truck is full, shut off the vacuum. Disconnect suction hose over a bucket to ensure no water touches the ground.

3.21 _____ SO: In the treatment system logbook, record that this procedure was performed, and record the approximate amount of liquid/sediment removed from the influent tank.

3.22 _____ SO: Escort waste contractor to security gate, and have security open the gate.

3.23 _____ LO: On the Photo-Cat HMI screen, press the "Admin" button. Enter password. Press the "Tank Configuration Screen."

3.24 _____ LO: On the Tank Configuration screen, change the "Photo-Cat Off" set point back to 3.0 feet.

3.25 _____ LO: On the Tank Configuration Screen, temporarily change the "Low Level Alarm" set point from 1.2 feet to 0.0 feet.

3.26 _____ LO: Enable the well pumps. On the Photo-Cat HMI screen, press the "Well Pumps" icon, then press the icon that reads "disabled." The icon should turn green and read "enabled."

3.27 _____ SO: Allow the extraction wells to fill the influent tank until the tank reaches 3.5 feet.

3.28 _____ LO: On the Photo-Cat HMI screen, press the "Admin" button. Enter password. Press the "Tank Configuration Screen."

3.29 _____ LO: On the Photo-Cat HMI "Tank Configuration Screen", return the "Low Level Alarm" set point from 0.0 feet back to 2.0 feet.

3.30 _____ SO: Reinstall the influent tank air release valve.

3.31 _____ SO: Place the LALL-401 float switch (low/low tank level switch) back into the influent tank southern man way. Close the man way and tighten the lugs.

3.32 _____ SO: Perform SOP-002 "Routine Start-Up" to start up the Photo-Cat.

Influent Tank (T-401)

T-401 Southern Man Way

T-401 Air Release Valve

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	04/11/10	All	Format, content expanded to include use of submersible pump

RESPONSIBLE PERSONNEL	
FT:	Field Technician
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for groundwater sampling. The intent of this DOP is to ensure that groundwater is, at all times, in dual containment. This is meant to accompany the Florida Department of Environmental Protection (FDEP) groundwater sampling Standard Operating Procedure (SOP) and any other relevant FDEP SOPs. This supplement deals only with containment and transfer of groundwater.

1.2 Scope and Applicability

This DOP applies to sampling wells associated with the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ FT: Verify that all appropriate sampling equipment is located on site (usually: pump(s), YSI with flow-through cell, water level meter, turbidity meter).

2.1.2 _____ FT: Verify that the meters, such as YSI and turbidity meter, are calibrated.

2.1.3 _____ FT: Obtain a copy of FDEP SOP FS 2200. FS 2200 details the procedure for sampling that is to be followed when performing this task.

2.1.4 _____ FT: Communicate with operations staff to learn whether purge water should be added to treatment system (IRA System) influent via sump. Note that water containing large quantities of sediment cannot be added to treatment system. Often the water that is removed from well vaults before well plugs can be removed is unsuitable for addition to treatment system. Keeping vault water in a dedicated bucket is a convenient way to generate the smallest possible amount of sediment-laden water.

2.1.5 _____ FT: Verify that a 55-gallon drum in the Conex box is available to store water that will be generated during this task. In almost all cases, at least the water from well vaults will go into drums.

2.2 Planning and Coordination

2.2.1 _____ FT: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2 EQUIPMENT

- Typical low flow monitoring well equipment (water level meter, YSI, turbidity meter, pump – peristaltic or submersible, depending on well)
- 5-gallon bucket/ container or 55-gallon drum
- Secondary containment trays (Rubbermaid plastic bin or equivalent for buckets, drum containment trays for drums)
- Visqueen (plastic sheeting)
- Plastic trash bag (for used PPE)
- Screwdriver
- $^{9}/_{16}$-inch socket wrench
- Binder clip (for securing tubing to bucket)
- Bilge pump (for evacuating rain water from vaults)
- FDEP SOP 2200
- FDEP Groundwater Sampling Logs (FD 9000-24)
- DOP-FT-001 Monitoring Well Sampling
- Proper PPE (steel-toed boots, nitrile gloves, safety glasses, traffic vest)
- Spill containment kit
- Appropriate sample bottles with labeling supplies
- Cooler with ice
- Vehicle or rolling cart with sides
- Traffic cones (if working where vehicles are a potential safety hazard)

4 STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ FT _____

4.1 _____ FT: Gather and stage all needed equipment.

4.2 _____ FT: Designate an area in which to store all components that contain groundwater (purge water container(s), peristaltic pump, flow-through cell). This may be in a vehicle or cart.

4.3 _____ FT: Ensure that this area has secondary containment for all components that could potentially leak groundwater. Containers that contain groundwater must remain in secondary containment until they reach the place where they will be emptied.

4.4 _____ FT: Upon arrival at each well, prepare the area around the well with containment (sheeting or a shallow tray), as necessary. Containment is necessary under any splices in tubing.

4.5 _____ FT: Don nitrile gloves. Work gloves are optional.

4.6 _____ FT: Remove the well cover bolts with the $^{9}/_{16}$-inch socket wrench, then, remove the well cover with the screwdriver. Caution: Watch out for fire ants and spiders (including widows) inside the well vault. If the vault contains excess rain water, use the bilge pump to remove this water.

4.7 _____ FT: Remove the lock from the j-plug.

4.8 _____ FT: Remove work gloves, if applicable.

4.9 _____ FT: Remove the j-plug correctly. This prolongs the life of the plug and ensures that the well is sealed when plug is replaced.

4.10 _____ FT: Look for red well ID tag to verify well ID.

4.11 _____ FT: Evaluate well condition: well plug, ID tag, etc. Record observations on log sheet or in log book.

4.12 _____ FT: Measure and record depth to water. Measure from survey mark, if one is visible. If there is no visible survey mark, measure from north.

4.13 _____ FT: Look up screen interval. If a well has a screen that is longer than ten feet, or if a well has a screen that is partially submerged, well volumes will have to be purged from that well. In some cases, a peristaltic pump is still an appropriate choice for this task. In some cases, a submersible pump is the only reasonable choice. Purging well volumes may generate very large quantities of

water (in the range of 50 gallons). In these cases, buckets may be used if someone is available to shuttle buckets while the sampler stays at the well. Drums may also be used. If well volumes will have to be purged, calculate the amount of water that will be generated and ensure that setup is appropriate before continuing.

4.14 _____ FT: Set up and connect to pump following either A or B below:

A. To purge and sample with a peristaltic pump, follow these steps:

1. __ Many wells that are sampled with peristaltic pumps will contain dedicated tubing. Check to see whether well contains tubing. If no tubing is found after thorough checking, add new tubing (including silicone pump head tubing and discharge end). Make sure length is correct. Wells that have screens longer than ten feet should not generally contain dedicated tubing as these wells are sampled using submersible pumps.

2. __ To sample with a peristaltic pump, retrieve the dedicated tubing (new or existing) and insert the silicone section into the pump head of the peristaltic pump.

3. __ Operate the pump in accordance with the manufacturer's recommendations for pump operation.

B To purge and sample using a submersible pump (such as a Grundfos SS pump), follow these steps:

1. __ Connect one end of the discharge tubing to the pump discharge barb.

2. __ Slowly lower the pump to the bottom of the well. Feed the discharge tubing as the pump is lowered.

3. __ The discharge tubing must be long enough that it can be secured in place at desired discharge location. In many cases, the tubing will be secured to a staged 55-gallon drum.

4. __ Connect motor leads to a 12-volt power supply (a vehicle battery may be used, as appropriate) and operate the pump in accordance with the manufacturer's recommendations for pump operation.

4.15 _____ FT: If a flow-through cell will be used, the effluent end of tubing will be connected to the flow-through cell influent. Optionally: begin pumping directly into purge water receptacle before connecting to flow-through cell. This allows sampler to see that water is free of sediment before connecting to flow- through

4.16 _____ FT: If a flow-through cell is used, tubing must be added to effluent port of flow-through cell and secured to appropriate discharge location.

4.17 _____ FT: Purge and sample the well in accordance with FDEP SOP 2200. Do not leave the equipment unattended. Make sure that no sampling equipment or tubing is leaking. If any questions arise, contact the event lead.

Notes:
If samplers must leave well area while purging is in process, all pumps must be turned off. Pumps cannot run unattended.
Protect instrument screens from direct sunlight.

4.18 _____ FT: After all samples have been collected, place them in cooler with ice or in sample refrigerator.

4.19 _____ FT: Reinstall j plug by turning top until plug seals well. Place lock on plug, close well cover.

4.20 _____ FT: Gather all materials; ensure that nothing is left at well site.

4.21 _____ FT: Any container that contains groundwater must be closed and remain in secondary containment to be moved.

4.22 _____ FT: Use vehicle or wagon to transport containers of groundwater to either Conex box or treatment system building. If water is relatively free of sediment, it may be added to the treatment system influent if approved by operations manager. If this approval is not obtained, or if the water contains significant quantities of solids, the water must be deposited into drums that are located on secondary containment pallets in the Conex boxes.

4.23 _____ FT: Using a partner as necessary, take the sealed bucket from the cart or vehicle into to the Conex box or treatment system building,

Note: If water will be added to a drum, the drum must be on a secondary containment pallet and must be labeled with a green and white Nonhazardous label. Label the contents “Purge water” and add the accumulation start date.

4.24 _____ FT: Using a partner as necessary, empty the contents into the 55-gallon drum labeled “purge water” or into the treatment system building sump. If the purge water to be emptied is in container significantly larger than a bucket (i.e., if drums of purge water need to be emptied), communicate with operations manager about how to transfer water.

4.25 _____ FT: All PPE and disposables used during this operation will be collected temporarily within plastic trash bags and transported to the Conex box. Those plastic bags will be stored within a designated drum labeled “used PPE.” If

there is no labeled drum, properly label the drum with green Nonhazardous label.

4.26 _____ FT: Any water spilled within any secondary containment system will be promptly cleaned up using a wet/dry vacuum and/or spill pads. Water will be transferred to the 55-gallon drum(s) labeled "purge water" placed on the secondary containment tray and solids will be placed within the designated PPE drum.

5. COMPLETION

5.1 _____ Verification of completion.

Signature _____ Date _____

6. REFERENCES

- Contingency Plan

7. OTHER RELEVANT DOCUMENTS

- DOP-FT-003 Trash Procedures
- DOP-FT-004 Transportation and Storage of Groundwater - Large Volume
- DOP-FT-005 Transportation and Storage of Groundwater - Small Volume
- DOP-FT-006 Cleaning and Decontaminating Equipment

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	**REVISION**	**DISCIPLINE**	**REVISION**
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	X		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/01/08	ALL	NEW PROCEDURE
1	1/20/10	ALL	UPDATE PROCEDURES TO BE MORE SPECIFIC ON MEASUREMENT AND ADD REPEAT MEASUREMENT STEP FOR QUALITY CONTROL (QC)

RESPONSIBLE PERSONNEL	
FT:	FIELD TECHNICIAN
SO:	SHIFT OPERATOR
OM:	OPERATIONS MANAGER

1. INTRODUCTION

This *Detailed Operating Procedure* (DOP) provides instructions for reading water levels. This DOP provides procedures to ensure the health and safety of the technician, the public and the environment. Information regarding data and any technical aspects is supplied by the relevant Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs).

1.1 Scope and Applicability

This DOP applies to reading water levels at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. EQUIPMENT (located in the Conex box)

- Water level meter
- Lined rolling cart with sides for walk-up wells, motor vehicle for drive-up wells
- Secondary containment tray (Rubbermaid plastic bin or the equivalent)
- Visqueen (plastic sheeting)
- Paper towels
- Plastic garbage bag (used to temporarily store used personal protective equipment [PPE])
- Two 5-gallon buckets with no holes or fractures (except for the mouth)
- Securely fitting lids for the 5-gallon buckets
- Proper PPE (steel-toed boots, nitrile gloves, safety glasses, traffic vest); may also include work gloves
- Spill containment kit
- $^{9}/_{16}$-inch socket wrench
- Screwdriver
- Spray bottle or wash bottle containing soap solution
- Spray bottle or wash bottle containing distilled or deionized water
- New J-plugs

- O-rings for manhole covers
- Bolts for manhole covers
- Dolphin locks and keys

Procedure Started: Time _____ Date: _____ _____

SO Operator _____

3. STEP BY STEP INSTRUCTIONS

3.1 _____ FT: Stage the equipment listed in Step 2 next to the first well to be monitored or in a motor vehicle to be used for reading water levels.

3.2 _____ FT: The rolling cart is the transportation means for walk-up wells. A motor vehicle is the transportation means for drive-up wells. Line either the cart or a designated area in the motor vehicle with plastic sheeting.

3.3 _____ FT: Place a rubber or plastic bin (dual containment tray) on the sheeting.

3.4 _____ FT: Choose a 5-gallon bucket labeled "Decon Water." The bucket should have a securely fitting lid.

3.5 _____ FT: Place the bucket into the bin. This bucket will catch all decontamination water. It is imperative that the decon water bucket remain in the secondary containment bin at all times until it has been transported to the Conex box dual containment pad.

3.6 _____ FT: Gather the necessary spray bottles (one with soap solution, one with deionized or distilled water). Spray bottles should be labeled. If spray bottles are not labeled, label them appropriately. Place decontamination solution spray bottles into a second bucket (that also has a securely fitting lid).

3.7 _____ FT: Place the bucket with the spray bottles into a dual containment tray. It may be the same bin that is occupied by the decontamination water bucket or it may be a separate bin.

3.8 _____ FT: Make sure that lids are securely on buckets before moving the vehicle or the cart.

3.9 _____ FT: Upon arriving at a well, check for spiders and fire ants. If it is safe to proceed, do so.

3.10 _____ FT: Don nitrile gloves.

3.11 _____ FT: Using the $^{9}/_{16}$-inch socket wrench, loosen and remove the bolts that secure the well cover. Use the screwdriver to lift and remove the manhole cover. Check for Red Inscribed Mica Tag well label to identify the correct well.

3.12 _____ FT: Inspect the J-plug, dolphin lock, well cover bolts, and well cover o-ring for signs of corrosion. If any of these items requires replacing, replace them.

3.13 _____ FT: Unlock the dolphin lock. Place it in a safe place where it will not be inadvertently knocked into the well.

3.14 _____ FT: Unscrew the top part of the J-plug, releasing the seal with the casing.

3.15 _____ FT: When the J-plug is loose, remove it from the casing and place it in a safe, clean place.

3.16 _____ FT: Open up well and allow water level to equilibrate (~ 2-3 min).

3.17 _____ FT: Lower the water level probe and tape into the well casing by unwinding the spool. As the water level probe descends, keep it near the center of the well casing and avoid letting the probe free fall down the well casing. The meter will sound when the sensor has reached the water in the well. Raise the probe slightly so the sound stops and then lower the probe until the meter just begins to sound and hold the tape steady against the north side of the well casing. You may repeat this raising and lowering of the probe until the sensor sounds while reading the depth at the north side of the top of casing to ensure the probe is contacting the groundwater surface in the well and has not come into contact with moisture along the inside surface of the casing. (Contact with moisture on the well casing usually produces an erratic sound, e.g. the sound will stop or stutter on and off with further lowering of the probe. The probe can be cleared of moisture typically by shaking the probe giving several quick but gentle tugs on the tape.) Measure the water level in the well to the nearest 0.01 foot on the tape that meets the top of the north side of the well casing the instant the sensor sounds continuously.

3.18 _____ FT: Record the Well ID, depth to water (in feet below top of casing) and time.

3.19 _____ FT: Repeat Step 3.17 (measure water level again). This is to ensure that the water level is not changing (i.e., the well has finished equilibrating), and for quality control purposes. Check the new measured water level against the one recorded in Step 3.18 to make sure they are the same.

3.20 _____ If the scope of work requires total depth measurement, measure total depth of the well. Well total depth is measured by lowering the water level probe until it encounters the base of the well, and recording the measurement. Typically this will not be done every time the water level is measured. Check with the specific field scope request to determine if total depth is required.

3.21 _____ FT: When rolling in the meter tape, use caution to avoid rolling too quickly as this can lead to groundwater being thrown from the tape.

3.22 _____ FT: Have a paper towel ready to dry the water level probe just after it is out of the well. Dispose of paper towels in a plastic garbage bag used to temporarily store used PPE.

3.23 _____ FT: Clean the probe by completing the following steps:

- Set the meter on a flat surface and hold the tape so that the probe is in the "Decon Water" bucket (but not resting against the side wall). Be sure the bucket is in the secondary containment tray at all times.
- Spray the probe with soap solution. If there is any trace of oil, grease or any sheen, wipe the probe thoroughly with soap-solution-soaked paper towels until it is clean.
- Rinse the probe by spraying it three times with distilled or DI water. Wipe dry with a clean paper towel.

3.24 _____ FT: Roll in the meter tape and secure it; put it away in a vehicle or cart.

3.25 _____ FT: Replace J-plug in well casing and tighten to seal. Secure with Dolphin lock. Replace the well cover o-ring and seat the well cap on top of it. Check to make sure the small gaskets or o-rings around the well bolts are intact and that no bolts are missing. If any gaskets or bolts are missing, replace them and then bolt the well cap down to seal the well box.

3.26 _____ FT: Seal the "Decon Water" bucket before moving it.

3.27 _____ FT: Perform DOP-FT-003 "Trash Procedures" to dispose of the used PPE and return all supplies to the Conex box

4. COMPLETION

4.1 _____ SO: Verification of completion. File in Log Book.

Signature _____ Date _____

5. REFERENCES

- DOP-FT-003 “Trash Procedures”

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	04/08/10	All	Format

RESPONSIBLE PERSONNEL	
AT:	Arcadis Technician
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for discarding items.

1.2 Scope and Applicability

This DOP applies to trash procedures at the Lockheed Martin Treatment Facility in Tallevast, Florida.

Procedure Started: Time _____ Date: _____ AT/ SO/ OM: _____

2. STEP BY STEP INSTRUCTIONS

2.1 Any trash items that have been in contact with groundwater – or that may have been in contact with groundwater – must be discarded with used PPE and other groundwater-contaminated items. These may be temporarily gathered in a bucket or garbage bag. They must ultimately be collected in a solids drum for proper storage (located in the Conex box) until the drums are removed by Southern Waste Services. Handling these items requires appropriate personal protective equipment (PPE; e.g., safety glasses and chemical protective gloves, such as nitrile gloves), located in the PPE cabinet.

2.2 Cardboard and paper must be recycled. They may be deposited into the garbage can labeled “Cardboard and Paper” (located in the break room). Optionally, cardboard may be deposited into the “Cardboard Only” dumpster that is located in the parking lot near the northeastern corner of the site.

2.3 Aluminum, plastic and glass must be recycled. They may be deposited into the small blue cans that are located in offices. Optionally, cans may be deposited into the garbage can labeled “Cans” in the break room and plastic bottles can be deposited into the garbage can labeled “Plastic Bottles” located in the break room.

2.4 Food garbage, and any other garbage that is not recyclable or hygienic, must be deposited into a garbage can. These are located throughout the building. Larger items may be placed in the dumpster outside. Closed bags or garbage may also be placed in the dumpster outside. The dumpster is located in the parking lot near the northeastern corner of the site.

3. COMPLETION

3.1 _____ AT/ SO/ OM: Verification of completion.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	04/22/10	All	Format, content

RESPONSIBLE PERSONNEL	
AT:	Arcadis Technician
AO:	Arcadis Oversight
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) is to be followed when storing and transporting groundwater, including purge water from monitoring wells, process water from the treatment system, and any solution or rinsate that may contain groundwater. The intent of this DOP is to ensure that, at all times, groundwater and any solutions thereof are in dual containment. This is meant to accompany any relevant Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs) and health and safety rules.

1.2 Scope and Applicability

This DOP is to be used when storing and transporting groundwater associated with the Lockheed Martin Tallevast site in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

Groundwater from the subsurface is contaminated with volatile organic compounds and 1,4-dioxane. Therefore, it is extremely important that the operator use care to avoid contact with groundwater or with any rinsates thereof.

3. PREREQUISITES

3.1 Pre-Mobilization Preparations

3.1.1 Identify system by which groundwater will be stored and transported while in secondary containment.

3.1.2 Learn what conditions are required by chosen system. For example, there may be a maximum quantity of water that can be added to a given container. Drums must be staged such that they can be moved with dollies and must be in an area that is accessible to the drum truck, etc.

3.1.3 Make arrangements for containment system. Work within dates during which there is access to the property (to stage a roll off, for example) and within the permitted offsite work hours (generally 8 am – 5 pm).

3.2 Field Preparations

3.2.1 _____ AT/ SC: Gather and stage all needed equipment (listed below).

3.2.2 _____ AT/ SC: Communicate with operations staff to learn whether purge water should be added to treatment system (IRA System) influent via sump. Note that water containing large quantities of sediment cannot be added to treatment system.

3.3 **Planning and Coordination**

3.3.1 AO/ AT: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event; refer to "Flood Preparation" in the Contingency Plan.

3.4 **Equipment**

Note: Several groundwater containment methods are acceptable. The only requirement is that any water that is- or may be impacted must be in dual containment. A few options are included below:

- Spill containment kit
- Proper personal protective equipment (PPE): steel-toed boots, chemical resistant gloves, safety glasses or goggles, work gloves as needed
- Designated bucket or trash bag for temporary storage of used PPE and anything else that has contacted groundwater
- Plastic sheeting or flat, impermeable tarp(s)
- First aid kit
- Fire extinguisher
- Containment for groundwater, such as:

Option 1:

Dual containment tank (double walled Baker Tank or similar)

Option 2:

55-gallon drum(s)

- Bung wrench
- Funnel
- Drum containment pallet(s) or tray(s)
- Tarp(s) to cover drum(s) and pallet(s) or tray(s)
- Drum dolly, if needed

- Ramp to ascend and descend containment pallet, if needed
- Drum labels (non-hazardous) and permanent marker

Option 3:

- Poly totes
- Sheeting-lined roll off (secondary containment for totes)

Or other option that provides secondary containment for groundwater

4. STEP-BY-STEP PROCEDURE

4.1 _____ AT/ SC: Prior to beginning work that can generate groundwater, ensure that containment and secondary containment are in place and acceptable.

4.2 _____ AT/ SC: If applicable, any hoses that will transport water must be secured at discharge point (using zip tie, clamp, or other method).

4.3 _____ AT/ SC: As groundwater collection begins, verify that all water is being discharged into desired location. Avoid filling any drum more than 80%.

4.4 _____ AT/ SC: If using drums, ensure that they are correctly labeled with green and white Nonhazardous labels as soon as filling begins. The contents (e.g., "Purge water") and accumulation start date must appear on the label.

4.5 _____ AT/ SC: When the task is complete – or when a container is approximately 80% full, seal the groundwater container with its appropriate lid (keeping it in its secondary containment).

4.6 _____ AT/ SC: All PPE and disposables used during this operation will be collected temporarily in bucket or plastic trash bags and transported to the Conex box. There, used PPE and disposables will be stored within a designated drum labeled "used PPE." If there is no labeled drum, properly label the drum with green Nonhazardous Waste label.

4.7 _____ AT/ SC: Any water spilled within any secondary containment system will be promptly cleaned up with the use of a wet/dry vacuum and/or spill pads. Water will be transferred to the 55-gallon drum(s) placed on the secondary containment tray, and solids will be placed within the designated PPE drum.

5. COMPLETION

5.1 ____ AT/ AO: Verification of completion.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	04/11/10	All	Format

RESPONSIBLE PERSONNEL	
AT:	Arcadis Technician
AO:	Arcadis Oversight
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) is to be followed when transporting groundwater, including purge water from monitoring wells, process water from the treatment system and any solution or rinsate that may contain groundwater. The intent of this DOP is to ensure that, at all times, groundwater and any solutions thereof are in dual containment. This is meant to accompany any relevant Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs) and health and safety rules.

1.2 Scope and Applicability

This DOP is to be used when transporting groundwater, including purge water from monitoring wells, process water from the treatment system and any solution or rinsate that may contain groundwater associated with the Lockheed Martin Tallevast site in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

Groundwater from the subsurface is contaminated with volatile organic compounds and 1,4-dioxane. Therefore, it is extremely important that the operator use care to avoid contact with groundwater or with any rinsates thereof.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ Gather and stage all needed equipment (listed below).

3.1.2 _____ Verify that there is a 55-gallon steel drum with the funnel attachment located in the Conex box.

3.1.3 _____ Communicate with operations staff to learn whether purge water should be added to treatment system (IRA System) influent via sump. Note that water containing large quantities of sediment cannot be added to treatment system. Often the water that is removed from well vaults before well plugs can be removed is unsuitable for addition to treatment system. Keeping vault water in a dedicated bucket is a convenient way to generate the smallest possible amount of sediment-laden water.

3.2 **Planning and Coordination**

3.2.1 AO/ AT: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event; refer to "Flood Preparation" in the Contingency Plan.

3.3 **Equipment**

The following items are located in the Conex boxes unless otherwise stated:

- 5-gallon container, with lid, in good condition
- Secondary containment tray (Rubbermaid® plastic bin or equivalent)
- Vehicle or rolling cart with sides
- Spill containment kit
- Labeling supplies
- Proper personal protective equipment (PPE; e.g., steel-toed boots, nitrile gloves, safety glasses or goggles, traffic vest)
- Designated bucket or trash bag for temporary storage of used PPE and anything else that has contacted groundwater
- Plastic sheeting

4. STEP-BY-STEP PROCEDURE

Prior to collecting groundwater, complete the following steps**:**

4.1 _____ AT/ SC: Choose a 5-gallon container labeled "Process Water" or "Purge Water," as appropriate, and a lid that seals the container.

4.2 _____ AT/ SC:Choose location at which to stage bucket(s) / container(s). This may be a rolling cart with sides, a specified area in a motor vehicle, or an area on the floor or ground.

4.3 _____ AT/ SC:Place the secondary containment tray in that location.

4.4 _____ AT/ SC: Place the process or purge water container inside a secondary containment bin.

NOTE: The groundwater container (e.g., 5-gallon bucket) must remain in its secondary containment (and optionally atop plastic sheeting) during collection of groundwater. It must remain in the secondary containment bin until it has arrived at Conex box or treatment system building for transfer of water into drum or sump.

4.5 _____ AT/ SC: When the task is complete – or when a container is approximately 80% full, seal the groundwater container with its appropriate lid (keeping it in its secondary containment).

4.6 _____ AT/ SC: Move the container the Conex box or treatment system building, keeping it in the secondary containment. The container and bin may be moved using a cart or vehicle if appropriate.

4.7 _____ AT/ SC: Using a partner as necessary, take the sealed bucket from the cart or vehicle into to the Conex box or treatment system building,

Note: If water will be added to a drum, the drum must be on a secondary containment pallet and must be labeled with a green and white Nonhazardous label. Label the contents “Purge water” and add the accumulation start date.

4.8 _____ AT/ SC: All PPE and disposables used during this operation will be collected temporarily within plastic trash bags and transported to the Conex box. Those plastic bags will be stored within a designated drum labeled “used PPE.” If there is no labeled drum, properly label the drum with green Nonhazardous Waste label.

4.9 _____ AT/ SC: Any water spilled within any secondary containment system will be promptly cleaned up with the use of a wet/dry vacuum and/or spill pads. Water will be transferred to the 55-gallon drum(s) placed on the secondary containment tray, and solids will be placed within the designated PPE drum.

5. COMPLETION

5.1 Verification of completion.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Format
1	04/08/10	All	Format, minimal content change

RESPONSIBLE PERSONNEL	
AO:	Arcadis Oversight
AT:	Arcadis Technician
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for cleaning and decontaminating equipment, tools, instruments or any items that have been in contact with groundwater or other contaminants. The intent of this DOP is to ensure that groundwater (and solutions, including rinsates, thereof) is at all times kept in secondary containment. This is meant to accompany any relevant Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs) and health and safety rules.

1.2 Scope and Applicability

This DOP applies to cleaning and decontaminating equipment, tools, instruments or any items that have been in contact with groundwater or other contaminants during work associated with the Lockheed Martin Tallevast Site.

2. PRECAUTIONS AND LIMITATIONS

Groundwater from the subsurface is contaminated with volatile organic compounds. Therefore, it is extremely important that all personnel use care to avoid contact with groundwater.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ AO/AT: Obtain a copy of DOP-FT-003, “Trash Procedures.”

3.1.2 _____ AO/AT: Obtain a copy DOP-FT-004 “Transportation and Storage of Groundwater - Large Volume” and/or DOP-FT- 005 “Transportation and Storage of Groundwater - Small Volume,” as appropriate.

3.1.3 _____ AO/AT: Gather all of the necessary equipment (listed in Step 4).

3.2 Planning and Coordination

3.2.1 AO/AT: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event; refer to “Hurricane Preparation” in the Contingency Plan.

B. A flooding event; refer to “Flood Preparation” in the Contingency Plan.

4. EQUIPMENT (located in the Conex box)

4.1 Wash container, such as 5-gallon container with lid, in good condition

4.2 Secondary containment tray (Rubbermaid plastic bin or equivalent)

4.3 Proper personal protective equipment (PPE): steel-toed boots, nitrile gloves, safety glasses or goggles, traffic vest, and anything else required by the work task

4.4 Designated bucket or trash bag for temporary storage of used PPE and anything else that has contacted groundwater

4.5 Spray bottle or wash bottle containing soap solution (Note: Soap may be Liquinox or Alconox)

4.6 Spray bottle or wash bottle containing distilled or deionized water

4.7 In addition to the items listed above, any or all of the following may be needed: Simple Green® cleaner, isopropyl alcohol, scrubbing pads, bottle or dish brush

5. STEP BY STEP PROCEDURE

Note: If water is to be transported, refer to DOP-004 "Transportation and Storage of Groundwater – Large Volume" or DOP-005 "Transportaion and Storage of Groundwater – Small Volume," as appropriate.

5. 1 ____ AT/ SC: When cleaning and decontaminating equipment, decon water will be generated. If this water is relatively free of sediment and you receive permission from the operations manager, the water may be added to the treatment system influent by way of the sump or sink. If the water will contain sediment, or if you do not receive permission from the treatment system staff, the water generated must be contained in drums that are located on secondary containment pallets in the Conex boxes. The drums must be correctly labeled with a green and white Nonhazardous label. The first step is to determine which of the two disposal methods listed above will be used.

5. 2 ____ AT/ SC: If applicable, set up the wash/rinse area so that 5-gallon containers used in the decontamination process are located inside of a secondary containment bin.

5. 3 ____ AT/ SC: Don nitrile gloves.

5. 4 ____ AT/ SC: If the item has any greasy or oily substance on it, perform any or all of the following steps, as appropriate:

5.4.1 _____ Clean the item with a paper towel or sponge containing alcohol or Simple Green.

5.4.2 _____ Clean the item with a scrubbing sponge or scrubbing pad (provided that it will not scratch or damage the item) and alcohol or Simple Green.

5.4.3 _____ Soak the item in alcohol or Simple Green and clean the crevices with a bottle or dish brush.

5. 5 ____ AT / SC: When there are no oil- or grease-based substances on the item, perform either of the following steps, as appropriate (at least one of these steps must be performed

- Cover the item with a soap solution and wipe the item clean with gloved hands, a clean sponge, or paper towels.
- Soak the item in soap solution in a clean container and clean the crevices with a bottle or dish brush.

5. 6 ____ AT/ SC: After the item has been cleaned thoroughly with soap, rinse it three times with distilled or deionized water. If applicable, direct all rinsate to the 5-gallon bucket.

5. 7 ____ AT/ SC: Ensure that the items are dried thoroughly or are allowed to air dry thoroughly in a location where no new contaminants will be introduced.

5. 8 ____ AT/ SC: Dispose of used PPE, paper towels and plastic sheeting according to DOP-FT-003, “Trash Procedures.”

5. 9 ____ AT/ SC: Any water/liquid that is generated during this process must be transferred to a 55-gallon drum labeled “Process Water” or to the treatment system.

5. 10 ____ AT/ SC: Return all supplies to the appropriate storage area.

6. REFERENCES

- Contingency Plan
- DOP-FT-003 “Trash Procedures”
- DOP-FT-004 “Transportation and Storage of Groundwater – Large Volume”
- DOP-FT-005 “Transportation and Storage of Groundwater – Small volume”

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	**REVISION**	**DISCIPLINE**	**REVISION**
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	12/01/08	ALL	NEW PROCEDURE
1	1/28/10	ALL	PROVIDE DETAILS ON REPLACING/DEPLOYING TRANSDUCER AND REORGANIZING SEQUENCE AND LOGIC.

RESPONSIBLE PERSONNEL	
FT:	FIELD TECHNICIAN
SO:	SHIFT OPERATOR
OM:	OPERATIONS MANAGER

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) provides instructions on downloading data from, replacing and/or deploying pressure transducers located within monitoring wells. The intent of this DOP is to ensure that groundwater is, at all times, contained within a secondary containment system and accurate water level information. Additional instructions and forms can be found on pages 7 to 9.

1.2 Scope and Applicability

This DOP applies to downloading data from, replacing or deploying new transducers in monitoring wells or stilling wells at the Lockheed Martin Treatment Facility and within the surrounding community in Tallevast, Florida. See the *Long-term Water Level Monitoring Plan* (ARCADIS 2010) for more information on transducer deployment and downloading data.

2. PLANNING AND COORDINATION

Prior to proceeding to well locations located off facility, the activity must have an approved Tallevast Work Permit and must be verified on the weekly schedule.

3. EQUIPMENT

- Dual containment tray (concrete mixing tray or any impermeable bin or tray with sides)
- 5 gallon bucket with lid
- Trash bags
- Plastic sheeting (Visqueen)
- Tools ($^{9}/_{16}$-inch socket, screwdriver, bilge pump)
- Proper PPE (steel-toed boots, nitrile gloves, safety glasses, traffic vest)
- Com cables (in-situ and Solinst cradle)
- Fresh desiccant for In-Situ® Transducers
- Laptop or PDA with Win-Situ® 5, Win-Situ® Sync and Level Logger® 3.1.1 and 3.4.1
- Dolphin Lock key
- Transducer Gauging and Records form
- Dedicated Field Log Book

Procedure Started: Time _____ Date: _____ _____

SO Operator _____

4. STEP BY STEP INSTRUCTIONS

The instructions begin with how to gain access to the well. As described below, before you download a transducer that is in a well or deploy a new transducer in a well, the water level must be manually measured in accordance with DOP-FT-002. If you are replacing a Solinst® transducer you will not return it to the well after downloading and skip to the deployment steps. If you are replacing an In-Situ® transducer after it is downloaded you will remove it from the well after it is downloaded and skip to the deployment steps.

WELL ACESS AND WL MEASUREMENT -

4.1 _____ FT: Gather the equipment listed and stage it next to the well.

4.2 _____ FT: Open the well containing the transducer to be accessed. To open the well, perform the following steps:

- Use a $^{9}/_{16}$-inch socket wrench to loosen bolts. Turn the bolts counter-clockwise.
- Remove the bolts.
- Use a screwdriver to pry open the manhole cover.
- Check the red inscribed Mica Tag well label identifying the correct well.
- Use the Dolphin lock key to unlock the Dolphin lock. Place the Dolphin lock in a safe location on the plastic sheeting.
- Unscrew the top of the J-plug so that the j-plug releases the pressure exerted against the inside of the casing.

4.3 _____ FT: Don nitrile gloves.

4.4 _____ FT: Measure the water level in the well in accordance with DOP-FT-002 Reading Water Levels and record in the field book.

4.5 _____ FT: If the well contains a transducer for downloading proceed to the next step (4.6). If the well does not contain a transducer and one is to be deployed in the well go to step 4.17.

DOWNLOADING -

4.6 _____ FT: If the transducer is a Solinst® transducer it will be suspended in the well by a 25 pound monofilament line and there will be no data cable visible at the top of the well. Retrieve and download the Solinst® transducer following the next several steps. If the transducer is an In-Situ®, as apparent from the data cable at the top of the well casing, it can stay in the well during downloads, skip to step 4.13 for instructions on downloading.

4.7 _____ FT: Place a clean 5-gallon bucket next to the well.

4.8 _____ FT: Retrieve the Solinst® transducer by pulling up the monofilament stay and gathering the slack in loops on one hand or by lowering it into the 5-gallon bucket. Wipe the transducer with a clean paper towel to remove excess groundwater. Place the transducer in the 5-gallon bucket, and dispose of the paper towel in the designated used PPE trash bag. If the transducer is an In-Situ® transducer, do not remove the transducer from the well.

4.9 _____ FT: Remove the Solinst® transducers from the bucket, and place the clean, dry transducer into the Solinst cradle. Connect the lead from the transducer to the computer. Using the Level Logger® 3.1.1/3.4.1 computer program download the transducer as follows:

4.10 _____ FT: Under "Com Port Selection" select "USB serial port."

- Hit "retrieve setting."
- Hit "Stop."
- Hit "data control."
- Hit "download" and "all data."
- Hit "save."
- Hit "Level Logger Setting."
- Hit "play."
- Hit "erase" and "yes."
- Hit "sync" and "yes."
- Hit "Start" and set start time for about 5 minutes from time of redeployment.

- The data downloaded from the Solinst® transducers will be placed in the following file path: C:/Program files/Solinst/Level Logger/Data

4.11 _____ FT: Disconnect the computer lead from the transducer, replace the cap.

4.12 _____ FT: If the transducer is to be replaced with a new transducer skip to step 4.17, otherwise, ensure the transducer cap and monofilament lead are secure (three knots or more in the monofilament) and lower the transducer back down the well. Proceed to step 4.36 and close the well as described.

4.13 _____ FT: For the In-situ® transducers, open Win-Situ® software on the laptop. Unscrew the cap (push in and turn counterclockwise) on the transducer lead at the top of the well. Remove the desiccant and discard.

4.14 _____ FT: Connect the communication cable to the serial port on the laptop or Rugged Reader® and connect the transducer to the communication cable. Click the plug icon on the computer screen to communicate with the transducer. Read the depth reading on laptop or RuggedReader® and record on form.

4.15 _____ FT: Follow steps appropriate to the software to download data. The data downloaded from the In-Situ® transducers will be placed in the following file path: **C/Program Files/Win Situ Data/Site Data.**

4.16 _____ FT: If the transducer is to be replaced with a new transducer pull the transducer out of the well by coiling the lead into a clean bucket and proceed to the next step (4.17), otherwise, disconnect the data cable, install new desiccant, put the cap back on the data cable and ensure it is secured to the top of the well. Replace well cap as found so as not to pinch or crease the data cable. Proceed to step 4.36 and close the well as described.

DEPLOYING NEW TRANSDUCER -

4.17 _____ FT: The total depth of the well will be measured as described in DOP-FT-002 Reading Water Levels. This will be necessary to ensure the transducer is set at the correct depth in the well using the appropriate length of monofilament lead or data cable.

4.18 _____ FT: If the transducer to be deployed is a Solinst® transducer it will be suspended in the well by a 25 pound monofilament line, proceed to the next step (4.18). If the transducer to be deployed is an In-Situ® transducer it will be suspended by the data cable, proceed to step 4.27.

4.19 _____ FT: For wells 50 ft deep or less, measure enough length of 25 pound monofilament fishing line so the transducer will be suspended between 1 and 3 feet off the bottom of the well. For wells greater than 50 ft deep, measure enough monofilament line so the transducer will remain submerged below the historically low water level measured in the well. (For wells greater than 50 ft deep, the depth of the transducer will be provided in the specific work plan).

4.20 _____ FT: Securely attach one end of the monofilament to the cap of the Solinst® transducer and the other end to the bottom of the J-Plug. Three knots minimum should be used to secure the monofilament to the transducer and J-plug.

4.21 _____ FT: Unscrew and remove the cap from the Solinst® transducer and place the transducer into the Solinst cradle. Connect the lead from the transducer to the computer. Using the Level Logger® 3.1.1/3.4.1 computer program, program the transducer as follows.

4.22 _____ FT: Synchronize the time of the transducer to the same time as the laptop.

4.23 _____ FT: Set up test following the on-screen instructions

4.24 _____ FT: During test setup, for use at the site, set the altitude to 31 ft.

4.25 _____ FT: Program the transducer to record data every hour. Record the time of programming, when the test was programmed to start, depth of deployment, transducer serial number, the name of the well in which it is being deployed, and any other pertinent info.

4.26 _____ FT: Remove the transducer from the cradle, replace the cap, check that each end of the monofilament is secured to the transducer and J-plg and lower the transducer into the well. Proceed to step 4.36 and close the well as described.

4.27 _____ FT: If the transducer to be deployed is a In-Situ® transducer it will be suspended in the well by the data cable and the depth will depend on the cable length. The cable length will be pre-determined and ordered such that 1) the transducer depth below water will not exceed the pressure limitations set by the manufacturer, and 2) the transducer will remain submerged during typical water level conditions at the well. Transducers in stilling wells were installed with 6-foot cables; all other devices were deployed with total cable lengths ranging from 15 to 31 feet.

4.28 _____ FT: Wait approximately 2 to 5 minutes for water level to equilibrate to the same reading it was in step 4.4.

4.29 _____ FT: Open Win-Situ® software on the laptop. Unscrew the cap (push in and turn counterclockwise) on the transducer cable at the top of the well. Remove the desiccant and set aside in a clean dry place.

4.30 _____ FT: Connect the communication cable to the serial port on the laptop or Rugged Reader® and connect the transducer to the communication cable. Click the plug icon on the computer screen to communicate with the transducer. Read the depth reading on laptop or RuggedReader® and record on form and in the field book.

4.31 _____ FT: Set up test following on-screen instructions

4.32 _____ FT: For logging level, choose depth.

4.33 _____ FT: Set up a linear test to record data every hour.

4.34 _____ FT: Program the transducer to begin recording at the next hour. Record the time of programming, when the test was programmed to start, depth of deployment, transducer serial number, the name of the well in which it is being deployed, and any other pertinent info.

4.35 _____ FT: Disconnect the data cable, replace the desiccant, put the cap back on the data cable and ensure it is secured to the top of the well. Replace well cap as found so as not to pinch or crease the data cable.

CLOSE AND SECURE WELL -

4.36 _____ FT: When all necessary work with the transducer has been completed, including completion of field forms and field log book, close the well as follows:

- Place the J-plug into the well casing.
- Screw the top of the J-plug clockwise so that it seals by exerting pressure against the well casing.
- Lock the J-plug in place using a Dolphin lock (the top hook of the j-plug must be lined up properly so that the lock handle will fit through the opening).
- Place the well cover on the vault opening so that the well cover bolt holes are lined up above the vault bolt holes.
- Place the bolts (with gaskets in place) through the bolt holes, lining up the threads.
- Use $^{9}/_{16}$-inch socket wrench to tighten the bolts. Turn clockwise to tighten the bolts.

4.37 _____ FT: All PPE and disposables used during this operation will be collected temporarily within plastic trash bags and transported to the Conex box. Those plastic bags will be stored within the designated drum labeled “Used PPE.”

4.38 _____ FT: Any water spilled within any secondary containment system will be removed from containment and treated via the treatment system on-facility or transferred to a 55 gallon drum. Solids will be placed within the designated PPE drum.

5 COMPLETION

5.1 _____ SO: Verification of completion. File in Log Book.

Signature _____ Date _____

6 REFERENCES

- DOP-FT-002 “Reading Water Levels”
- DOP-FT-003 “Trash Procedures”
- Long-term Water Level Monitoring Plan, ARCADIS 2010.

TRANSDUCER GAUGING FORM
LONG-TERM CONTINUOUS GROUNDWATER ELEVATION MONITORING
WETLAND MONITORING
AMERICAN BERYLLIUM COMPANY (ABC) FACILITY, TALLEVAST, FLORIDA

Date: **Staff:**

Location	*Pressure Trandscucer type*	*Time*	*Depth to Water (ft btoc)*	*Total Depth (ft btoc)*	*Troll level reading (ft)*	*Download Data*	*Stop/Restart Test*	*Battery Life (%)*	*Comments/Observations*
MW-19	I								
MW-36	I								
MW-37	I								
MW-123	I								
MW-127	S								
MW-128	S								
PZ-LSAS-7	I								
MW-219	I								
MW-220	I								
MW-221	I								
MW-222	I								
MW-116	I								
MW-178	I								
MW-179	I								
MW-180	I								
MW-181	I								
MW-141	S								
MW-142	S								
MW-143	S								
MW-144	S								
MW-145	S								
MW-103	S								
MW-98	S								
MW-102	S								
MW-167	S								
MW-168	S								
MW-169	S								
MW-170	S								
MW-182	S								
MW-121	S								
MW-171	I								
MW-172	I								
MW-173	I								
MW-174	I								
Stilling Well-2 (Tallevast Road Ditch)	S								
BaroTroll(in shed)	I								
Stilling Well-5 (Golf Course Pond)	I								
MW-RW-1	S(Canada)								
MW-RW-2	S(Canada)								
MW-RW-3	S(Canada)								
MW-TW-6	S(Canada)								
MW-TW-2	S(Canada)								
MW-TW-1	S(Canada)								
MW-TW-18	S(Canada)								
MW-RW-5	S(Canada)								
BaroLogger	S (Canada)								

All devices should be set to record every 1 hour
comments should include things like:
significant weather events
if the bilge was needed to remove water from around the well

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
FT:	Field Technician
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) provides instructions for performing soil boring and subsequent sampling. All samples are sent to TestAmerica in Tampa, Florida for analysis using Methods 8260C and 8260B SIM for 1,4 dioxane. The Florida Department of Environmental Protection (FDEP) Soil Sampling Standard Operating Procedure (SOP) does not require collection of soil samples below the water table. In some cases, only two to three intervals have been sampled before encountering the water table.

1.2 Scope and Applicability

This DOP applies to soil boring and subsequent sampling at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PLANNING AND COORDINATION

Retrieve copy of DEP-SOP-001/01-FS-3100. Read this DOP.

Retrieve a copy of DOP-FT-006 “Cleaning and Decontaminating Equipment.”

3. EQUIPMENT

- Hand auger
- Pre-weighed, pre-labeled and pre-certified soil sampling kit with 5 gram t-core sampler, containing two 40-milliliter (mL) glass vials filled with 5mL distilled water using the included 5 gram t-core sampler, one 40mL glass vial filled with a methanol preservative using the same 5 gram t-core sampler and one 2-ounce plastic bottle filled by hand for measuring the dry weight of the soil only
- Cooler with wet ice
- Field log book
- Plastic garbage bag
- Stainless steel spoon

Procedure Started: Time _____ Date: _____ _____

SO Operator _____

4. STEP BY STEP PROCEDURE

4.1 _____ FT: Measure and flag the sample point location using the prepared map.

4.2 _____ FT: Don nitrile gloves

4.3 _____ FT: Remove grass, leaves or debris from sample location.

4.4 _____ FT: Using a standard, decontaminated (with liquinox and deionized water) hand auger marked with pre-measured interval depths, auger down to the first interval at a depth of 6 inches and remove the soil and set it aside for backfill.

4.5 _____ FT: Take samples at a depth of 3 inches (the mid-point of the interval) from the exposed wall of the boring using a sterile 5 gram t-core sampler. Place the sample in a pre-weighed, pre-labeled and pre-certified soil sampling kit.

4.6 The soil sample kit used is the same for each interval and contains:

- two 40mL glass vials filled with 5mL distilled water using the included 5 gram t-core sampler
- one 40mL glass vial filled with a methanol preservative using the same 5 gram t-core sampler
- one 2-ounce plastic bottle filled by hand for measuring the dry weight of soil only

4.7 _____ FT: Place the samples back in the foam container in which they came and placed in a cooler stocked with wet ice. Discard the t-core sampler in a plastic garbage bag.

4.8 _____ FT: Record the location names and sample times in a field book.

4.9 _____ FT: Using the same hand auger, auger down to the second interval at a depth of 24 inches and set the soil aside for backfill. Manually take a series of samples at a depth of 14 inches (the mid-point of the 6- to 24-inch interval) from the exposed wall of the boring using a new, sterile 5

gram t-core sampler. Place the soil in a pre-weighed, pre-labeled and pre-certified soil sampling kit.

4.10 _____ FT: Place the samples back in the foam container in which they came and place the foam container in a cooler stocked with wet ice. The t-core sampler is discarded.

4.11 _____ FT: Record the sample times in a field book.

4.12 _____ FT: Using the hand auger, auger down to the third interval at a depth of 36 inches (the mid-point of the 24- to 48-inch interval). At this point sampling manually from the wall of the boring is no longer feasible, so the sample must be taken from the end of the hand auger. Scrape the surface layer of the soil protruding from the hand auger bit using a sterile, stainless steel spoon. Then, using a new, sterile 5 gram t-core sampler, extract the sample. Place it in a pre-weighed, pre-labeled, and pre-certified soil sampling kit.

4.13 _____ FT: Set aside the soil for backfill.

4.14 _____ FT: Place the samples back in the foam container in which they came and place the foam container in a cooler stocked with wet ice. Discard the t-core sampler.

4.15 _____ FT: Record the sample times in a field book.

4.16 _____ FT: If the tech has not yet reached the water table, (indicated by discovery of completely wet, saturated soil), using the hand auger, auger down to the third interval at a depth of 60'' (the mid-point of the 48'' to 72'' interval). At this point sampling manually from the wall of the boring is no longer feasible, so the sample must be taken from the end of the hand auger. Scrape off the surface layer of the soil protruding from the hand auger bit using a sterile, stainless steel spoon. Then, using a new, sterile 5 gram t-core sampler, extract the sample. Place the sample in a pre-weighed, pre-labeled, and pre-certified soil sampling kit.

4.17 _____ FT: Set soil aside for backfill.

4.18 _____ FT: Return samples to the foam container and place in the cooler on wet ice.

4.19 _____ FT: Record the sample times in the field book.

4.20 _____ FT: Backfill the soil boring and mark it with a pin flag that is labeled with the boring location name.

4.21 _____ FT: Follow DOP-FT-006 to decontaminate the hand auger.

4.22 _____ FT: This process is repeated at all soil boring locations.

4.23 _____ FT: Perform DOP-FT-003 “Trash Procedures” to dispose of used PPE and T-core samplers.

5. COMPLETION

5.1 _____ SO: Verification of completion. File in Log Book.

Signature _____ Date _____

6. REFERENCES

- DOP-FT-006 “Cleaning and Decontaminating Equipment”
- DOP-FT-003 “Trash Procedures”

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) provides instructions for performing Geoprobe boring and the accompanying water sampling. The samples are sent via courier to TestAmerica in Tampa, Florida for the following analyses: Method 8260 B and 8260 B SIM ID for volatile organic compounds (VOCs) and 1,4 dioxane. The samples are sent to the lab with a 24-hour turn-around time specified.

1.2 Scope and Applicability

This DOP applies to Geoprobe boring and the accompanying water sampling at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

None.

3. PLANNING AND COORDINATION

Procedure Started: Time _____ Date: _____ _____

SO Operator _____

4. STEP BY STEP INSTRUCTIONS

After measuring and flagging the sample point location, use the supplied map to conduct the following activities:

4.1 _____ Remove grass, leaves or debris and hand auger to 5 feet.

4.2 _____ Instruct the drilling crew to position the Geoprobe over the boring.

4.3 _____ Instruct the drilling crew to advance rods to a depth of 9 feet. Instruct the drillers to expose the stainless steel screen over the interval of 5 to 9 feet.

4.4 _____ Cut a length of polyethylene tubing long enough to yield more than 160 milliliters (mL) of groundwater and place one end of the tubing down the hollow-stem rods to approximately 6 inches from the bottom of the exposed screen.

4.5 _____ Connect the polyethylene tubing to the silicon tubing and connect it to the peristaltic pump. Lay down the plastic sheeting in the area around the boring. Place the sampling equipment in a secondary containment bin and place the bin on top of the plastic sheeting. Place a 5-gallon bucket in a secondary containment bin and place the bin on top of the plastic sheeting.

4.6 _____ Use a binder clip to secure the tubing from the peristaltic pump to the 5-gallon bucket inside the secondary containment bin. Power up the pump and purge the water into the 5-gallon bucket until the water is clear. Then shut off the pump.

4.7 _____ Place the effluent side of tubing into the flow-through cell of a calibrated YSI (water quality meter) that purges into the 5-gallon bucket for the purpose of logging field parameters.

4.8 _____ After several additional minutes, begin logging parameters on a DEP-SOP-001/01 Form FD 9000-24 sample log sheet.

4.9 _____ Following the DEP-SOP-FS-2200, "Groundwater Sampling" (except turbidity stability standards) log three consecutive stable readings from the YSI (water quality meter), and turbidity readings from a calibrated LaMotte turbidity meter.

4.10 _____ Once these readings have stabilized, don nitrile gloves and prepare four sterile 40mL glass vials with labels. Caution: These vials are lab preserved with hydrochloric acid. This acid will harm you if it comes in contact with skin or eyes. Stop the peristaltic pump and reverse the flow direction. Instruct the drilling crew to extract the tubing from the hollow core rods and bring the end to the sampling tech. Using the reverse flow method, pump the sample into the sample vials.

4.10.1 Deposit the samples into a protective bubble bag and put the samples into a cooler stocked with ice.

4.11 _____ Purge the water from the tubing into the bucket and discard it into the "used PPE" trash bag for later disposal.

4.12 _____ FT: Before moving the filled 5-gallon bucket, the following activities must be conducted:

- Fasten the lid to the bucket in such a way that it seals.
- Place bucket and secondary containment tray into the rolling cart with sides, and walk the cart to the Conex box. Using a partner,

remove the sealed bucket from the cart, and empty the contents into the 55-gallon drum labeled "purge water."

- For drive-up sampling, place the secondary containment tray containing the 5-gallon bucket in the vehicle, and drive the vehicle to the Conex box. Using a partner, lift the sealed bucket out of the containment tray and empty the contents into the 55-gallon drum labeled "purge water." If there is no one available to assist, leave the filled bucket on the dual containment pad inside the Conex box.

4.13 _____ Instruct the drilling crew to remove the Geoprobe rods from the boring for decontamination. The rods are decontaminated using a bucket filled with 3 gallons of water and 4 ounces of alconox and a brush.

4.14 _____ Document these procedures in the field log book.

4.15 _____ Repeat Steps 4.4 through 4.14 for the following intervals:

10 to 14 feet

15 to 19 feet

20 to 24 feet

25 to 29 feet

4.16 _____ Instruct the drilling crew to advance the Geoprobe rods to the confining layer.

4.17 _____ Confirm the depth to the confining layer. Record this data in the field log book. (Typically, it has been between 30 to 32 feet).

4.18 _____ Instruct the drilling crew to remove the Geoprobe rods from the boring for decontamination. The rods are decontaminated using a bucket filled with 3 gallons of water and 4oz of alconox and a brush.

4.19 _____ Instruct the drillers to fill the boring with Portland cement.

5. COMPLETION

5.1 _____ SO: Verification of completion. File in Log Book.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	6/28/10	All	Revision

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) provides instructions for an ARCADIS employee to escort a subcontractor onto the site.

1.2 Scope and Applicability

This DOP provides instructions for an ARCADIS employee to escort a subcontractor into the fenced area of the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

When "walking" a truck, stay out of the vehicle's path.

3. PREREQUISITES

3.1 Field Preparations

The ARCADIS personnel involved in escorting a subcontractor onto the site are responsible for the following field preparations.

3.1.1 _____ Communicate with the subcontracted company to coordinate driver arrival time

3.1.2 _____ Inform drivers of the following:

The 5 mph site speed limit.

The requirement that trucks be "walked."

The personal protective equipment (PPE) requirements (ARCADIS employee must also provide "loaner" vests and safety and/ or hard hats as needed).

If the subcontractor work involves the use of any chemicals, the subcontractor must be informed that material safety data sheets (MSDSs) are required to be provided to ARCADIS personnel before arrival to the site.

3.1.3 _____ Ensure that any person/vehicle needing access beyond the locked gate on the south side of the property signs in and receives a badge at the security desk

3.2 **Planning and Coordination**

3.2.1 _____ Trucks may enter and leave the site between the hours of 8:00 am and 5:00 pm, Monday through Saturday.

4. STEP-BY-STEP INSTRUCTIONS

4.1 _____ After coordinating the subcontractor/delivery driver access time, meet the driver. Instruct driver to use the main entrance off of Tallevast Rd.

4.2 _____ Have the driver park and turn off his vehicle. Walk the driver to the security desk to sign in and receive a badge.

4.3 _____ Visually inspect the vehicle for any leaks. If any fluids other than water are noted, the driver/subcontractor will not be allowed to proceed past the security gate on the south side of the property.

4.4 _____ Once the driver has returned to the vehicle, have the security guard unlock the gate on the south side of the property and have the driver drive through the gate. Instruct the driver to stop after driving through the gate. Security will close and lock the gate. Walk the truck to your final destination ensuring compliance with the speed limit (5 MPH).

4.5 _____ Instruct the driver to shut off the engine if it is not needed to perform the specific task. After goods have been delivered or services rendered, escort the driver to the security gate on the south side of the property. Retrieve the security badge from the driver. Call security to unlock the gate and allow the driver to exit. Give badge to the security guard.

4.4.1 _____ Instruct the driver to exit through the main entrance at Tallevast Rd.

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
S	Sampler

1. INTRODUCTION

1.1 Purpose

This *Detailed Operating Procedure* (DOP) provides instructions for sampling sediment. This is intended to accompany the relevant Florida Department of Environmental Protection (FDEP) Sediment Sampling Standard Operating Procedure (SOP).

1.2 Scope and Applicability

This DOP is to be used when performing sampling sediment from ditches or ponds as part of the work being performed by ARCADIS at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Sediment collected during sampling potentially contains site contaminants of concern (COCs), such as 1,4-dioxane and chlorinated organic compounds. Some site contaminants are carcinogenic. Caution must be taken to prevent contacting sediment. Protective gloves must be worn when handling sampling equipment or samples. This will protect the technician from any compounds in the sediment and, because gloves will be changed between samples, will also prevent cross contamination of samples.

2.2 Working near, in or on the water carries a drowning risk. Personal floatation devices (PFDs) must be worn by sampling personnel.

2.3 A "buddy," who is able to swim, must be nearby and available to help the sampler in case of emergency.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ S: Obtain an impermeable plastic bin or bucket and stainless steel spoons.

3.1.2 _____ S: Follow DOP-FT-006, "Cleaning and Decontaminating Equipment" to decontaminate the bin or bucket.

3.1.3 _____ S: Gather all equipment listed in Step 3.3 of this DOP.

3.2 **Equipment Required**

- Stable, flat-bottom John boat with oars and anchors (fore and aft), or waders
- Echmann grab sampling dredge (stainless steel)
- Stainless steel spoons
- 5-gallon bucket or 5-gallon container
- Plastic sheeting
- Scissors to cut plastic sheeting
- FDEP SOPs #FS4000 and #FC1000
- Proper personal protective equipment (PPE; steel-toed boots, nitrile gloves, safety glasses)
- PFD
- Sample containers and labeling supplies
- Equipment cleaning supplies

3.3 **Approvals and Notifications**

Notifications:

Field Superintendent

3.3.1 Approval to perform this procedure has been obtained from the Field Superintendent

_____ Signature _____ Date _____

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ Sampler: _____

_____

*This task requires that the sampler have a "buddy" (who is able to swim) nearby and available to help in case of emergency.

4.1 _____ S: Prior to sampling, prepare a work area in which to process samples. This may be on the central portion of the boat hull or it may be on a relatively flat area of the shore. First, cover the area with plastic sheeting. Then, place a clean, impermeable plastic bin or bucket on the plastic sheeting.

4.2 _____ S: Don life preserver.

4.3 _____ S: If employing a boat, position the boat above the selected sampling location and stabilize the boat's position, either by anchoring fore and aft or by some other means.

If employing waders, the technician must position him/herself near the selected sampling location and establish solid footing with a wide stance (with feet approximately 2 feet apart).

4.4 _____ S: Open the spring-loaded jaws of the sampler and attach the chains to the pegs at the top of the sampler.

4.5 _____ S: Lower the dredge from the side of the boat to the bottom of the pond, making sure it settles flat.

If using waders, try to avoid stirring up sediment, stand next to the sampling location and send dredge to the bottom, making sure it settles flat.

4.6 _____ S: Holding the line taut, send down the messenger to close the jaws of the dredge.

4.7 _____ S: Pull the sampler to the surface and then into the boat or onto the onshore work area

4.8 _____ S: Check to make sure the jaws are fully closed. If they are not, repeat Steps 4.5 through 4.7

4.9 _____ S: Allow excess water to drain to the pond, and place the sampler in the bucket. Carefully open the top access of the sampler, remove the sample with a clean, stainless steel spoon and transfer the sample into the appropriate sample container(s).

4.10 _____ S: Label, preserve to 4°C with wet ice and complete field notes.

4.11 _____ S: Return excess sample and collected excess water to the pond. Clean the sampler and bucket per the procedures outlined in DOP-FT-006 "Cleaning and Decontaminating Equipment."

4.12 _____ S: Collect all PPE and disposables used during this operation, temporarily within plastic trash bags and transport to Building 3. The plastic bags will be stored within a designated drum. The drum will be properly labeled and disposed of properly off site when full. Refer to DOP-FT-003, "Trash Procedures."

4.13 _____ S: After using boat, place it in the proper location

After using waders, rinse and dry before putting them away.

5. COMPLETION

5.1 _____ S: Verification of completion**.**

Signature _____ Date _____

6. REFERENCES

- DOP-FT-006 "Cleaning and Decontaminating Equipment"
- DOP-FT-003 "Trash Procedures"

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	08/28/09	All	New Procedure

RESPONSIBLE PERSONNEL	
OM:	Operations Manager
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for conducting a gradiometer and GPR survey.

1.2 Scope and Applicability

This DOP applies gradiometer and GPR surveys at the Lockheed Martin Tallevast Facility in Tallevast, Florida.

2. EQUIPMENT REQUIRED

2.1 Tools and Equipment

PPE: non-metallic safety boots, safety glasses, traffic vest, and all task specific equipment detailed below.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SC: Communicate with onsite ARCADIS staff.

3.1.2 _____ OM: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

3.2 Planning and Coordination

3.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to “Hurricane Preparation” in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to “Flood Preparation” in the Contingency Plan.

3.3 Approvals and Notifications

3.3.1 _____ Approval to perform this procedure has been obtained from the OM.

OM’s Signature _____ Date _____

4. STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SC _____

4.1 _____ SC: Using a map of the survey location, mark a grid on ground surface with marking paint.

4.2 _____ SC: **GPS survey with RTK/GPS**. This section (section 4.2) outlines steps involved in the GPS survey using RTK/GPS. The RTK/GPS system consists of a Trimble 5700 base station and a Trimble 5800 roving antenna.

4.2.1 _____ SC: The following steps are taken to set up and run the base station:

4.2.1.1 _____ SC: Center the 5700 tripod on the control point.

4.2.1.2 _____ SC: Attach the 5700 antenna to the top of the tripod.

4.2.1.3 _____ SC: Attach cables to control unit and battery. Turn the 5700 on.

4.2.1.4 _____ SC: Set up the tripod for the radio antenna about 10 feet away from the GPS.

4.2.1.5 _____ SC: Attach radio antenna, console, battery and cables. The radio should turn on automatically.

4.2.1.6 _____ SC: Connect the data collector to the 5700 control unit. Start RTK/Base station setup.

4.2.1.7 _____ SC: Enter coordinates and start base station.

4.2.1.8 _____ SC: Ensure that the radio console displays a blinking “Trans” message.

4.2.2 _____ SC: The following steps are taken to set up and run the roving antenna:

4.2.2.1 _____ SC: Turn on the 5800.

4.2.2.2 _____ SC: The antenna should start tracking satellite and recognize the radio link within 30 seconds.

4.2.2.3 _____ SC: Connect the data collector to the 5800 antenna. Start RTK survey.

4.2.2.4 _____ SC: Wait for the 5800 to initialize.

4.2.2.5 _____ SC: Check the location of the base station on the map. Survey a known point and repeat surveying the same point every time the base station is set up to verify accuracy.

4.2.2.6 _____ SC: Survey points as required.

4.2.2.7 _____ SC: When using the RTK/GPS in conjunction with geophysical equipment, connect a serial cable to port II. The default settings are NMEA/GGA data format, 8-N-1, 9800.

4.3 _____ SC: **Surface GPR with GeoMetrics G-858G.** This section (section 4.3) outlines steps involved in the portion of the work using a Geometrics G-858G magnetometer for surface GPR. The Geometrics G-858G magnetometer consists of two total field cesium-vapor magnetometer sensors, console and batteries. The instrument measures the total magnetic field registered by each sensor and calculates the difference between the two readings (a gradiometer measures the gradient of the magnetic field). The instrument can be connected to GPS for streaming positioning data. The following steps are taken to set up and run the instrument:

4.3.1 _____ SC: Connect the battery to the console and turn on the console.

4.3.2 _____ SC: Check the status of the sensors by going into the test magnetometer menu.

4.3.3 _____ SC: Wait for the sensors to warm up and initiate.

4.3.4 _____ SC: Check the signal strength with the sensors facing the proposed data collection directions to avoid sensor dead zones.

4.3.5 _____ SC: Verify that the operators do not carry magnetic objects by having each operator approaching the sensors while monitoring the response from the sensors. The operator-induced response at 3 ft from the sensors should be less than 1 nT (nano Tesla).

4.3.6 _____ SC: Verify operation of the system by collecting data along a test line with targets placed out at known locations.

4.3.7 _____ SC: Collect data along profiles as required.

4.4 _____ SC: **Surface GPR with MALA GeoScience X3M**. This section (section 4.4) outlines the steps involved in the portion of the work using a MALA GeoScience X3M GPR system for surface GPR. The MALA GeoScience X3M GPR system consists of a GPR antenna array, encoder wheel, control unit, data recoding unit with display and battery. The antenna contains a transmitter that transmit GPR pulses and a receiver that receives the reflected GPR pulses. The time it takes for the pulse to go from the transmitter to a reflecting underground object and back to the receiver is recorded together with the amplitude of the reflected signal. The data is displayed on a screen for in-field interpretations and can be downloaded to a computer for further analysis. The GPR antennas come in different frequencies for different applications. The following steps are taken to set up and run the instrument:

4.4.1 _____ SC: Connect battery cables to the control unit and data recording unit and turn on both units.

4.4.2 _____ SC: Verify the instrument settings such as trace interval, time window and sampling frequency.

4.4.3 _____ SC: Conduct test profiles.

4.4.4 _____ SC: Set up a project and record the location of the profiles in a field book.

4.4.5 _____ SC: Collect data along profiles as required.

4.5 _____ SC: **Borehole GPR with The MALA GeoScience RAMAC/GPR**. This section (section 4.5) outlines steps involved in the borehole GPR portion of the work. The MALA GeoScience RAMAC/GPR Borehole GPR system consists of a transmitting and a receiving antenna with internal batteries, a Kevlar reinforced fiber optic cable, a control unit, an encoder wheel and a laptop computer. The system works similar to the surface GPR system. However, during operation the borehole antennas are lowered into boreholes. The following steps are taken to set up and run the instrument:

4.5.1 _____ SC: Turn on the transmitter by connecting the bottom plug.

4.5.2 _____ SC: Connect the fiber optic cable between the transmitter and receiver.

4.5.3 _____ SC: Attach the fiberglass spacer between the transmitter and receiver.

4.5.4 _____ SC: Connect the Kevlar reinforced fiber optic cable to the receiver. This will turn on the receiver.

4.5.5 _____ SC: Connect the fiber optic cables to the control unit. Turn the control unit on. All three lights on the control unit should be blinking.

4.5.6 _____ SC: Start the data collection software on the laptop (Groundvision). Conduct a test to ensure that the transmitter and receiver are operating normally.

4.5.7 _____ SC: Center a tripod on the well and attach the encoder wheel to the top of the tripod.

4.5.8 _____ SC: Lower the antenna assembly into the borehole.

4.5.9 _____ SC: Place the Kevlar reinforced cable over the encoder wheel.

4.5.10 _____ SC: Set the top of the antenna at the reference point (this is typically the ground surface or the top of casing. Communicate with the client).

4.5.11 _____ SC: Collect data going down into the well. Note the maximum depth reached and compare with actual total depth.

4.5.12 _____ SC: Collect data going back up as well. Verify that the variation in profile lengths is acceptable (typically less than 12 inches).

4.5.13 _____ SC: Decon instrument between each well using Liquinox and a dual contained 5 gallon bucket.

4.5.14 _____ Repeat steps 4.5.7 through 4.5.13 to perform this task at additional wells.

4.5.15 _____ SC: Place decon water in 55 gallon drum labeled “Purge Water” located in the Conex box.

4.5.16 _____ SC: When finished for the day, place all tools and equipment in the east side of building 1.

5. COMPLETION

5.1 _____ OM: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- DOP-FT-006 “”Cleaning and Decontaminating Equipment”
- DOP-FT-010 “Subcontractor Access”
- Contingency Plan

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
ENVIRONMENTAL	X	SAFETY	X
ENGINEERING	X		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	10/02/09	All	New Procedure

RESPONSIBLE PERSONNEL	
AT:	ARCADIS Technician
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) outlines the steps to be followed to abandon wells.

1.2 Scope and Applicability

This procedure applies to the abandonment of any type of well (including private, monitoring and extraction wells) associated with the Lockheed Martin Tallevast Site in Tallevast, Florida.

1.3 Equipment

- Portland Cement type 2
- Tremie pipe
- Inside PVC cutting tool
- Concrete mixing tub
- Funnel
- Plastic garbage bag

The following are items that are needed to containerize groundwater:

- PVC coupler
- 3’ PVC pipe
- 1’ PVC pipe
- PVC tee
- Two 5-gallon buckets with lids
- Secondary containment bins
- Plastic sheeting
- 55-gallon drum or large poly tank

2. PRECAUTIONS AND LIMITATIONS

Work must be stopped if lightning is seen or thunder heard. Work may not be resumed until at least thirty minutes have passed since most recent sight/ sound of lightning/ thunder.

3. PREREQUISITES

3.1 **Planning and Coordination**

3.1.1 _____ AT: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

4. WELL ABANDONMENT

4.1 _____ SC: If needed, cut the top of casing as level as possible. Note: dry fit the PVC for the next four steps.

4.2 _____ SC: Attach PVC coupler to top of casing.

4.3 _____ SC: Attach stick-up (approximately 3' of PVC pipe)

4.4 _____ SC: Attach PVC tee as shown in photo.

4.5 _____ SC: Attach another 1' of PVC stick up pipe as shown in photo. *The assembly shown in the photo and described in the first five steps will allow for capture of the groundwater that may be displaced by the Portland cement.*

4.6 _____ SC: Lay down plastic sheeting over the well to be abandoned. Cut out small hole to expose stick-up assembly. Secure edges of sheeting.

4.7 _____ SC: Mix Portland cement. Use the following table to determine groundwater volume and volume of cement needed.

1'' well	0.04 gallons per foot
1.25'' well	0.06 gallons per foot
2'' well	0.16 gallons per foot
3'' well	0.37 gallons per foot
4'' well	0.65 gallons per foot

4.8 _____ SC: Insert tremie pipe into the top of the stick-up assembly.

4.9 _____ SC: Add cement to tremie pipe slowly so that the displaced groundwater can be contained.

4.10 _____ SC: The cement should displace the groundwater in the well, resulting in groundwater exiting the PVC tee into the bucket.

4.11 _____ SC: When the bucket is approximately 75% full, put the lid on the bucket and carefully transfer it to the 55 gallon drum. Label drum with a non hazardous waste label.

4.12 _____ SC: Keep filling the funnel with cement until cement exits the PVC tee fitting.

4.13 _____ SC: Transfer any groundwater that may have spilled in the dual containment bin into the 55 gallon drum.

4.14 _____ SC: Place any used PPE and the plastic sheeting in a plastic garbage bag for later disposal.

4.15 _____ SC: Ensure that 55 gallon drum is properly secured on truck before transport.

4.16 _____ SC: Remove PVC tee assembly from well.

4.17 _____ SC: Allow cement to dry, then cut top of casing to one foot below grade.


PORTLAND

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	01/26/10	All	New DOP

RESPONSIBLE PERSONNEL	
AT:	Arcadis Technician
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for the management of soil waste.

1.2 Scope and Applicability

This DOP applies to soil waste generated as a result of work associated with the Lockheed Martin Tallevast site in Tallevast, Florida.

2. EQUIPMENT REQUIRED

2.1 Tools and Equipment

- PPE: safety boots, safety glasses or goggles, traffic vest, and any task specific equipment (such as leather work gloves), as needed
- Soil drum(s)
- Plastic sheeting, if applicable

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SC: Communicate with appropriate Arcadis staff.

3.1.2 _____ AT: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

3.2 Planning and Coordination

3.2.1 _____ AT: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event; refer to “Hurricane Preparation” in the Contingency Plan.

B. A flooding event; refer to “Flood Preparation” in the Contingency Plan.

4. STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SC _____

4.1 _____ SC/AT: When soil waste is generated as a result of sampling, drilling, or other activities, it must not be placed directly on the ground surface. As the soil is generated, place it either onto sheeting whose corners have been secured or into an appropriate container, such as a soil drum.

4.2 _____ SC/AT: While work continues, the soil may remain accessible on the sheeting or in the container until work is completed. Often, soil is examined for geological logging or is used as backfill. When there is no longer a need to keep the soil accessible, and when it is no longer being accumulated, it must be properly stored.

4.3 _____ SC/AT: Ensure that all workers handing soil use appropriate PPE.

4.4 _____ SC/AT: Soil drums must be in good condition (free of dents, rust, or other apparent damage).

4.5 _____ SC/AT: Soil drums must be labeled with correctly completed Non-Hazardous Waste labels and stored appropriately until they are removed by an approved waste transportation company, such as SWS.

4.6 _____ SC/AT: Follow DOP-FT-003 “Trash Procedures” to dispose of used PPE, sheeting and other waste generated.

5. COMPLETION

5.1 _____ AT: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- DOP-FT-003 “Trash Procedures”
- Contingency Plan

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	**REVISION**	**DISCIPLINE**	**REVISION**
OPERATIONS		SAFETY	
ENGINEERING		QUALITY	
TRAINING		EMERGENCY PREPAREDNESS	
ENVIRONMENTAL			

CHANGE REQUEST REVISION LOG

REV.	DATE	AFFECTED PAGES	REVISION DESCRIPTION
0	1/28/10	ALL	NEW PROCEDURE

RESPONSIBLE PERSONNEL	
FT:	FIELD TECHNICIAN
SO:	SHIFT OPERATOR
OM:	OPERATIONS MANAGER

1. INTRODUCTION

This *Detailed Operating Procedure* (DOP) provides guidance for making entries required in a field log book to document environmental investigations.

1.1 Scope and Applicability

This DOP applies to field log books maintained for investigations at the Lockheed Martin Treatment Facility and within the surrounding community in Tallevast, Florida.

2. PLANNING AND COORDINATION

Prior to visiting well locations off site, the activity must have an approved Tallevast Work Permit and must be verified on the weekly schedule.

3. EQUIPMENT (located in the Conex box)

- Field Log Book. Many scopes of work for this facility have a dedicated field log book, so ensure that the correct field log book is selected for the proposed activity.

- Ball point (medium point) pen with blue or black ink (black preferred). A fine point Sharpie pen may be used if the ink does not bleed through the page and become visible on the back side of the page. If weather conditions prevent the use of a pen, indicate so in the log and use a “rite in the rain” pen or equivalent.

- Zip-lock baggie or other weather-proof container to protect the field log book from the elements.

Procedure Started: Time _____ Date: _____ _____

SO Operator _____

4. QUALITY ASSURANCE

Be mindful that the field log book may be presented in court. All entries should be legible and should accurately represent the field technician’s observations in the field (as discussed above). Do not leave the field log book exposed to the elements or other conditions that might moisten the pages and smear/dissolve the entries. When not in the field, the log book should be stored in a location that is easily accessible to field crews.

5. STEP BY STEP INSTRUCTIONS

5.1 _____ FT: Print legibly. Do not use cursive writing.

5.2 _____ FT: The name of the project, project number, and project location should be written in indelible ink on the outside of the field log book. If applicable, the description on the outside of the field log book should include the scope of work to which the field log book is dedicated (for example, "Wetlands Monitoring Field Book" or "LTWLM Field Book").

5.3 _____ FT: On the inside of the front cover, write "If Found, Please Return to ARCADIS" and include the appropriate address and phone number, the name of the person to which the book is assigned, and the name of the project manager.

5.4 _____ FT: Reserve the first page of the book for a Table of Contents.

5.5 _____ FT: Reserve the last five pages of the book for important contact information, notes, reminders, etc.

5.6 _____ FT: Number each page of the field log book progressively as information is recorded in the book.

5.7 _____ FT: On each day of field work, the following should be recorded in the field log book as applicable:

a. Project name

b. Date and time arrived

c. Work site location

d. Names of people on site related to the project including employees, visitors, subcontractor employees, agency personnel, client representative, etc.

e. Briefly describe the work to be performed, and list the major or pertinent equipment on site.

f. Indicate the health and safety (H&S) level to be used, if greater than Level D. See Arcadis Health and Safety Plan (HASP).

g. Record instrument calibrations and checks.

h. Record time and general content of H&S briefing.

i. Describe the weather conditions including temperature, precipitation, and wind speed and direction.

j. List periodic time entries in the far left hand column of each page.

k. Minimize unused space on each page. If significant amounts of unused space are left on a page and will not be used, the field technician should strike through the space and initial and date the strikethrough to indicate that the excess space was intentionally left blank.

5.8 _____ FT: If H&S monitoring is performed, record the time and results of initial and follow-up monitoring. Note factual observations including collection of quality assurance/quality control (QA/QC) samples, delays, well damage, accidents, work plan deviations, instrument problems, and problem resolutions.

5.9 _____ FT: Describe work performed and how documented such as photographs, sample core logs, water sampling logs, etc.

5.10 _____ FT: Describe basis for field decisions including pertinent conversations with visitors, regulators, or project personnel. Telephone conversations (such as calls to the project manager or client) used as the basis for field decisions or to inform other project staff of problems or important findings should also be documented.

5.11 _____ FT: Note final instrument calibrations and checks.

5.12 _____ FT: Sign the log book at the end of each day at a minimum. Draw a line to the end of the page to indicate no further entries on that page. Sign the bottom of each page if possible.

5.13 _____ FT: If an entry to the log book is changed, strike out the deleted text or item with a single line such that the entry remains legible, and initial and date the change. Such changes should only be made by the same person who made the initial entry.

5.14 _____ FT: Field log book entries must be made in the field at the site, not at a later time at a different location. Under NO circumstances should the field log book be filled out prior to the field work and measurement values and times entered later. Entries should be sequential and should represent the observations and measurements at the time they were obtained. Supplemental entries to the field log book may be made at a later date, but should be on a subsequent page marked with the date and time of the supplemental entry. The supplemental

entry must be clearly identified as such, and the entry must be signed and dated as described in this DOP.

5.15 _____ FT: Problems noted in the field log book must be brought to the attention of the project manager and task manager in a timely fashion. Problems may be reported in person, on the telephone, or in a written daily log form. If daily logs are prepared and you will not be able to personally give the daily log to the project manager, send the daily log via FAX or scan and send via email to the project manager and task manager (or pertinent team member).

5.16 _____ FT: Each page of the field log book should be scanned for electronic/digital archiving at periodic intervals. This will ensure that copies of the field notes are available in the event the field log book is lost or damaged, and that field data can be easily disseminated to others without the risk of physically sending the field log book. Field log books that are full should be archived with the project files and readily retrievable. Note the volume of each subsequent field book for the same project.

6. COMPLETION

6.1 _____ SO: Verification of completion. File in Log Book.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	04/04/10	All	New DOP

RESPONSIBLE PERSONNEL	
AT	Arcadis Technician
AO	Arcadis Oversight
SC	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for developing or redeveloping wells. Note that extraction wells will generally be redeveloped according to DOP-029, Extraction Well Cleaning. DOP-FT-017, Well Installation using Mud Rotary or Sonic Drilling, includes instructions for developing a well upon its installation.

1.2 Scope and Applicability

This DOP applies to wells associated with the Lockheed Martin Tallevast site in Tallevast, Florida.

2. EQUIPMENT REQUIRED

2.1 Tools and Equipment

- Spill containment kit
- Plastic sheeting or flat, impermeable tarp(s)
- Proper personal protective equipment (PPE): steel-toed boots, nitrile (or other chemical resistant) gloves, safety glasses or goggles, traffic vest (as needed), hearing protection (if applicable), work gloves (if applicable)
- Designated bucket or trash bag for temporary storage of used PPE and anything else that has contacted groundwater
- First aid kit
- Fire extinguisher
- A pump, such as Grundfos SS pump, centrifugal pump, or other.
- A power source for the pump, if applicable. Many submersible pumps require 12 volt batteries (vehicle batteries can be used).
- Sufficient tubing
- Water level meter (long enough to measure total depth of well)
- A turbidity meter will often be required
- A YSI or other meter(s) will often be required.

- Containment for Groundwater, such as:

  Option 1:

  Dual containment tank (double walled Baker Tank or similar)

  Option 2:

  55-gallon drum(s)

  - Bung wrench
  - Funnel
  - Drum containment pallet(s) or tray(s)
  - Tarp(s) to cover drum(s) and pallet(s) or tray(s)
  - Drum dolly, if needed
  - Ramp to ascend and descend containment pallet, if needed
  - Drum labels (non-hazardous) and permanent marker

  Option 3:

  - Poly totes
  - Sheeting-lined roll off (secondary containment for totes)

Note: other containment methods may be used. The only requirement is that any water that is- or may be impacted must be in dual containment.

3. PREREQUISITES

3.1 Pre-Mobilization Preparations

3.1.1 _____ AO: Several types of pumps are available. Each has its own limitations and abilities. Total well depth and approximate quantity of silt are important factors in choosing a pump. Submersible pumps may be damaged by pumping water that contains large quantities of solids. Whale pumps and centrifugal pumps may be good options in many cases. The equipment supplier will be a good source of information about the pump best suited to a given task.

3.1.2 _____ AO: Determine what the development criteria will be. The criteria may be just pumping until the water clears up (visually) or until significant sediment has been removed (according to total depth measurement). On the other hand, the criteria may involve stabilization of several parameters. In some cases, wells will be developed according to U.S Environmental Protection Agency (EPA) guidance, as follows:

pH ±0.1 standard units (SU)
specific conductivity ±3%
oxidation reduction potential (ORP) ±10 millivolt (mV)
turbidity <10 nephelometric turbidity units (NTUs)
DO ±0.3 milligrams per liter (mg/L)
for three consecutive readings no less than one minute apart.

If the well purges dry, development will continue once the well has recharged. Development will be complete once the turbidity is less than 10 NTU.

3.1.3 _____ AO: Determine the method by which the development water will be discharged or contained. In some cases, discharge to ground may be permitted. In some cases, development water may be added to the treatment system (IRA System) influent. This must be discussed with the operations manager. In many cases, some or all of the development water will be contained in a tank or in drums. Drums must be on secondary containment. Secondary containment specifics will depend on the work area setting. Options include, but are not limited to: drum trays in a vehicle, drum pallets in a Conex box, etc.

3.2 Field Preparations

3.2.1 _____ SC: This task may be performed by Arcadis staff or by subcontractors. If task is to be performed by subcontractors, they will need to communicate with appropriate Arcadis staff before beginning work.

3.2.2 _____ SC/ AT: If applicable, obtain and review DOP-FT-004 “Transportation and Storage of Groundwater - Large Volume” or DOP-FT- 005 “Transportation and Storage of Groundwater - Small Volume,” as appropriate.

3.2.3 _____ SC/ AT: Obtain and review DOP-FT-003 “Trash Procedures”

3.2.4 _____ AT: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure**.**

3.3 Planning and Coordination

3.3.1 _____ AT/ AO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event; refer to “Hurricane Preparation” in the Contingency Plan.

B. A flooding event; refer to “Flood Preparation” in the Contingency Plan.

4. STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SC/ AT: _____

4.1 _____ SC: If necessary, use any or all of the following items to protect workers from traffic hazards and to keep unauthorized people from entering work zone: cones, caution tape, barricades, and vehicle(s).

4.2 _____ AO: Use PID to monitor the air during well development. Record the PID readings in field notebook.

4.3 _____ SC/AT: Lay sheeting or an impermeable tarp over the area around the well. Note that sheeting can sometimes cause a slippery work surface.

4.4 _____ SC/AT: Measure and record initial depth to water.

4.5 _____ SC/AT: Measure and record depth to bottom (may be called depth to bottom, DTB, or total depth, TD). If there is a survey mark, measure from that point on top of casing (TOC). If no survey mark is visible, measure from north.

4.6 _____ SC/AT: Set up area where water is to be discharged (e.g. stage drum(s) on secondary containment nearby).

4.7 _____ SC/AT: Use an appropriate pump. Attach tubing per pump requirements.

4.8 _____ SC/AT: Slowly lower the tubing (or the pump if using a submersible pump) to the bottom of the well, avoiding disturbance of the settled material.

4.9 _____ SC/AT: The discharge tubing must be long enough that it can be secured in place at desired discharge location. In many cases, the tubing will be secured to a staged tank or 55-gallon drum.

4.10 _____ SC/AT: If using a submersible pump, connect motor leads to a 12-volt power supply (a vehicle battery may be used, as appropriate). In all cases, operate the pump in accordance with the manufacturer's recommendations for pump operation.

4.11 _____ SC/AT: Begin pumping. Record time purging is initiated. The pump discharge rate can vary significantly but may be around 3 gallons per minute.

4.12 _____ SC/AT: As pumping begins, verify that all development water is being discharged into desired location. Avoid filling any drum more than 80%.

4.13 _____ SC/AT: Visually monitor the discharge water for change in water clarity; record observations.

4.14 _____ SC/ AT: Development requirements vary. Follow specific development requirements for each well; they may be given in the T&FR or scope of work or in discussions with a project or task manage.

4.15 _____ SC/AT: Notes taken in logbook must include any parameter readings taken including pH, turbidity, etc. If parameter stabilization is required, ensure that the last three consecutive readings fall within acceptable ranges.

4.16 _____ SC/AT: Discontinue pumping when all development criteria have been met. Record time purging is ended.

4.17 _____ SC/AT: Measure and record final depth to water.

4.18 _____ SC/AT: Measure and record final total depth of well. Final total depth will be measured from same point as initial total depth (i.e., survey mark or north).

4.19 _____ SC/AT: Record approximate quantity of water removed from well.

4.20 _____ SC/AT: Clean and decontaminate the equipment used in accordance with DOP-FT-006 “Cleaning and Decontaminating Equipment” and store appropriately.

4.21 _____ SC/AT: Groundwater collected shall be managed according to DOP-FT-004 “Transportation and Storage of Groundwater - Large Volume” or DOP-FT- 005 “Transportation and Storage of Groundwater - Small Volume,” as appropriate.

5. COMPLETION

5.1 _____ AT/ AO: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- Contingency Plan
- DOP-FT-003 Trash Procedures
- DOP-FT-004 Transportation and Storage of Groundwater - Large Volume
- DOP-FT-005 Transportation and Storage of Groundwater - Small Volume
- DOP-FT-006 Cleaning and Decontaminating Equipment

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	01/26/10	All	New DOP

RESPONSIBLE PERSONNEL	
AO:	Arcadis Oversight
AT:	Arcadis Technician
SC:	Subcontractor

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for installing wells using a sonic or a mud rotary drill rig. It is meant to accompany any relevant Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs) and health and safety rules.

1.2 Scope and Applicability

This DOP is to be used by Arcadis when installing wells associated with the Lockheed Martin Tallevast Site in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

Groundwater from the subsurface may be contaminated with volatile organic compounds. Therefore, it is extremely important that all personnel use care to avoid contact with groundwater. There are several hazards associated with drilling operations. Steel-toed boots and safety glasses must be worn at all times. Hard hats are required whenever there is an overhead hazard. When a drill rig's mast is up, hard hats are required around the rig within a radius equal to the mast length. Hearing protection is required during drilling. Members of the drilling team at some times need chemical resistant gloves (such as nitrile) and at some times need work gloves. Arcadis employees will also need chemical resistant gloves if they will be handling groundwater, soil, or anything that has contacted the subsurface.

3. PREREQUISITES

3.1 Pre-mobilization Preparations

3.1.1 Learn whether FAA permits are required for the area in which drilling will take place. If they will be required, ensure that the field staff has everything needed to adhere to all stipulations of the permit.

3.1.2 Learn whether all other applicable permits will be able to be obtained.

3.1.3 Select a method by which the team will contain and dispose of water and other waste. Options for water waste include drum(s), poly tank(s), and dual-walled tank(s) (e.g. dual walled Baker tank). Options for cuttings, mud, and soil waste include drum(s) and/or a roll-off.

3.1.4 Plan for pathways by which the well location will be accessed. In some cases, plywood may be required to create a temporary roadway or work area floor.

3.1.5 Discuss daily schedule with site supervisor or project manager. Arcadis is not generally permitted to work offsite before 8 am or after 5 pm. Specific schedules may vary. Communicate with the drilling company personnel about the daily and weekly schedules.

3.1.6 Complete Arcadis Utility Locate Procedure.

3.1.7 Ensure that drilling team will have GFCIs for all electrical connections that will be made (e.g. plugging in a jack hammer).

3.2 Field Preparations

3.2.1 SC: Gather all needed equipment, listed in section 3.4 Equipment.

3.2.2 SC: Communicate with Arcadis oversight personnel.

3.2.3 AO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure

3.2.4 AO: Gather all needed material, such as, field note book, PID, personal PPE, camera.

3.3 Planning and Coordination

3.3.1 AO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event; refer to “Hurricane Preparation” in the Contingency Plan.

B. A flooding event; refer to “Flood Preparation” in the Contingency Plan.

3.4 Equipment

- Containment for Groundwater, such as:

Option 1:

Dual containment tank (similar to double walled Baker Tank)

Option 2:

55-gallon drum(s)

- Bung wrench
- Funnel

- Drum containment pallet(s) or tray(s)
- Tarp(s) to cover drum(s) and pallet(s) or tray(s)
- Drum dolly, if needed
- Ramp to ascend and descend containment pallet, if needed
- Drum labels (non-hazardous)

Option 3:

- Poly totes
- Sheeting-lined roll off (secondary containment for totes)

Note: other containment methods may be used. The only requirement is that any water that is- or may be impacted must be in dual containment.

- Spill containment kit
- Plastic sheeting or flat, impermeable tarp(s)
- Proper personal protective equipment (PPE): steel-toed boots, nitrile (or other chemical resistant) gloves, safety glasses or goggles, traffic vest, hearing protection, work gloves, hard hats
- Designated bucket or trash bag for temporary storage of used PPE and anything else that has contacted groundwater
- First aid kit
- Fire extinguisher
- Orange and white checkered flag, if necessary (for use near airport)
- The following items are needed for well development: a pump (such as Grundfos SS pump), sufficient tubing (Grundfos SS pump uses 3/8” ID tubing), and a water level meter. A turbidity meter and other meters may be required. The pump requires a 12 volt battery; a vehicle battery can be used.

4. STEP-BY-STEP INSTRUCTIONS FOR MUD ROTARY DRILLING

Procedure Started: Time _____ Date: _____ AO: _____

4.1 _____ AO: Use PID to continually screen air around and in the work zone. Record PID readings in field notebook.

4.2 _____ SC: If necessary, use any or all of the following items to protect workers from traffic hazards and to keep unauthorized people from entering work zone: cones, caution tape, barricades, and vehicle(s).

4.3 _____ SC: Construct washing, rinsing, decontamination area.

4.4 _____ AO: Examine proposed well location in relation to buildings and all visible indications of utility lines. Assess viability and safety of installing well at proposed location.

4.5 _____ SC: If applicable, break concrete or asphalt surface at location where well installation is planned.

4.6 _____ SC/AO: Using hand auger and/ or post hole digger, conduct borehole clearance to 5 feet. Observe soil for signs of previous digging or backfill that might indicate the installation of underground utilities. Borehole diameter should be 120% of the outer diameter of the augers that will be used with the rig (i.e. 6” OD augers necessitate a 7.2” diameter clearance borehole).

4.7 _____ SC: If applicable, lay plywood on the ground to create a roadway and/ or floor for drilling area.

4.8 _____ SC: If applicable, attach flagging and lighting to mast per FAA permit.

4.9 _____ SC: Move drill rig to well location.

4.10 _____ SC: Place a fire extinguisher and a first aid kit in a location that is convenient to the work area and is in the shade. Fire extinguisher must not be in direct sunlight.

4.11 _____ SC: Plan an area in which to stage sand, grout, and all other equipment and supplies. Note that anything that will contact any part of the subsurface, directly or indirectly, must be kept clean. This includes the screen, riser, sand, bentonite, etc., that are part of well installation as well as any tools that contact these items or contact the subsurface. Under no circumstances can an item be in contact with asphalt or kept in an area where contact with contaminating substances (including gasoline) is

possible, and then be in contact with the subsurface, directly or indirectly.

4.12 _____ SC: Plan any other necessary staging areas.

4.13 _____ SC: Make any necessary adjustments in rig position and level rig.

4.14 _____ SC: Transport any support vehicles or other necessary items to the work area.

4.15 _____ SC: To provide for containment and spill prevention, complete the following steps:

4.15.1 _____ SC: If drums will be used, lay sheeting or an impermeable tarp over ground surface or floor of a vehicle (such as a truck or trailer). Then stage drum containment pallet(s) or tray(s) on sheeting or tarp, then place empty drums on containment. Before beginning to fill a drum, label the drum with a correctly completed Non-Hazardous label.

4.15.2 _____ SC: Any containers that hold liquid, including mud tub, must be over sheeting, tarp or berm.

4.15.3 _____ SC/AT: Ensure that a spill kit is located near the work area.

4.16 _____ SC: Mix drilling mud by combining bentonite with water in mud tub or designated drum.

4.17 _____ SC: Set up pumping system for delivery of drilling mud into the drill stem. Secure the intake hose.

Note: gasoline must not be added to pump while at the well location.

4.18 _____ SC: Connect drill stem, bit or auger(s), and lower to depth of borehole.

4.19 _____ SC: As drilling continues, the top of the topmost auger or rod will approach ground surface. When this happens, additional augers and/ or lengths of rod will be added. A support (sometimes integral to the rig, sometimes separate, as in the case of a shoe), must always be in place before the top of the auger/ rod is disconnected from the drill rig; this ensures that the auger or rod will not fall. Complete this step as many times as necessary until reaching desired depth.

4.20 _____ SC: Trip out; remove all rods from hole.

4.21 _____ SC: Install well. Well point, screen, riser, etc. will be consistent with plans and/ or diagrams for that well.

4.22 _____ SC: Cap top of well.

4.23 _____ SC: Add sand in borehole around well according to plan. Measure depth to sand. Augers will be removed from bore hole during this step.

4.24 _____ SC: Add bentonite in borehole around well according to plan. Measure depth to bentonite. Augers will be removed from bore hole during this step.

4.25 _____ SC: Mix cement (aka grout) and add to borehole around well according to plan. The remaining augers will be removed from bore hole during this step.

4.26 _____ SC: Allow cement to dry. Top off as necessary.

4.27 _____ SC: Completion will vary but will often be flushmount or stick-up type usually surrounded by a 2' x 2' concrete pad that is 4" thick. Extraction wells generally have a different vault style. Make additional accommodations (such as stand for pump and/ or sample port) as needed.

4.28 _____ SC/AT: Develop well following these steps:

4.28.1 _____ AO: Use PID to monitor the air during well development.

4.28.2 _____ SC/AT: Lay sheeting or an impermeable tarp over the area around the well. Note that some types of sheeting can create a slippery work surface.

4.28.3 _____ SC/AT: Measure and record initial depth to water and total depth of well.

4.28.4 _____ SC/AT: Set up area where water is to be discharged (e.g. stage drum(s) on secondary containment nearby).

4.28.5 _____ SC/AT: Various different types of pumps are acceptable. Often, a submersible pump, such as a Grundfos SS pump, will be used. Directions here are for use of such a pump.

4.28.6 _____ SC/AT: Connect one end of the discharge tubing to the pump discharge barb.

4.28.7 _____ SC/AT: Slowly lower the pump to the bottom of the well. Feed the discharge tubing as the pump is lowered.

4.28.8 _____ SC/AT: The discharge tubing must be long enough that it can be secured in place at desired discharge location. In many cases, the tubing will be secured to a staged tank or 55-gallon drum.

4.28.9 _____ SC/AT: Connect motor leads to a 12-volt power supply (a vehicle battery may be used, as appropriate) and operate the pump in accordance with the manufacturer's recommendations for pump operation.

4.28.10 _____ SC/AT: Begin pumping. Record time purging is initiated. The pump discharge can vary significantly but may be around 3 gallons per minute.

4.28.11 _____ SC/AT: As pumping begins, verify that all development water is being discharged into desired location. Avoid filling any drum more than 80%.

4.28.12 _____ SC/AT: Surge the well screen. This will agitate the sand pack and remove any fines deposited during the installation of the well.

4.28.13 _____ SC/AT: Visually monitor the discharge water for change in water clarity; record observations.

4.28.14 _____ SC/AT: Development requirements may vary. Follow the specific development requirements for each well; they may be given in the T&FR or scope of work or in discussions with a project or task manager.

4.28.15 _____ SC/AT: Discontinue pumping when all development criteria have been met. Record time purging is ended.

4.28.16 _____ SC/AT: Measure and record final depth to water and total well depth.

4.28.17 _____ SC/AT: Record approximate quantity of water removed from well.

4.28.18 _____ SC/AT: Clean and decontaminate the equipment used in accordance with DOP-FT-006 "Cleaning and Decontaminating Equipment" and store appropriately.

4.28.19 _____ SC/AT: Groundwater collected shall be managed according to DOP-FT-004 "Transportation and Storage of Groundwater - Large Volume" or DOP-FT- 005 "Transportation and Storage of Groundwater - Small Volume," as appropriate.

4.29 _____ SC: Ensure that all augers and other tools that contact groundwater or the subsurface have been washed.

4.30 _____ SC: Disassemble washing, rinsing, decontamination area.

4.31 _____ SC: Transfer all augers, tools, and other materials that belong to drilling company from work area to drilling company vehicles.

4.32 _____ SC/AO: Ensure that everything that was taken to the work site for this project is removed from the site.

4.33 _____ SC/AO: Upon completion of work and demobilization activities, but before leaving work site, look over the area. Check to see whether there were any unintended impacts. If there were, discuss with Arcadis PM and proceed as directed. Optionally, photograph area.

4.34 _____ AO: Make notes to help future samplers locate the new well.

4.35 _____ AO: Report to Arcadis PM that the well installation work has been completed.

4.36 _____ AO: Verification of completion.

Signature _____ Date _____

5. STEP-BY-STEP INSTRUCTIONS FOR SONIC DRILLING

Procedure Started: Time _____ Date: _____ AO: _____

5.1 _____ AO: Use PID to continually screen air around and in the work zone. Record PID readings in field notebook.

5.2 _____ SC: If necessary, use any or all of the following items to protect workers from traffic hazards and to keep unauthorized people from entering work zone: cones, caution tape, barricades, and vehicle(s).

5.3 _____ SC: Construct washing, rinsing, decontamination area.

5.4 _____ AO: Examine proposed well location in relation to buildings and all visible indications of utility lines. Assess viability and safety of installing well at proposed location.

5.5 _____ SC: If applicable, break concrete or asphalt surface at location where well installation is planned.

5.6 _____ SC/AO: Using hand auger and/ or post hole digger, conduct borehole clearance to 5 feet. Observe soil for signs of previous digging or backfill that might indicate the installation of underground utilities. Borehole diameter must be 120% of the outer diameter of the augers that will be used with the rig (i.e. 6” OD augers necessitate a 7.2” diameter clearance borehole).

5.7 _____ SC: If applicable, lay plywood on the ground to create a roadway and/ or floor for drilling area.

5.8 _____ SC: If applicable, attach flagging and lighting to mast per FAA permit.

5.9 _____ SC: Move drill rig to well location.

5.10 _____ SC: Place a fire extinguisher and a first aid kit in a location that is convenient to the work area and is in the shade. Fire extinguisher must not be in direct sunlight.

5.11 _____ SC: Plan an area in which to stage sand, grout, and all other equipment and supplies. Note that anything that will contact any part of the subsurface, directly or indirectly, must be kept clean. This includes screen, riser, sand, bentonite, etc., that are part of well installation as well as any tools that contact these items or contact the subsurface. Under no circumstances can an item be in contact with asphalt or kept in an area where contact with contaminating substances (including gasoline) is

possible, and then be in contact with the subsurface, directly or indirectly.

5.12 _____ SC: Plan any other necessary staging areas.

5.13 _____ SC: Make any necessary adjustments in rig position and level rig.

5.14 _____ SC: Transport any support vehicles or other necessary items to the work area.

5.15 _____ SC: To provide for containment and spill prevention, complete the following steps:

5.15.1 _____ SC: If drums will be used, lay sheeting or an impermeable tarp over ground surface or floor of a vehicle (such as a truck or trailer). Then stage drum containment pallet(s) or tray(s) on sheeting or tarp, then place empty drums on containment. Before beginning to fill a drum, label the drum with a correctly completed Non-Hazardous label.

5.15.2 _____ SC: Any containers that hold liquid must be over sheeting, tarp, or berm.

5.15.3 _____ SC/ AT: Ensure that a spill kit is located near the work area.

5.16 _____ SC: Attach outer casing to drill dead. Advance outer casing.

5.17 _____ SC: Attach inner casing with sample rod to drill dead. Advance casing.

5.18 _____ SC: As drilling continues, the top of the topmost rod/casing will approach ground surface. When this happens, additional lengths of rod/casing will be added. Support grips must always be in place before the top of the rod/casing is disconnected from the drill rig; this ensures that the rod/casing will not fall. Complete this step as many times as necessary until reaching desired depth.

5.19 _____ SC: To collect soil sample from sonic rig, driller will trip out inner casing and sample rod. The sample rod is then vibrated. The soil that is extruded from the rod is captured in poly bags that can be cut open by the AO to log the lithology and collect analytical soil samples if necessary.

5.20 _____ SC: Once the drill casing (outer and inner) has reached desired depth the inner casing is removed.

5.21 _____ SC: Install well. Well point, screen, riser, etc. will be consistent with plans and/ or diagrams for that well.

5.22 _____ SC: Cap top of well.

5.23 _____ SC: Add sand in borehole around well according to plan. Measure depth to sand. Outer casing will be removed during this step.

5.24 _____ SC: Add bentonite in borehole around well according to plan. Measure depth to bentonite. Outer casing will be removed during this step.

5.25 _____ SC: Mix cement (aka grout) and add to borehole around well according to plan. Remaining outer casing will be removed during this step.

5.26 _____ SC: Allow cement to dry. Top off as necessary.

5.27 _____ SC: Completion will vary but will often be flushmount or stick-up type usually surrounded by a 2' x 2' concrete pad that is 4" thick. Extraction wells generally have a different vault style. Make additional accommodations (such as stand for pump and/ or sample port) as needed.

5.28 _____ SC/ AT: Develop well following these steps:

5.28.1 _____ AO: Use PID to monitor the air during well development.

5.28.2 _____ SC/AT: Lay sheeting or an impermeable tarp over the area around the well. Note that some types of sheeting can create a slippery work surface.

5.28.3 _____ SC/AT: Measure and record initial depth to water and total depth of well.

5.28.4 _____ SC/AT: Set up area where water is to be discharged (e.g. stage drum(s) on secondary containment nearby).

5.28.5 _____ SC/AT: Various different types of pumps are acceptable. Often, a submersible pump, such as a Grundfos SS pump, will be used. Directions here are for use of such a pump.

5.28.6 _____ SC/AT: Connect one end of the discharge tubing to the pump discharge barb.

5.28.7 _____ SC/AT: Slowly lower the pump to the bottom of the well. Feed the discharge tubing as the pump is lowered.

5.28.8 _____ SC/AT: The discharge tubing must be long enough that it can be secured in place at desired discharge location. In many cases, the tubing will be secured to a staged tank or 55-gallon drum.

5.28.9 _____ SC/AT: Connect motor leads to a 12-volt power supply (a vehicle battery may be used, as appropriate) and operate the pump in accordance with the manufacturer's recommendations for pump operation.

5.28.10 _____ SC/AT: Begin pumping. Record time purging is initiated. The pump discharge can vary significantly but may be around 3 gallons per minute.

5.28.11 _____ SC/AT: As pumping begins, verify that all development water is being discharged into desired location. Avoid filling any drum more than 80%.

5.28.12 _____ SC/AT: Surge the well screen. This will agitate the sand pack and remove any fines deposited during the installation of the well.

5.28.13 _____ SC/AT: Visually monitor the discharge water for change in water clarity; record observations.

5.28.14 _____ SC/AT: Development requirements may vary. Follow the specific development requirements for each well; they may be given in the T&FR or scope of work or in discussions with a project or task manager.

5.28.15 _____ SC/AT: Discontinue pumping when all development criteria have been met. Record time purging is ended.

5.28.16 _____ SC/AT: Measure and record final depth to water.

5.28.17 _____ SC/AT: Record approximate quantity of water removed from well.

5.28.18 _____ SC/AT: Clean and decontaminate the equipment used in accordance with DOP-FT-006 "Cleaning and Decontaminating Equipment" and store appropriately.

5.28.19 _____ SC/AT: Groundwater collected shall be managed according to DOP-FT-004 "Transportation and Storage of Groundwater - Large Volume" or DOP-FT- 005 "Transportation and Storage of Groundwater - Small Volume," as appropriate.

5.29 _____ SC: Ensure that all rods and other tools that contact groundwater or the subsurface have been washed.

5.30 _____ SC: Disassemble washing, rinsing, decontamination area.

5.31 _____ SC: Transfer all rods, tools, and other materials that belong to drilling company from work area to drilling company vehicles.

5.32 _____ SC/AO: Ensure that everything that was taken to the work site for this project is removed from the site.

5.33 _____ SC/AO: Upon completion of work and demobilization activities, but before leaving work site, look over the area. Check to see whether there were any unintended impacts. If there were, discuss with Arcadis PM and proceed as directed. Optionally, photograph area.

5.34 _____ AO: Make notes to help future samplers locate the new well.

5.35 _____ AO: Report to Arcadis PM that the well installation work has been completed.

5.36 _____ AO: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- Contingency Plan
- DOP-FT-003 Trash Procedures
- DOP-FT-004 Transportation and Storage of Groundwater - Large Volume
- DOP-FT-005 Transportation and Storage of Groundwater - Small Volume
- DOP-FT-006 Cleaning and Decontaminating Equipment

Lockheed Martin Tallevast Treatment System

Tallevast, Florida

Standard Operating Procedures (SOP)

and

Detailed Operating Procedures (DOP)

Index

DOP-016 Extraction Well Pump Pull

DOP-017 Extraction Well Pump Wet End Cleaning

DOP-018 Checking and Replacing Photo-Cat Fuses

DOP-019 Checking and Replacing Photo-Cat Lamps and Ballasts

DOP-020 Deleted

DOP-021 Acid Tank Fill

DOP-022 Caustic Tank Fill

DOP-023 Liquid Phase GAC Change Out and Reconfiguration

DOP-023A Liquid Phase GAC Change Out Alternate

DOP-024 pH Sensor Calibration

DOP-025 Catalyst Cleaning

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DOP-FT-006 Cleaning and Decontaminating Equipment

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DOP-FT-009 Geoprobe Boring and Water Sampling

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DOP-FT-013 Well Abandonment

DOP-FT-014 Management of Soil Waste

DOP-FT-015 Field Log Book Entries

DOP-FT-016 Well Development

DOP-FT-017 Well Installation Using Mud Rotary or Sonic Drilling

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	11/15/08	All	New Procedure
1	04/10/09	8,9,12	Corrections

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Standard Operating Procedure (SOP) provides instructions for verifying that the Tallevast Treatment System is properly configured for routine start up.

1.2 Scope and Applicability

This SOP applies to restarting the Tallevast Treatment System after short-term shutdowns (less than 2 days). It does not apply to treatment system start up after a prolonged shutdown.

2. PRECAUTIONS AND LIMITATIONS

None.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

3.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent a routine treatment system restart. If such issues are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.1.4 _____ SO: Ensure a copy of this procedure is available to provide a check off sheet for recording the actual configuration.

3.2 Planning and Coordination

3.2.1 SO: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

4. SYSTEM CHECKS PRIOR TO ROUTINE TREATMENT SYSTEM STARTUP

Procedure Started: Time _____ Date: _____ SO _____

4.1 _____ SO: Inspect (in flow direction and left to right) influent manifold on southeast wall of Treatment Building to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Ball Valve	BV-139	OPEN		
Ball Valve	BV-140	OPEN		
Pressure Transmitter	PIT-110	Connected & Powered		
Sample Port	SP-110	CLOSED		
Flow Meter	FM-110	Connected & Powered		
Diaphragm Valve	FCV-110	¼ OPEN		
Ball Valve	BV-110	OPEN		
Ball Valve	BV-137	OPEN		
Ball Valve	BV-138	OPEN		
Pressure Transmitter	PIT-109	Connected & Powered		
Sample Port	SP-109	CLOSED		
Flow Meter	FM-109	Connected & Powered		
Diaphragm Valve	FCV-109	¼ OPEN		
Ball Valve	BV-109	OPEN		
Ball Valve	BV-135	OPEN		
Ball Valve	BV-136	OPEN		
Pressure Transmitter	PIT-107	Connected & Powered		
Sample Port	SP-107	CLOSED		
Flow Meter	FM-107	Connected & Powered		
Diaphragm Valve	FCV-107	¼ OPEN		
Ball Valve	BV-107	OPEN		
Ball Valve	BV-133	OPEN		
Ball Valve	BV-134	OPEN		
Pressure Transmitter	PIT-108	Connected & Powered		
Sample Port	SP-108	CLOSED		
Flow Meter	FM-108	Connected & Powered		
Diaphragm Valve	FCV-108	¼ OPEN		
Ball Valve	BV-108	OPEN		
Ball Valve	BV-131	OPEN		
Ball Valve	BV-132	OPEN		
Pressure Transmitter	PIT-106	Connected & Powered		
Sample Port	SP-106	CLOSED		
Flow Meter	FM-106	Connected & Powered		

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Diaphragm Valve	FCV-106	¼ OPEN		
Ball Valve	BV-106	OPEN		
Ball Valve	BV-129	OPEN		
Ball Valve	BV-130	OPEN		
Pressure Transmitter	PIT-105	Connected & Powered		
Sample Port	SP-105	CLOSED		
Flow Meter	FM-105	Connected & Powered		
Diaphragm Valve	FCV-105	¼ OPEN		
Ball Valve	BV-105	OPEN		
Ball Valve	BV-127	OPEN		
Ball Valve	BV-128	OPEN		
Pressure Transmitter	PIT-104	Connected & Powered		
Sample Port	SP-104	CLOSED		
Flow Meter	FM-104	Connected & Powered		
Diaphragm Valve	FCV-104	¼ OPEN		
Ball Valve	BV-104	OPEN		
Ball Valve	BV-125	OPEN		
Ball Valve	BV-126	OPEN		
Pressure Transmitter	PIT-103	Connected & Powered		
Sample Port	SP-103	CLOSED		
Flow Meter	FM-103	Connected & Powered		
Diaphragm Valve	FCV-103	¼ OPEN		
Ball Valve	BV-103	OPEN		
Ball Valve	BV-123	OPEN		
Ball Valve	BV-124	OPEN		
Pressure Transmitter	PIT-101	Connected & Powered		
Sample Port	SP-101	CLOSED		
Flow Meter	FM-101	Connected & Powered		
Diaphragm Valve	FCV-101	¼ OPEN		
Ball Valve	BV-101	OPEN		
Ball Valve	BV-121	OPEN		
Ball Valve	BV-122	OPEN		
Pressure Transmitter	PIT-102	Connected & Powered		
Sample Port	SP-102	CLOSED		
Flow Meter	FM-102	Connected & Powered		
Diaphragm Valve	FCV-102	¼ OPEN		
Ball Valve	BV-102	OPEN		
Ball Valve	BV-141	CLOSED		
Ball Valve	BV-142	OPEN		
Pressure Transmitter	PIT-111	Connected & Powered		
Ball Valve	BV-143	CLOSED		
Ball Valve	BV-111	OPEN		

4.2 _____ SO: Inspect influent tank T-401, associated piping and systems to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Influent Tank	T-401	Level > 30%; < 50% (physical confirmation)		

4.3 _____ SO: Remove the 4-inch threaded plug from flanged fitting located on the northwest corner of the top of the tank.

4.4 _____ SO: Use water level meter to obtain depth to water surface (dtws) within the tank and distance to tank bottom (total depth). Subtract the dtws from the total depth to obtain the depth of the water in the tank (water depth). Dividing water depth by total depth will yield the percentage the tank is full.

4.5 _____ SO: Replace the 4-inch threaded plug.

4.6 _____ SO: Proceed with the following checks.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Air Relief Valve	ARV-400	Free & Functional (depress spring and note if sticking occurs)		
Ball Valve	BV-407	OPEN		

4.7 _____ SO: Inspect the aeration system to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Ball Valve	BV-400	OPEN		
Drain Valve	DV-401	CLOSED		
Ball Valve	BV-409	OPEN		
Pressure Transmitter	PIT-400	Connected & Powered		
Ball Valve	BV-410	OPEN		
Ball Valve	BV-408	OPEN		
Pressure Transmitter	PIT-401	Connected & Powered		
Drain Valve	DV-402	CLOSED		
A-400 Operational				
Ball Valve	BV-401	OPEN		
Ball Valve	BV-403	OPEN		
Ball Valve	BV-405	OPEN		
Ball Valve	BV-402	CLOSED		
Ball Valve	BV-404	CLOSED		
Ball Valve	BV-406	CLOSED		
A-401 Operational				
Ball Valve	BV-402	OPEN		
Ball Valve	BV-404	OPEN		
Ball Valve	BV-406	OPEN		
Ball Valve	BV-401	CLOSED		
Ball Valve	BV-403	CLOSED		
Ball Valve	BV-405	CLOSED		

4.8 _____ SO: Inspect the iron removal filters to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Ball Valve	BV-220	CLOSED		
Ball Valve	BV-221	OPEN		
Ball Valve	BV-222	CLOSED		
Ball Valve	BV-223	CLOSED		
Sample Port	SP-220	CLOSED		
Drain Valve	DV-220	CLOSED		
Drain Valve	DV-221	CLOSED		
Ball Valve	BV-224	CLOSED		
Ball Valve	BV-225	OPEN		
Ball Valve	BV-226	OPEN		
Ball Valve	BV-227	CLOSED		
Ball Valve	BV-228	CLOSED		
Sample Port	SP-223	CLOSED		
Sample Port	SP-221	CLOSED		
Drain Valve	DV-222	CLOSED		

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Ball Valve	DV-223	CLOSED		
Ball Valve	BV-229	OPEN		

4.9 _____ SO: Inspect the acid injection system to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Acid Supply Tank	T-201	Quantity > 5 gallons		
Acid Injection Pump	P-202	Functional*		
Pressure Relief Valve	PR-201	Functional*		
Sample Port	SP-222	CLOSED		
Static Mixer	M-201	In Place		
pH Sensor	AIT-201	Functional*		

4.10 _____ SO: Inspect the sediment removal filters to verify the information presented in the following table

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Pressure Transmitter	PIT-207	Connected & Powered		
Ball Valve	BV-201	OPEN		
Ball Valve	BV-202	OPEN		
Ball Valve	BV-208	OPEN		
Ball Valve	BV-209	CLOSED		
Ball Valve	BV-210	CLOSED		
Sample Port	SP-201	CLOSED		
Drain Valve	DV-201	CLOSED		
Drain Valve	DV-202	CLOSED		
Ball Valve	BV-203	OPEN		
Ball Valve	BV-204	OPEN		
Pressure Transmitter	PIT-208	Connected & Powered		
Ball Valve	BV-205	OPEN		
Ball Valve	BV-206	OPEN		
Drain Valve	DV-203	CLOSED		
Drain Valve	DV-204	CLOSED		
Ball Valve	BV-211	CLOSED		
Ball Valve	BV-212	CLOSED		
Ball Valve	BV-207	OPEN		
Ball Valve	BV-208	OPEN		
Pressure Transmitter	PIT-209	Connected & Powered		
Sample Port	SP-203	CLOSED		

4.11 _____ SO: Inspect the Photo-Cat units to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Photo-Cat A	PC-300A	See Photo-Cat O&M Manual		
Photo-Cat B	PC-300B	See Photo-Cat O&M Manual		
Flow Meter	FM-200	Connected & Powered		
Air Compressor	AC-600	Functional*		
Pressure Regulating Valve	PRV-601	Set Point 120 psig		
Air Dryer	AD-600	Functional*		
Ball Valve	BV-603	OPEN		
Ball Valve	BV-604	OPEN		
Sample Port	SP-301	CLOSED		
Sample Port	SP-300	CLOSED		
Air Compressor	AC-601	Functional*		
Air Dryer	AD-601	Functional*		
Ball Valve	BV-606	OPEN		
Ball Valve	BV-607	OPEN		
Flow Control Valve	FCV-401	Functional*		

4.12 _____ SO: Inspect the GAC units to verify the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
GAC Vessels (Primary 301- Secondary 302)				
Drain Valve	DV-301	CLOSED		
Drain Valve	DV-302	CLOSED		
Drain Valve	DV-303	CLOSED		
Sample Port	SP-302	CLOSED		
Sample Port	SP-303	CLOSED		
Sample Port	SP-304	CLOSED		
Ball Valve	BV-340	OPEN		
Ball Valve	BV-341	OPEN		
Ball Valve	BV-342	OPEN		
Ball Valve	BV-320	CLOSED		
Ball Valve	BV-321	CLOSED		
Ball Valve	BV-322	OPEN		
Ball Valve	BV-323	CLOSED		
Ball Valve	BV-324	CLOSED		
Ball Valve	BV-325	OPEN		
Ball Valve	BV-326	OPEN		
Ball Valve	BV-327	CLOSED		
Ball Valve	BV-328	OPEN		

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Ball Valve	BV-329	OPEN		
Ball Valve	BV-330	CLOSED		
Ball Valve	BV-331	OPEN		
Ball Valve	BV-332	CLOSED		
Ball Valve	BV-333	CLOSED		
Ball Valve	BV-334	OPEN		
Ball Valve	BV-337	OPEN		
Ball Valve	BV-338	OPEN		
Ball Valve	BV-339	OPEN		
Spool Piece		GAC-302 Effluent		

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
GAC Vessels (Primary 302- Secondary 303)				
Drain Valve	DV-301	CLOSED		
Drain Valve	DV-302	CLOSED		
Drain Valve	DV-303	CLOSED		
Sample Port	SP-302	CLOSED		
Sample Port	SP-303	CLOSED		
Sample Port	SP-304	CLOSED		
Ball Valve	BV-340	OPEN		
Ball Valve	BV-341	OPEN		
Ball Valve	BV-342	OPEN		
Ball Valve	BV-320	CLOSED		
Ball Valve	BV-321	OPEN		
Ball Valve	BV-322	CLOSED		
Ball Valve	BV-323	CLOSED		
Ball Valve	BV-324	CLOSED		
Ball Valve	BV-325	CLOSED		
Ball Valve	BV-326	OPEN		
Ball Valve	BV-327	OPEN		
Ball Valve	BV-328	CLOSED		
Ball Valve	BV-329	OPEN		
Ball Valve	BV-330	OPEN		
Ball Valve	BV-331	CLOSED		
Ball Valve	BV-332	OPEN		
Ball Valve	BV-333	CLOSED		
Ball Valve	BV-334	OPEN		
Ball Valve	BV-337	OPEN		
Ball Valve	BV-338	OPEN		
Ball Valve	BV-339	OPEN		
Spool Piece		GAC-303 Effluent		

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
GAC Vessels (Primary 303- Secondary 301)				
Drain Valve	DV-301	CLOSED		
Drain Valve	DV-302	CLOSED		
Drain Valve	DV-303	CLOSED		
Sample Port	SP-302	CLOSED		
Sample Port	SP-303	CLOSED		
Sample Port	SP-304	CLOSED		
Ball Valve	BV-340	OPEN		
Ball Valve	BV-341	OPEN		
Ball Valve	BV-342	OPEN		
Ball Valve	BV-320	OPEN		
Ball Valve	BV-321	CLOSED		
Ball Valve	BV-322	CLOSED		
Ball Valve	BV-323	CLOSED		
Ball Valve	BV-324	OPEN		
Ball Valve	BV-325	CLOSED		
Ball Valve	BV-326	OPEN		
Ball Valve	BV-327	CLOSED		
Ball Valve	BV-328	OPEN		
Ball Valve	BV-329	CLOSED		
Ball Valve	BV-330	OPEN		
Ball Valve	BV-331	CLOSED		
Ball Valve	BV-332	CLOSED		
Ball Valve	BV-333	OPEN		
Ball Valve	BV-334	OPEN		
Ball Valve	BV-337	OPEN		
Ball Valve	BV-338	OPEN		
Ball Valve	BV-339	OPEN		
Spool Piece		GAC-301 Effluent		

4.13 _____ SO: Inspect final pH adjustment system and effluent header by verifying the information presented in the following table.

Device	Device #	Correct Start-up Configuration	Actual Configuration	Verification (Initial)
Caustic Supply Tank	T-301	Quantity > 5 gallons		
Caustic Injection Pump	P-301	Functional*		
Pressure Relief Valve	PR-301	Functional*		
Ball Valve	BV-335	OPEN		
Air Relief	AR-304	Functional*		
Sample Port	SP-305	CLOSED		
Ball Valve	BV-334	OPEN		
Static Mixer	M-202	In Place		
pH Sensor	AIT-301	Functional*		
Ball Valve	BV-307	CLOSED		
Ball Valve	BV-305	OPEN		
Flow Meter	FM-301	Functional*		
Ball Valve	BV-306	OPEN		
pH Sensor	AIC-302	Functional*		
Air Relief	AR-305	Functional*		
Sample Port	SP-306	CLOSED		
Ball Valve	BV-308	OPEN		
Ball Valve	BV-309	CLOSED		

5. COMPLETION

5.1 SO: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- Purifics Photo-Cat operating manual.
- Contingency Plan

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	11/15/08	All	New Procedure
1	04/10/09	All	Corrections and revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This *Standard Operating Procedure* (SOP) provides instructions for routine treatment system startup following shutdown of more than one hour.

1.2 Scope and Applicability

This procedure applies to start up of the Tallevast Treatment System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Start up should not proceed without physically verifying that the water level in the influent tank is less than 4.0 feet. If level is above 4.0 feet, contact the lead operator immediately.

2.2 Start up should not proceed if any equipment leaks are detected while performing SOP-001, "System Checks Prior to Start Up." If leaks are detected, perform appropriate repairs or maintenance.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of "Operations Log."

3.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent a normal system start up. If such issues are noted, exit this procedure until resolution is obtained.

3.1.3 _____ SO: If the system has been shut down for more than 12 hours, verify that SOP-001 has been completed and the start-up checklist is approved per requirements. If not, exit this procedure and perform SOP-001.

3.1.4 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.1.5 _____ SO: Verify that the fan for the variable frequency drive for P-201 is running properly. If not, exit this procedure and perform the repair.

3.2 Planning and Coordination

3.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO: _____

4.1 _____ SO: If power to Photo-Cat A is off, complete Steps 4.2, 4.3 and 4.4 before proceeding. If the power to Photo-Cat A is on, skip to Step 4.5.

4.2 _____ SO: Open Photo-Cat A right panel door and verify that the Human Machine Interface (HMI) on/off switch, located on underside of the HMI, is in the "off" position.

4.3 _____ SO: Turn Photo-Cat A power switch (red handle located left of the Purifics logo) to the "on" position.

4.4 _____ SO: Return to the HMI on/off switch and turn the HMI "on."

4.5 _____ SO: Touch the panel display to activate the HMI on Photo-Cat A.

4.6 _____ SO: On the "Feed" screen, verify that the level in the acid tank is more than 5 gallons and less than 90 gallons.

4.7 _____ SO: If the level in the acid tank is less than 5 gallons, order and transfer acid per DOP-021, "Acid Tank Fill" before proceeding.

4.8 _____ SO: On the "Discharge" screen, verify level in caustic tank is more than 5 gallons and less than 75 gallons.

4.9 _____ SO: If tank is less than 5 gallons, order and transfer gallons per DOP-022, "Caustic Tank Fill" before proceeding.

4.10 _____ SO: Verify that the level in the influent tank is between 3.1 and 4.0 feet as displayed on the HMI screen. If the level is less than 3.1 feet, the extraction wells must be operated without the operation of the Photo-Cat system until the level in

the influent tank is 3.7 feet. If the water level in the tank is more than 3.9 feet, the Photo-Cat system will need to be operated without the operation of the extraction wells until the level in the influent tank is 3.7 feet. If the influent tank level is outside normal operating range, exit this procedure and contact the Lead Operator.

4.11 _____ SO: Open the "Reactor" screen on the HMI and press "Unit Power." The system will start when the button turns green. Continue to monitor the system for at least 5 minutes. If the extraction wells are not enabled: On the "wells" screen, tap the icon that reads "disabled." The icon will turn green and the wells should be enabled.

4.12 _____ SO: Log start-up time in the Operations Log and exit to SOP-005, "Routine Operations."

5. COMPLETION

5.1 _____ SO: Verification of completion.

Signature _____ Date _____

6. REFERENCES

- Purifics Photo-Cat operating manual
- SOP-001 "System Checks Prior to Routine Treatment System Start Up"
- SOP-003 "Short-Term Treatment System Shutdown"

Figure 1. Photo-Cat A

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	1/23/09	All	New Procedure
1	4/10/09		Corrections

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Standard Operating Procedure (SOP) provides step-by-step instructions for shutting down the Tallevast Treatment System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

1.2 Scope and Applicability

This SOP applies to shutdowns of the treatment system lasting more than 30 minutes. This does not cover shutdowns of extended duration (more than 2 days).

2. SHORT-TERM TREATMENT SYSTEM SHUTDOWN

Procedure Started: Time _____ Date: _____ Shift Operator _____

2.1 _____ SO: Press the "Unit Power" button located in the upper right hand corner until it turns red. This should shut down the Photo-Cat system.

2.2 _____ SO: On the HMI screen, go to the well pumps screen by tapping the icon that reads "well pumps." Press "enable well pumps." Icon will turn red and extraction well pumps should be disabled.

2.3 _____ SO: Verify that extraction wells are all "off" by confirming that all flows indicated on the HMI "Well Pumps" screen are zero.

2.4 _____ SO: **IF** flow indication from any flow meter is not zero, **THEN** go to the flow meter's local display and verify that the flow reading on the HMI "Well Pumps" screen matches the flow meter's local display.

2.5 _____ SO: **IF** flow indication from any flow meter is confirmed to be non- zero, **THEN** go to the extraction well's local disconnect and put the disconnect handle into the "off" position. Return to the treatment building and verify flow on the HMI "Well Pumps" screen and the flow meter's local display are zero. Open the influent feed pump (P-201) variable frequency drive (VFD) panel and visually inspect the 10 extraction well electrical contactors for any damage or malfunction.

2.6 _____ SO: **IF** an extraction well electrical contactor appears damaged or remains engaged, **THEN** shut off power to the VFD cabinet and lock and tag out the cabinet in accordance with DOP-LOTO-011 "Variable Frequency DriveVFD-220." Inform the lead operator of the condition immediately.

2.7 _____ SO: Verify that the influent feed pump (P-201) is "off" by confirming that the flow indicated on the HMI "Reactor" screen FM-200 is zero.

2.8 _____ SO: **IF** flow indication from FM-200 is not zero, **THEN** go to pump P-201 and assess (listen and look) its operational state (on or off).

2.9 _____ SO: **IF** pump P-201 is still operating, **THEN** go to main breaker panel and switch P-201 breaker to the "off" position. Notify the OM or LO that there is a malfunction.

2.10 _____ SO: Verify that aerator pump (P-400) is off by confirming that the pressure indicated on the HMI "Reactor" screen PI-400 is zero.

2.11 _____ SO: **IF** pump P-400 is still operating, **THEN** go to P-400 panel and switch P-400 Hand-Off-Auto to the "Off" position. Notify the OM or LO that there is a malfunction.

2.12 _____ SO: Verify that the acid/caustic pumps are off at the pumps. Listen and look. If the pumps are off there will be no chemical moving in the lines, and you will hear no sound coming from the pump.

2.13 _____ SO: **IF** chemical pumps are still operating, **THEN** unplug the chemical pumps from the outlet, and notify the Lead Operator.

2.14 _____ SO: Verify the UV lamp ballast contactors are not engaged by opening the PLC cabinet on Photo-Cat A. Occasionally, a contactor will get stuck and the UV lamps will remain on after the system is shut down. If a contactor is engaged, the leads will be depressed. If the contactor remains engaged after the system has been shut down, contact the lead operator.

2.15 _____ SO: Note shutdown time and reason for shutdown in the Operations Log Book.

2.16 _____ SO: **IF** system shutdown was routine (i.e., none of the "if/then" steps were required to be followed), **THEN** return system to operation in accordance with SOP-002, "Routine System Start Up" following completion of the activity for which the system was shut down.

2.17 _____ SO: **IF** system shutdown was not routine (i.e., one or more of the "if/then" steps were required to be followed), **THEN** leave the system off and notify the OM or LO.

3. COMPLETION

3.1 _____ SO: Verification of completion.

Signature _____ Date _____

4. REFERENCES

- Purifics Photo-Cat Operating Manual

- DOP-LOTO-011 “Variable Frequency Drive VFD-200”
- SOP-002 “Routine System Start Up”

Figure 1. Photo-Cat Unit A

Figures 2A and 2B. P-201 VFD panel location and inside of panel.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. PURPOSE

This *Standard Operating Procedure* (SOP) implements the requirements of 29 CFR 1910.147, "The Control of Hazardous Energy (Lockout/Tagout);" 29 CFR 1910.333, "Selection and Use of Work Practices;" and NFPA 70E, "Standard for Electrical Safety in the Workplace," 2004 Edition; and provides a consistent method to protect employees from injury using *lockout* (see Step 7, Definitions) and *tagout* (see Step 7, Definitions).

2. SCOPE

This SOP provides instruction for planning, placement, verification and removal of lockout and/or tagout (LO/TO). This SOP applies only to the control of energy during servicing and/or maintenance of equipment and is applicable to LO/TO performed on fixed permanently installed equipment, temporarily installed equipment and portable equipment at Lockheed Martin Corporation (LMC) facilities.

This SOP discusses servicing and maintenance of equipment in which the unexpected energization or startup of the equipment or release of stored energy could cause injury to personnel. This SOP applies to the control of energy during servicing and/or maintenance of equipment.

This SOP covers servicing and/or maintenance that takes place during construction and *normal operation* (see Step 7, Definitions) **only under the following conditions**:

- An employee is required to remove or bypass a guard or other safety device.
- An employee is required to place any part of his or her body into an area of a piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during an equipment operating cycle.

This SOP does not cover the following activities:

- Work on cord- and plug-connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by unplugging the equipment from the *energy source* (see Step 7, Definitions) and by the plug being under the *exclusive control* (see Step 7, Definitions) of the employee performing the *servicing or maintenance* (see Step 7, Definitions).

- Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines, provided that the following are demonstrated:
  - Continuity of service is essential.
  - Shutdown of the system is impractical.
  - Documented procedures are followed and special equipment is used that will provide proven effective protection for employees.
- Minor tool changes and adjustments and other minor servicing activities are not covered by this SOP if they are routine, repetitive and integral to the use of the equipment for production, provided that the work is performed using alternative measures that provide effective personnel protection.
- This SOP **does not** apply to situations that have been evaluated and found not to involve a hazard or to situations for which hazards are mitigated by approved methods (e.g., job safety analysis, safe work permit or independent hazard review).

3. RESPONSIBILITIES/PREREQUISITES

3.1 Responsibilities

Performer	Responsibilities
Cognizant Director	Review the LO/TO program at least annually, and implement corrective actions for identified deficiencies.
Facility Area Supervisor (FAS) (see Step 7, Definitions)/*Equipment Owner* (see Step 7, Definitions)	Review and approve LO/TO as applicable. Resolve problems/concerns regarding the LO/TO process. Verify that equipment has been placed in a condition to support application of LO/TO. The FAS exercises overall responsibility for adequacy of LO/TOs and adherence to the specified requirements.
Authorized Employee (AE; see Step 7, Definitions)	Perform LO/TO activities as applicable.
Qualified Person (see Step 7, Definitions)	Operate equipment, systems or *isolation devices* (see Step 7, Definitions) as required for LO/TO. Perform zero-energy verifications as qualifications allow.
All Employees	Comply with the restrictions and limitations imposed during the use of LO/TO.

3.2 Prerequisites

3.2.1 Personnel assigned to prepare LO/TO will be knowledgeable on the equipment and systems for which they are preparing an LO/TO.

4. REQUIREMENTS

4.1 General Requirements Controlling LO/TO

4.1.1 Equipment that has been locked and/or tagged out **WILL NOT BE OPERATED** by any person.

4.1.2 **All employees** are required to comply with the restrictions and limitations imposed upon them during the use of LO/TO.

4.1.3 Each trained employee working under the protection of LO/TO will be protected by a *personal lock* (see Step 7, Definitions) and *personal "Do Not Operate" tag* (see Step 7, Definitions) under the exclusive control of that employee.

4.2 Lockout Devices

4.2.1 If an isolation device is *capable of being locked out* (see Step 7, Definitions), then a lockout device will be used to prevent operation of the device and will be affixed in a manner that will hold the energy-isolating device in a "safe" or "off" position.

4.2.2 Isolations will be protected by locks and *lockout devices* (see Step 7, Definitions) to the maximum extent possible. Locks used for LO/TO will meet the following requirements:

4.2.2.1 LMC Contractor personnel will use only locks (Grainger part no. 4RD97) and lockout devices approved by LMC for LO/TO. The bodies of locks used for LO/TO are red in color, keyed different and will not be used for any other purpose.

4.3 Tags and *Tagout Devices* (see Step 7, Definitions)

4.3.1 Tags used for LO/TO will be standardized (Grainger part no. 6T895) and meet the following requirements:

4.3.1.1 *"Do Not Operate" tags* (see Step 7, Definitions) are essentially warning devices affixed to energy-isolating devices and do not provide the physical restraint on those devices that is provided by a lock.

4.3.1.2 When a "Do Not Operate" tag is attached to an energy-isolating device, it will not be removed without authorization of the authorized person responsible for it, and will not be bypassed, ignored or otherwise defeated.

4.3.1.3 "Do Not Operate" tags must be legible and understandable by all qualified employees and all other employees whose work operations are or may be in the area. Personnel will use only "Do Not Operate" tags approved by LMC for LO/TO.

4.3.1.4 "Do Not Operate" tags and their means of attachment must be made of materials that will withstand the environmental conditions encountered in the workplace.

4.3.1.5 "Do Not Operate" tags may evoke a false sense of security, and their meaning must be understood as part of the overall energy control program. "Do Not Operate" tags are reserved for LO/TO use and will not be used for any other purpose. NOTE: "Out of Service" tags will not be substituted for "Do Not Operate" tags.

4.3.1.6 "Do Not Operate" tags will be securely attached to energy-isolating devices so that they cannot be inadvertently or accidentally detached during use, and so they clearly indicate that operation or movement of the isolation device from the "safe" or "off" position is prohibited.

4.4 Isolation Practices for LO/TO

4.4.1 Electrical Systems

4.4.1.1 Isolation must be provided for any electrical energy equal to or greater than 50 volts (V; ac or dc) unless it can be demonstrated that de-energizing introduces additional or increased hazards, or is infeasible due to equipment design or operational limitations or for performing approved troubleshooting, calibrations or other work activity that requires a system to remain *energized* (see Step 7, Definitions) to perform the activity. If the electrical circuit(s) cannot be de-energized, an approved work control document must be used to specify applicable safety precautions/instructions and required safety equipment to address hazards from both electrical shock and arc.

4.4.1.2 Grounding requirements must be considered as part of the isolation for any electrical circuit. The grounds must be tagged to ensure that they remain installed until the work is complete and removed prior to re-energizing the equipment or system.

4.4.1.3 Control circuit devices (e.g., pushbuttons, selector switches and interlocks) may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electrical equipment may not be used as a substitute for LO/TO.

4.4.1.4 When using lifted leads as an isolation point, the "Danger" tag used to identify the required condition of the leads should not be placed inside a junction box, as this could be a fire hazard. The "Do Not Operate" tag should be placed on the junction box cover or other appropriate location.

5. INSTRUCTIONS

5.1 Simple LO/TO

NOTE: *Documentation of the steps followed for simple LO/TO is not required.*

5.1.1 A simple LO/TO may be performed if ALL of the following conditions exist:

A. The equipment has no potential for stored or residual energy, or reaccumulation of stored energy after shutdown that could endanger employees.

B. The equipment has a single energy source that can be readily identified and isolated.

C. The isolation and locking out of the single energy source will completely de-energize and deactivate the equipment.

D. The equipment is isolated from the single energy source and locked out during servicing or maintenance.

E. A single lockout device will achieve a locked-out condition.

F. The lockout device is under the exclusive control of the AE performing the servicing or maintenance.

G. The servicing or maintenance does not create hazards for other employees.

H. The facility has not experienced any unexpected activation or re-energization of the equipment during servicing or maintenance.

5.1.2 If all the criteria listed in 5.1.1 A through 5.1.1 H are **not** satisfied, then the servicing or maintenance **cannot** be performed using a simple LO/TO.

5.1.3 AE/: Notify all *affected employees* (see Step 7, Definitions) that servicing or maintenance is required on the equipment and that the equipment must be shut down and locked out to perform the servicing or maintenance.

5.1.4 AE/: Identify the type(s) and magnitude(s) of energy associated with performing the servicing or maintenance on the equipment, using applicable drawings and/or documents and physical walk-down, and identify the isolation device required to de-energize and isolate the equipment from the energy source.

5.1.5 AE/: Obtain permission from the equipment owner to shut down and perform the LO/TO and the servicing or maintenance.

5.1.6 Qualified Person: If the equipment is operating, shut it down in accordance with approved procedures or other instructions as applicable, ensuring that all operating controls are placed in the neutral, off or other appropriate position.

5.1.7 Qualified Person: Position, as necessary, the isolation device needed to isolate the equipment from the energy source.

5.1.8 AE: Lock out the energy-isolating device, using Personal Lock and Personal "Do Not Operate" tag.

5.1.9 Qualified Person: Ensure that the equipment is completely de-energized by performing zero-energy verification(s).

5.1.9.1 For electrical energy sources, use approved methods to verify the absence of electrical energy (voltage).

5.1.9.2 Perform zero-energy verification(s) for other energy sources as identified in Step 5.1.4.

5.1.10 AE: Perform the servicing or maintenance on the equipment.

5.1.10.1 If it is necessary to leave the job prior to completing the work, other than for lunch or for a break, then perform the following step:

5.1.10.1.1 Turn over the job to an oncoming shift relief by having the oncoming AE install his or her Personal Lock and Personal "Do Not Operate" tag in place of your Personal Lock and Personal "Do Not Operate" tag.

5.1.11 AE: When servicing or maintenance is complete, perform the following activities:

5.1.11.1 Check the equipment and the immediate area around the equipment to ensure that nonessential items have been removed and that the equipment components are operationally intact.

5.1.11.2 Check the work area to ensure that all employees have been safely positioned or removed from the area.

5.1.11.3 Verify that the equipment controls are in the neutral, off or other appropriate position.

5.1.11.4 Remove your personal lock, *personal "Danger" tag* (see Step 7, Definitions), and lockout device, as applicable, from the isolation device.

5.1.11.5 Notify all affected employees that the servicing or maintenance on the equipment has been completed and that the equipment may be placed back into operation.

5.2 Multiple Latent Energy System LO/TO

5.2.1 When multiple latent energy sources are present in equipment, then a LO/TO DOP (or equivalent) will be used.

6. ADDITIONAL INSTRUCTIONS

6.1 Removing a Personal Lock and Personal "Danger" Tag When the Employee Who Applied Them is not Available

6.1.1 FAS: Ensure that the following occurs:

6.1.1.1 Employee who applied the personal lock and personal "Danger" tag is not at the facility.

6.1.1.2 Take all reasonable measures to contact the employee.

6.1.1.3 If unable to contact the employee, notify the employee's immediate manager or supervisor to inform the employee before he/she resumes work that his/her personal lock and personal "Do Not Operate" tag have been removed.

6.1.1.4 Direct the removal of the personal lock and personal "Do Not Operate" tag.

6.2 Working with Subcontractors

6.2.1 General

6.2.1.1 When work is performed by a subcontractor (includes all non-LMC employees), a dual responsibility exists for the safety of LMC and subcontractor employees.

6.2.1.2 Before LO/TO by a subcontractor, the subcontractor will inform LMC of their respective LO/TO procedures.

6.2.1.3 Subcontractors will have the right to use their own supplemental LO/TO program with approval from LMC.

6.2.1.4 LMC employees will understand and comply with the restrictions and prohibitions of the subcontractor's LO/TO procedure, if applicable.

6.2.1.5 LMC will provide copies of the LMC Tallevast LOTO as necessary, to the outside subcontractor employee. It is the Contractor's responsibility to provide LMC Tallevast LO/TO training to their employees.

6.2.1.6 Before a subcontractor starts work on a system that has been locked out and tagged out using the LMC LO/TO procedure, zero-energy verifications must be completed by AEs.

6.2.1.7 Subcontractor personnel may perform all aspects of this procedure, provided that all training requirements are met and documented.

6.3 Escorted Personnel

6.3.1 Escorted personnel may not perform work under the protection of a LO/TO.

7. DEFINITIONS

Affected employee. An employee whose job requires him/her to operate or use equipment on which servicing/maintenance is being performed under lockout/tagout or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. An affected employee may NOT perform work under the protection of a LO/TO.

Authorized employee (AE). An individual trained on all aspects of this procedure who prepares, installs, verifies, performs work under and/or removes LOs/TOs.

Capable of being locked out. Refers to an isolation device that has a means to attach a lock or into which a locking mechanism is built.

"Do Not Operate" tag. A numbered tag, red and white with black lettering, used to prohibit operation of equipment or components.

Energized. Connected to an energy source or containing residual or stored energy.

Energy source. Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy.

Equipment owner. The individual (FAS, shift supervisor, facility superintendent, principal investigator or similar position) responsible for the equipment to which an LO/TO is being applied. The equipment owner is trained to at least the level of affected employee.

Exclusive control. Exclusive control means that the employee has physical possession of the key to his/her personal lock and tag, which is attached to the isolation device. . For cord- and plug-control equipment, the plug is considered to be under the exclusive control of the employee if it is physically in his/her possession, or within arm's reach and in line of sight of the employee, or if the employee has affixed an LO/TO device to the plug.

Facility area supervisor (FAS). A general term used to identify the supervisor directly and officially in charge of a facility/area or systems/equipment operation and who has been trained in all aspects of this procedure. The FAS can be the equipment owner. For areas that do not have an operating organization, the FAS is the maintenance supervisor under whose direction the work will be performed (all references to the FAS include the designated alternate).

Isolation device. A mechanical device that physically prevents the transmission or release of energy. Examples include a manually operated electrical circuit breaker, fuse block, fuse, disconnect switch, line valve (not a check valve), slip blind, wood or metal block, Halon system control head solenoid or squib/initiator cable connector removal, or any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type of devices are not isolation devices.

Lockout. Placing a lockout device on an isolation device according to the LO/TO procedure, ensuring that the isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device. A device that uses a positive means, such as a padlock, to hold an isolation device in the desired position. Included are blank flanges and bolted slip blinds.

Normal operation. The use of equipment to perform its intended operating function.

Personal "Danger" tag. A tag placed by an AE on a lockbox/isolation device that clearly indicates his/her name and organization.

Personal lock. A lock, under the exclusive control of the AE who placed it (except where specifically addressed in this procedure), used to ensure the continuity of energy isolation while work is being performed by the AE.

Qualified person. An individual who is trained and qualified to perform the specified task.

Servicing or maintenance. Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing equipment. These activities include lubrication, cleaning or clearing jamming of equipment, and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Tagout. Placing a tag on an isolation device, in accordance with the LO/TO procedure, to indicate that the isolation device and the equipment being controlled cannot be operated until the tag is removed.

Tagout device. A tag and its means of attachment, that can be securely fastened to an isolation device in accordance with the LO/TO procedure, to indicate that the isolation device and the equipment being controlled cannot be operated until the tagout device is removed.

8. REFERENCES

29 CFR 1910.147, "The Control of Hazardous Energy (Lockout/Tagout)"

29 CFR 1910.333, "Selection and Use of Work Practices"

NFPA 70E, "Standard for Electrical Safety in the Workplace," 2004 Edition

9. APPENDICES

Appendix A, Equipment Lockout Form Requirements
Appendix B, Example of Equipment Lockout Form

Secondary Heating Control System

Appendix A

Equipment Lockout Form Requirements

(Per Multiple Latent Energy Sources)

A. Equipment name/identifier

B. Configuration control status

C. The tasks for which the lockout can be used *(Applicable to:)*

D. Optional – Photos/drawings of the equipment showing where the locks are installed and where zero-energy verification is performed

E. Instruction steps as follows:

1. Lockout Installation

1.1 AE Performing the Servicing/Maintenance: If the equipment is not under configuration control, identify the method that will be used to verify that isolation points have not changed.

1.2 AE: Obtain FAS permission to install the lockout.

1.3 AE: Obtain a lock.

1.4 AE: Log the lockout in the LO/TO Index Sheet.

1.5 AE: Notify affected employees lockout is being installed.

1.6 Qualified Person: Shut down the equipment using approved procedures or other instructions, as applicable.

1.7 Qualified Person: Position the isolation devices and lock them as follows (an example is presented in the table below).

Energy	Isolation Device & Location	Position	Lock Instructions
Electrical	CP-HA-942 Knife switch on front of panel CP-HA-942	OFF	Attach Lock 942
Pneumatic	HAV-HA-193 Self-bleeding valve on south side of panel CP-HA-942	OFF	Attach Lock 193

1.8 AE: Place the keys in the lockbox.

1.9 AE: Install a lock on the lockbox (key to be controlled by the FAS).

1.10 Qualified Person: Relieve or restrain stored energy (if applicable).

1.11 AE: Sign and date the installation block.

2. Perform Zero-Energy Verification(s)

2.1 Qualified Person: Perform the zero-energy verification(s) specified on the equipment-specific lockout.

2.2 Qualified Person: Sign and date the zero-energy verification block(s).

3. Work Under the Lockout

3.1 AE: Ensure that your work fits the *Applicable to:* statement at start of this form.

3.2 AE: Verify proper application of the lockout (walk-down) and, where visually possible, verify that the isolation device positions are those required by the lockout.

3.3 AE: Ensure that the Installer and Zero-Energy blocks are completed. If not, STOP work.

3.4 AE: Ensure that there is a lock on the lockbox. If not, STOP work.

3.5 AE: Apply your personal lock and personal “Danger” tag to the lockbox.

4. Work Completion

4.1 AE: Upon completion of work, verify that the work is complete to the point that will allow removal of the lockout.

4.2 AE: Sign and date the work completion block.

5. Lockout Removal

5.1 AE: Check the equipment and surrounding area to ensure that all nonessential items have been removed, the equipment is operationally intact and all guards are in place.

5.2 AE: Verify that employees are safely positioned or removed from the area.

5.3 Qualified Person: Verify that all controls are in the neutral, off or other appropriate position.

5.4 AE: Obtain the lock key from the FAS.

5.5 AE: Remove the lockout devices from the equipment.

5.6 Qualified Person: Position the isolation devices as specified (an example is presented in the table below).

Isolation Device & Location	Position
CP-HA-942 Knife switch on front of panel CP-HA-942	ON
HAV-HA-193 Self-bleeding valve on south side of panel CP-HA-942	ON

5.7 AE: If a laminated copy of the equipment-specific lockout form is used, remove signatures and dates. Otherwise, file the paper copy in the log book.

5.8 AE: Notify affected employees that the lockout has been removed.

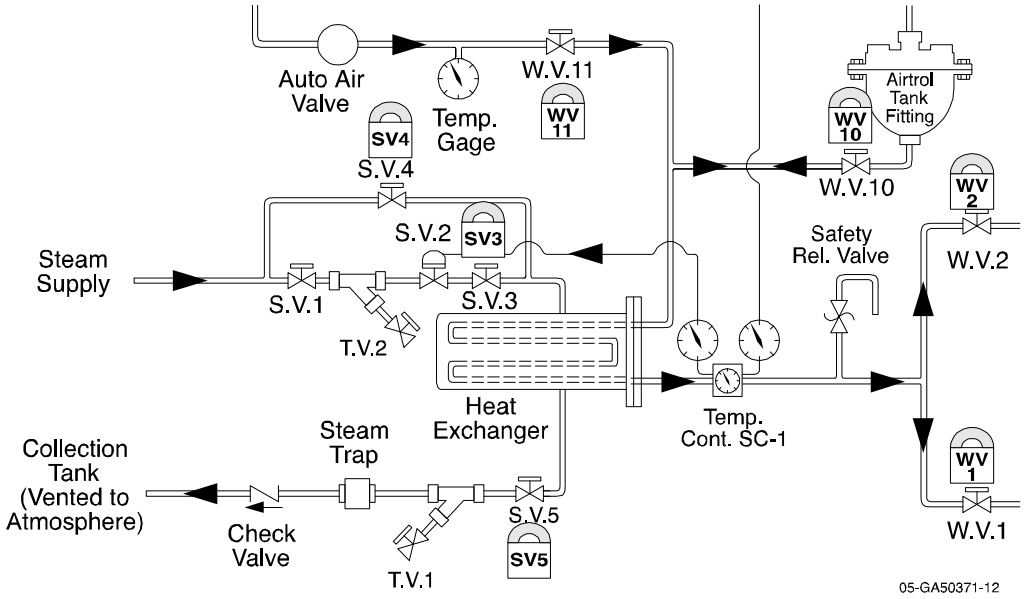
5.9 AE: Clear the lockout on the LO/TO Index Sheet.

Appendix B

Example of Equipment Lockout Form
Secondary Heating Control System

Equipment is under Configuration Control

Applicable To: Mechanical maintenance repairs for piping components, including Airtrol Tank and Heat Exchanger



LOCKOUT INSTALLATION

- AE: Obtain FAS permission to install lockout.
  - Obtain a lock.
  - Log the lockout on the LO/TO Index Sheet.
  - Notify affected employees that lockout is being installed.
- Qualified Person: Shut down the equipment using approved procedures or other instructions, as applicable.
- Qualified Person: Position the isolation devices and lock them as presented in the table below.

Energy	Isolation Device and Location	Position	Lock Instructions
High Temp > 125°F	S.V. 3 Steam Control Valve Outlet Valve	SHUT	Attach Lock
High Temp > 125°F	S.V. 4 Steam Control Valve Bypass Valve	SHUT	Attach Lock
High Temp > 125°F	S.V. 5 Condensate Return Isolation Valve	SHUT	Attach Lock
Pressure	W.V. 1 Hot Water Circ Pump #2 Suction Valve	SHUT	Attach Lock
Pressure	W.V. 2 Hot Water Circ Pump #1 Suction Valve	SHUT	Attach Lock
Pressure	W.V. 10 Pressure Control Isolation Valve	SHUT	Attach Lock
Pressure	W.V. 11 Return Header Isolation Valve	SHUT	Attach Lock

- AE: Place the keys in the lockbox
- AE: Install a lock on the lockbox (key to be controlled by the FAS)

INSTALLER SIGNATURE _____ DATE ____/____/____

ZERO-ENERGY VERIFICATION – QUALIFIED PERSON/AEQ PERFORM THE FOLLOWING:	ZERO ENERGY SIGNATURE & DATE
• Verify < 125°F on heat exchanger using infrared heat gun. • Manually operate safety relief valve upstream of W.V. 1 and 2, relieve any residual pressure, and verify no pressure build up. • After verifying < 125°F, manually break flange downstream of S.V. 3 and 4, relieve any residual pressure, and verify no pressure buildup.	_____ ____/____/____

WORK UNDER LOCKOUT – AE PERFORM THE FOLLOWING:

- Ensure that your work fits the *Applicable to:* statement at the start of this form.
- Ensure that the Installer and Zero-Energy Blocks are completed. If not, STOP work.
- Verify proper application of the lockout (WALK-DOWN) and, where visually possible, verify that the isolation device positions are those required by the lockout.
- Ensure that there is a lock on the lockbox. If not, STOP work.
- Attach your personal lock and personal "Danger" tag to the lockbox.

- WORK COMPLETION: AE PERFORM THE FOLLOWING: Verify that the work is complete to the point that will allow removal of the lockout.
- Remove the personal lock and personal "Danger" tag from the lockbox.

SIGNATURE _____ DATE _____/_____/_____

LOCKOUT REMOVAL:

- AE: Check the equipment and surrounding area to ensure that all nonessential items have been removed, the equipment is operationally intact and all guards are in place.
- AE: Verify that employees are safely positioned.
- Qualified Person: Verify that all controls are in a neutral or "off" position.
- AE: Obtain the lock key from the FAS.
- AE: Remove the lockout devices from the equipment.
- Qualified Person: Position the isolation devices as presented in the table below.

Device	Position
S.V. 3 Steam Control Valve Outlet Valve	OPEN
S.V. 4 Steam Control Valve Bypass Valve	OPEN
S.V. 5 Condensate Return Isolation Valve	OPEN
W.V. 1 Hot Water Circ Pump #2 Suction Valve	OPEN
W.V. 2 Hot Water Circ Pump #1 Suction Valve	OPEN
W.V. 10 Pressure Control Isolation Valve	OPEN
W.V. 11 Return Header Isolation Valve	OPEN

- AE: Notify affected employees that the lockout has been removed.
- AE: Clear the lockout on the LO/TO Index Sheet.
- AE: If this form is laminated, remove signatures and dates. Otherwise file the paper copy in the logbook.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	04/28/09	All	Revised Procedure
2	12/14/10	3,6	H&S Improvements

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Standard Operating Procedure (SOP) presents instructions for performing routine shift operations with a personal digital assistant (PDA). The PDA will guide the operator through routine operations. All tasks listed on the PDA will be verified by using the stylus to check the box next to the item listed. This procedure details activities to be performed throughout the operator's twelve hour day or night shift. Initial next to each step to verify the step was completed. If the PDA is not available, use SOP-005A to complete the routine operations tasks without the use of the PDA.

1.2 Scope and Applicability

This SOP applies operations at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PLANNING AND COORDINATION

2.1 Equipment Required

Handheld PDA, flashlight if needed

Procedure Started: Time _____ Date: _____ SO _____

3. STEP-BY-STEP INSTRUCTIONS

3.1 Shift Change

3.1.1 _____ SO: Retrieve and power up the PDA (located in the Operator's office)

3.1.2 _____ SO: The PDA instructs you to obtain current working edition of "Operations Log" from the supply cabinet.

3.1.3 _____ SO: Review the "Operations Log" with the preceding shift operator.

3.1.4 _____ SO: Review a printed copy of the "Daily Log" from the previous shift.

3.1.5 _____ SO: Give tailgate safety meeting.

3.2 **Perform first round leak/component check**

3.2.1 _____ SO: Perform leak and component checks as indicated on the PDA. Using the PDA, scan the barcode for the equipment listed. Check listed equipment for leaks using your hand to check for moisture. If moisture is present, check the box that reads "maintenance needed" on the PDA. Check components for proper operability as instructed by the PDA.

When checking pumps for proper operability, place your hand on top of the motor cover. Caution: Motors may be hot. Note any excessive heat or vibration. If excessive heat or vibration is present, check the box that reads "maintenance needed." Check compressors for power and air pressure. Check the VFD fan by placing your hand over the vent on the outside of the VFD cabinet. If air flow is not noted, shut down the system per SOP-003 "Short Term System Shut Down", perform DOP-LOTO-011 to isolate the VFD cabinet, and replace the VFD fan.

3.3 **Perform first round filter pressure check**

3.3.1 _____ SO: Check pressure drop across iron removal filters and sediment removal filters using the PDA. Scan the barcode on the filters as directed by the PDA. Record the pressures as instructed.

3.4 **Perform first round extraction well balance check**

3.4.1 _____ SO: Using the PDA, check the balance on the extraction well manifold. Scan the barcode next to the HMI that reads "EW Balance Check", then, as instructed, enter flow rate, pressure, and drawdown for each extraction well. NOTE: Extraction wells must be pumping to record these values. These values can be found on the "Well Pumps" screen on the HMI (Human Machine Interface).

3.5 **Perform first round tank water level**

3.5.1 _____ SO: Retrieve a water level meter from the storage area and bring it to the top of the influent tank. Remove the plug on the flange located on the northwest corner. Measure the depth to water through the flange opening. Measure to the white mark on the flange. Enter the value into the PDA. If the depth to water

measurement exceeds the predetermined set points, the PDA will instruct the operator to shut down the system.

3.6 **Perform extraction well vault leak check**

3.6.1 _____ SO: NOTE: *This step applies to the day shift only*. Night shift should proceed to the next step. Unlock and open the cover on each extraction well. Check the well vault piping and valves for leaks. Using the PDA, scan the barcode on each extraction well. Verify that there are no leaks. Replace cover and lock when finished.

3.7 **Perform catalyst color check**

3.7.1 _____ SO: Perform DOP-010 "Checking Catalyst Color." Use the color chart on the PDA to record the color as a numeric value.

3.8 **Sync PDA**

3.8.1 _____ SO: Return to the Operator's office and place the PDA in the cradle. The PDA should automatically sync to the Operator's computer. After the PDA displays the message "synchronization complete", open the database using the shortcut on your desktop. Click on the icon that reads "Operational Data." Click the icon that reads "First Work Order" Print the first work order.

3.9 **Gather maintenance work orders and check with security**

3.9.1 _____ SO: Check with security as per DOP-005. Gather the maintenance work orders generated by maintenance system JobPlus. The lead operator will print these out every week and distribute them between the four operators. They are located in the operator's office.

3.9.2 _____ SO: The first work order will dictate which tasks are performed. (e.g., filter change, extraction well balancing, repair, catalyst cleaning) Print or copy the appropriate SOP/DOP to perform each task listed on the first work order. Bring the maintenance work orders and the "first work order" to the treatment facility.

3.10 **Complete maintenance work orders and first work order**

3.10.1 _____ SO: Complete any maintenance work orders assigned. Fill out maintenance work order sheet. When finished, file maintenance work orders and the "First Work Order" in the Operator's filing cabinet in the Operator's office.

3.11 **Perform treatment system housekeeping**

3.11.1 _____ SO: If time allows, perform DOP-006 "Treatment Center Housekeeping"

3.12 **Shift half way point**

3.12.1 _____ SO: At the shift half way point (approximately 6 hours into 12 hour shift) Retrieve the PDA from the cradle in the Operator's office. Return to the treatment facility.

3.13 **Perform Photo-Cat screen check**

3.13.1 _____ SO: Use the PDA to perform the Photo-Cat screen check. This is to ensure that all of the set points are correct on the Photo-Cat HMI screen. On the main menu of the PDA, select "Screens." Scan the "Photo-Cat A" barcode as instructed by the PDA. Verify that the set points listed on the PDA match those on the various Photo-Cat HMI screens.

3.14 **Take inventory**

3.14.1 _____ SO: Take inventory of supplies using the PDA. On the PDA main menu, select "Inventory." Scan the barcode as instructed on the PDA. Begin taking inventory at the supply cabinet, then the PPE cabinet, and finally the storage boxes.

3.15 **Perform second round leak/component checks**

3.15.1 _____ SO: Perform second leak and component checks as indicated on the PDA. With the PDA stylus, select "2nd Leak" on the PDA main menu. Using the PDA, scan the barcode for the equipment listed. Check listed equipment for leaks using your hand to check for moisture. If moisture is present, check the box that reads "maintenance needed" on the PDA. Check components for proper operability when instructed by the PDA.

Note: When checking pumps for proper operability, place your hand on top of the motor cover. Caution: Motors may be hot. Note any excessive heat or vibration. If excessive heat or vibration is present, check the box that reads "maintenance needed." Check compressors for power and air pressure. Check the VFD fan by placing your hand over the vent on the outside of the VFD cabinet. If air flow is not noted, shut down the system per SOP-003 "Short Term System Shut Down", perform DOP-LOTO-011 to isolate the VFD cabinet, and replace the VFD fan.

3.16 **Perform second round filter pressure check**

3.16.1 _____ SO: Check pressure drop across iron removal filters and sediment removal filters using the PDA. Using the stylus, select "2nd Filters" from the PDA main menu. Scan the barcode on the filters as directed by the PDA. Record the pressures as instructed.

3.17 **Perform second round extraction well balance check**

3.17.1 _____ SO: Using the PDA, check the balance on the extraction well manifold. Using the PDA stylus, select "2nd balance" from the main menu. Scan the barcodes for the individual extraction wells, then, as instructed, enter flow rate, pressure, and drawdown for each extraction well. *NOTE: Extraction wells must be pumping to record these values. These values can be found on the "Well Pumps" screen on the HMI (Human Machine Interface).*

3.18 **Perform second round tank water level**

3.18.1 _____ SO: Retrieve a water level meter from the storage area and bring it to the top of the influent tank. On the PDA main menu select "2nd Tank Water Level." Remove the plug on the flange located on the northwest corner. Measure the depth to water through the flange opening. Measure to the white mark on the flange. Enter the value into the PDA. If the depth to water measurement exceeds the predetermined set points, the PDA will instruct the Operator to shut down the system.

3.19 **Sync PDA and check with security**

3.19.1 _____ SO: Check with the security guard as per DOP-005. Return to the Operator's office and place the PDA in the cradle. The PDA should automatically sync to the Operator's computer. After the PDA displays the message "synchronization complete", open the database using the shortcut on your desktop. Click on the icon that reads "Operational Data." Click the icon that reads "Second Work Order" Print the second work order.

3.20 **Complete second work order**

3.20.1 _____ SO: Bring the "second work order" to the treatment facility. The second work order will dictate what tasks are performed. (e.g., filter change, extraction well balancing, repair, catalyst cleaning) Print or copy the appropriate SOP/DOP to perform each task listed on the second work order.

3.20.2 _____ SO: When finished file the second work order in the Operator's filing cabinet in the Operator's office.

3.21 **Complete Daily Logs**

3.21.1 _____ SO: 1 hour before the end of the twelve hour shift (6:00 PM for the day shift and 6:00 AM for the night shift) retrieve the PDA from the cradle in the Operator's office. Bring it to the Treatment Facility. Select "Daily Log" from the main menu. Complete Daily Log.

3.22 **Sync PDA and print daily log**

3.22.1 _____ SO: Return to the Operator's office and place the PDA in the cradle. The PDA should automatically sync to the Operator's computer. After the PDA displays the message "synchronization complete", open the database using the shortcut on your desktop. Click on the icon that reads "Operational Data." Enter your shift comments then click the icon that reads "Finalize/ Print Daily Log" The program should automatically print the Daily Log. Retrieve Daily Log from printer. Click the icon that reads "Click Button to prepare handheld for field activities." Wait for the next shift operator to arrive.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	03/15/09	All	New Procedure
1	12/14/10		H&S Improvements

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This is a hard copy version of the PDA (Personal Digital Assistant) database meant to accompany SOP-005 if the PDA is nonoperational or unavailable. Verify tasks are performed by initialing next to each step. This procedure details tasks to be performed during the Operator's twelve hour day or night shift.

Procedure Started: Time _____ Date: _____ SO _____

2. Instructions and Tables

2.1 Shift Change

2.1.1 _____ SO: Obtain current working edition of "Operations Log."

2.1.2 _____ SO: Review the "Operations Log" with the preceding shift operator.

2.1.3 _____ SO: Review printed copy of the "Daily Log" from the previous shift.

2.1.4 _____ SO: Give tailgate safety meeting.

2.2 First Round Leak and Component Check

2.2.1 _____ SO: Perform leak and component checks as indicated in the following tables. Check listed equipment for leaks using your hand to check for moisture. If a leak is present, and minor, check the box and record the location of the leak in the "1st Task List" section at the end of this document. If there is a leak of any kind outside the treatment system building, shut down the system immediately.

Note: When checking pumps for proper operability, place your hand on top of the motor cover. Caution: Motors may be hot. Note any excessive heat or vibration. If excessive heat or vibration is present, record the condition in the "1st Task List" section at the end of this document. Check compressors for power and air pressure Check the VFD fan by placing your hand over the vent on the outside of the VFD cabinet. If no air flow is noted, the treatment system must be shut down as per SOP-003 and the fan must be replaced. Perform DOP-LOTO-011 to lockout the VFD cabinet before replacing the fan.

Manifold										
_	•		•		•		•		•	
102		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
101		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
103		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
104		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
105		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
109		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
108		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
107		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
106		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
110		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
BV-111		Flanges								
FM-201		Flanges								
2-inch Y Strainer		Flanges								

Aeration System		
	•	
BV-400		Flanges
P-400		Flanges
BV-401		Flanges
BV-403		Flanges
BV-402		Flanges
BV-404		Flanges

Feed/Filter System		
	•	
Influent Pump P-201		Flange
SS/Plastic Transition		Flange
Pump Suction reducer		Flange
Airline to PCV		Connector

Feed/Filter System								
	•		•		•		•	
Bag Filter BF-210		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-211		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-212		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-213		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-202		Lid		Drain Valve		Sample Ports		
Bag Filter BF-201		Lid		Drain Valve		Sample Ports		
Cartridge Filter CF-202		Lid		Drain Valve		Sample Ports		
Cartridge Filter CF-201		Lid		Drain Valve		Sample Ports		
Cartridge Filter Outlet		Flanges						

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Acid System						
	•		•		•	
Pump P-202		Connectors		Pressure Relief Valve		Tubing
Static Mixer M-201		Static Mixer		Flanges		
Tank T-201		Tank				
pH Sensor AE-201		pH Sensor Connection				
Tank Dual Containment		Containment				
Transition to SS		Flange				
Transition to PVC		Flange				

Photo-Cat System		
	•	
Inlet Flange		Flange
A Transfer Outlet Flange		Flange
CRU		Flange
SFCV		Flange
Photo-Cat A Lamps		Flange
B Inlet Flange		Flange
B Outlet Flange		Flange
DPCV		Flange
Photo-Cat B Lamps		Flange
SLP		Flange
Accumulator		Flange
SLCV		Flange

Caustic System		
	•	
P-301		Connectors
P-301		Pressure Relief Valve
P-301		Tubing
T-301		Tank
Static Mixer M-301		Static Mixer
Static Mixer M-301		Flanges
pH sensor AE-301		Sensor connection
Transition to SS		Flange
Transition to PVC		Flange

GAC System								
	•			•			•	
GAC Manifold		Valves						
GAC-301		Valves	GAC-302		Valves	GAC-303		Valves
		Lid			Lid			Lid
		Blind Flange/Spool Piece			Blind Flange/Spool Piece			Blind Flange/Spool Piece
		Air Release			Air Release			Air Release
		Sample Port			Sample Port			Sample Port
		Flanges			Flanges			Flanges
		Underside			Underside			Underside
		Drain Valve			Drain Valve			Drain Valve

Component	
•	
	Influent Feed Pump P-201
	Aerator Pump P-400
	Slurry Loop Pump
	Air Compressor AC-600
	Air Compressor AC-601
	Iron Removal Bag Filters
	Sediment Removal Filters
	GAC
	VFD cabinet fan

Influent Tank		
	•	
Effluent Pipe		Double Containment Pipe
Aerator Piping		Double Containment Pipe
T-401 BV-407		Flange, Leak Tray
T-401		Manways
T-401		Flanges
T-401		Pressure Relief Valve
BV-407		Flanges
Influent/Recirc Pipe		Double Containment Pipe
Sump Inlet Pipe		Double Containment Pipe
Feed Pipe		Double Containment Pipe
Vapor Phase Carbon Unit		Check for Excessive Heat

Extraction Well Vault Leak Check (Day shift Only)				
	•		•	
EW-101		Cam Lock		Check Valve
EW-102		Cam Lock		Check Valve
EW-103		Cam Lock		Check Valve
EW-104		Cam Lock		Check Valve
EW-105		Cam Lock		Check Valve
EW-106		Cam Lock		Check Valve
EW-107		Cam Lock		Check Valve
EW-108		Cam Lock		Check Valve
EW-109		Cam Lock		Check Valve
EW-110		Cam Lock		Check Valve

2.3 Perform first round extraction well balancing

2.3.1 _____ SO: Check balance on extraction well manifold using the table below. Record drawdown, pressure, and flow for each extraction well. Use the table to determine if the extraction well needs to be balanced. If balancing is needed, record the well name on the "1st Task List" section at the end of this document. Refer back to this table as a general guide to balance the extraction well. Note: Extraction wells must be pumping to record these values.

Typical Extraction Well Flow Rate and Water Level Ranges

Extraction Well	Typical Flow Rate Range (GPM)	Typical Operational Water Level (FBG)
EW-101	2 to 2.7	15 to 18
EW-102	3 to 3.7	23 to 28
EW-103	0.5 to 0.8	15 to 18
EW-104	0.8 to 1.5	18 to 23
EW-105	1.8 to 2.5	16 to 19
EW-106	0.5 to 0.8	21 to 26
EW-107	2.3 to 3.0	18 to 21
EW-108	3.5 to 8.5	18 to 27
EW-109	0.5 to 0.8	14 to 17
EW-110	2.5 to 3.2	19 to 24

Drawdown				
	Range	**Draw Down Level**	**If less than**	**If greater than**
EW-101	2 to 24 feet		12, turn GV-101 ¼ turn CCW	22, turn GV-101 ¼ turn CW
EW-102	2 to 38 feet		20, turn GV-102 ¼ turn CCW	30, turn GV-102 ¼ turn CW
EW-103	2 to 20.9 feet		9 turn GV-103 ¼ turn CCW	18, turn GV-103 ¼ turn CW
EW-104	2 to 30.7 feet		19, turn GV-104 ¼ turn CCW	28 turn GV-104 ¼ turn CW
EW-105	2 to 23.8 feet		12, turn GV-105 ¼ turn CCW	22, turn GV-105 ¼ turn CW
EW-106	2 to 31.2 feet		14, turn GV-106 ¼ turn CCW	24, turn GV-106 ¼ turn CW
EW-107	2 to 24 feet		12, turn GV-107 ¼ turn CCW	22, turn GV-107 ¼ turn CW
EW-108	2 to 40 feet		22, turn GV-108 ¼ turn CCW	32, turn GV-108 ¼ turn CW
EW-109	2 to 23.3 feet		12, turn GV-109 ¼ turn CCW	22, turn GV-109 ¼ turn CW
EW-110	2 to 30 feet		18, turn GV-110 ¼ turn CCW	28 turn GV-110 ¼ turn CW
Pressure				
	Range	**Pressure**	**If less than**	**If greater than**
PI-101	10 to 42 psi		20, turn GV-101 ¼ turn CW	50, turn GV-101 ¼ turn CCW
PI-102	10 to 42 psi		20, turn GV-102 ¼ turn CW	50, turn GV-102 ¼ turn CCW
PI-103	15 to 42 psi		20, turn GV-103 ¼ turn CW	50, turn GV-103 ¼ turn CCW
PI-104	15 to 42 psi		20, turn GV-104 ¼ turn CW	50, turn GV-104 ¼ turn CCW
PI-105	15 to 42 psi		20, turn GV-105 ¼ turn CW	50, turn GV-105 ¼ turn CCW
PI-106	15 to 42 psi		20, turn GV-106 ¼ turn CW	50, turn GV-106 ¼ turn CCW
PI-107	15 to 42 psi		20, turn GV-107 ¼ turn CW	50, turn GV-107 ¼ turn CCW
PI-108	15 to 42 psi		20, turn GV-108 ¼ turn CW	50, turn GV-108 ¼ turn CCW
PI-109	15 to 42 psi		20, turn GV-109 ¼ turn CW	50, turn GV-109 ¼ turn CCW
PI-110	15 to 42 psi		20, turn GV-110 ¼ turn CW	50, turn GV-110 ¼ turn CCW
Flow				
	Range	**Flow**	**If less than**	**If greater than**
FIT-101	0.5 to 8 gpm		1.5, turn GV-101 ¼ turn CCW	2.7, turn GV-101 ¼ turn CW
FIT-102	0.5 to 8 gpm		1.5, turn GV-102 ¼ turn CCW	3.7, turn GV-102 ¼ turn CW
FIT-103	0.5 to 8 gpm		0.5, turn GV-103 ¼ turn CCW	2.0, turn GV-103 ¼ turn CW
FIT-104	0.5 to 8 gpm		0.5, turn GV-104 ¼ turn CCW	2.0, turn GV-104 ¼ turn CW
FIT-105	0.5 to 8 gpm		1.0, turn GV-105 ¼ turn CCW	3.0, turn GV-105 ¼ turn CW
FIT-106	0.5 to 8 gpm		0.5, turn GV-106 ¼ turn CCW	2.0, turn GV-106 ¼ turn CW
FIT-107	0.5 to 8 gpm		1.5, turn GV-107 ¼ turn CCW	4.0, turn GV-107 ¼ turn CW
FIT-108	0.5 to 8 gpm		1.5, turn GV-108 ¼ turn CCW	8.5, turn GV-108 ¼ turn CW
FIT-109	0.5 to 8 gpm		0.5, turn GV-109 ¼ turn CCW	2.0, turn GV-109 ¼ turn CW
FIT-110	0.5 to 8 gpm		1.5, turn GV-110 ¼ turn CCW	4.0, turn GV-110 ¼ turn CW

2.3.2 _____ SO : If any pump is not drawing the well down, the flow is low, the pressure is low and the valve can no longer be adjusted to improve, pull and clean the pump. See DOP-017, "Extraction Well Pump Wet End Cleaning" (day shift only). If the pump must be cleaned, record the extraction well ID and condition in the "1st Task List" section at the end of this document. If these conditions are met during the night shift, communicate this condition to the day shift operator or the lead operator.

2.4 Perform catalyst color check

2.4.1 _____ Perform catalyst color check using DOP-010, "Checking Catalyst Color." If, after performing this procedure, catalyst cleaning is needed, record this in the "1st Task List section and Operations Log Book. Notify the LO to schedule catalyst cleaning. Using the catalyst color guide, circle the numerical value that best represents the catalyst color.

1	2	3	4	5

2.5 Perform first round filter pressure check

2.5.1 _____ SO: Check pressure drop across iron removal filters and sediment removal filters using the table below. If the differential exceeds those stated in the table below, the filters should be replaced. Perform DOP-013 "Bag and Cartridge Filter Change" to replace the filters. If filters need to be replaced, record the filter IDs and condition in the "1st Task List" section at the end of this document.

Filters			Action
Identification	**Gauge**	**Pressure**	
BF-210 and BF-211	PI-220		If differential exceeds 50 psi, perform DOP-013 "Bag and Cartridge Filter Change."
	PI221		
	Differential		
BF-212 and BF-213	PI-222		If differential exceeds 50 psi, perform DOP-013.
	PI-223		
	Differential		
CF-201 and CF-202	PI-208		If differential exceeds 10 psi, perform DOP-013.
	PI-209		
	Differential		
BF-201 and BF-202	PI-207		If differential exceeds 10 psi, perform DOP-013.
	PI-208		
	Differential		

2.6 Perform first round tank water level

2.6.1 _____ SO: Retrieve a water level meter from the storage area and take it to the top of the influent tank. Remove the plug on the flange located on the northwest corner. Measure the depth to water through the flange opening. Measure to the white mark on the flange. Record the depth to water in the following table. If the depth to water measurement exceeds the predetermined set points, the table will instruct the operator to shut down the system.

Depth to Water from top of tank (T-401)	

Tank level too high. If depth to water is between these levels, shut down the system immediately. Call lead operator.	0.0 feet to 3.6
Acceptable depth to water range	3.7 feet to 4.9 feet
Tank level too low. If depth to water is between these levels, shut down the system immediately. Call lead operator.	5.0 feet to 8.0 feet

2.7 Gather maintenance work orders and check with security

2.7.1 _____ SO: Call or visit the security guard as per DOP-005. Gather the maintenance work orders generated by maintenance software JobPlus. The lead operator will print these out every week and distribute them between the four operators. They are located in the operator's office.

2.7.2 _____ SO: Bring the maintenance work orders and the "1st Task List" found at the end of this document to the treatment facility. The "Task List" will dictate what tasks are performed. (e.g., filter change, extraction well balancing, repair, catalyst cleaning, etc.) Print or copy the appropriate SOP/DOP to perform each task listed on the first shift work order.

2.8 Complete maintenance work orders and first task list

2.8.1 _____ SO: Complete any maintenance work orders assigned. Fill out maintenance work order sheet. Complete any tasks indicated the 1st task list section at the end of this document. When finished, file maintenance work orders and the 1st task list section in the Operator's filing cabinet in the Operator's office.

2.9 Perform Treatment Center Housekeeping

2.9.1 _____ SO: If time allows, perform DOP-006 "Treatment Center Housekeeping"

Stop. Please continue after hour 6 of your 12 hour shift.

2.10 Perform Photo-Cat screen check

2.10.1 _____ SO: Perform system operating parameter check list. Verify that the system parameters on the various Photo-Cat HMI screens are identical to the parameters listed in the tables below. If the parameters listed on the Photo-Cat HMI screen differ from the parameters listed here, record the parameters seen on the HMI screen and consult the Lead Operator.

"Well Pumps" Screen	Parameters	þ
Aeration SP:	30.0 lpm	

"Feed" Screen	Parameters	þ
INFL pH SP:	3	

"Reactor" Screen	Parameters	þ
Photo-Cat Aeration SP:	0.40 lpm	
SFCV -ISP:	40%	
SLCV-ISP:	40%	
CRU-ISP:	65 psi	
DPCV-ISP:	50 psi	

"Discharge" Screen	Parameters	þ
EFF pH SP:	6.5	

"Tank Config" Screen	**"Tank Level Settings"**	þ
High Level Alarm	4.3 feet	
Extraction Wells Off	4.0 feet	
Photo-Cat ON SP:	3.7 feet	
Tank Level SP:	3.5 feet	
Aeration ON	3.5 feet	
Photo-Cat OFF	3.0 feet	
Low Level Alarm	2.5 feet	
"Tank Config" Screen	**"Flow Rate Settings"**	
Initial Flow	23 gpm	
Minimum Flow	19 gpm	
"Tank Config" Screen	**"GAC Totalizer Set Points"**	
GAC Warning SP:	850,000 gallons	
GAC Fault SP:	1,000,000 gallons	
"Tank Config" Screen	**"Aeration System Alarm Set Points"**	
High Air Pressure	90 psi	
Low Air Pressure	40 psi	
High Pump Pressure	50 psi	
Low Pump Pressure	15 psi	

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"Photo-Cat Config" Screen	**"Installed Equipment"**	þ
Reactor Lamps	ON	
Acidification	Enabled	
Neutralization	Enabled	
Peroxide	Disabled	
Aeration	Enabled	
Mass Flow Control	Enabled	
PROFIBus Valves	Enabled	
DDL System	Enabled	
Rack Fan Cooling	Disabled	
Power Monitoring	Disabled	
Air Compressor	Disabled	
Photo-Cat L	Disabled	
Heat Exchanger	Disabled	
"Photo-Cat Config" Screen	**"Accumulator Constants"**	
High-High Level	95%	
High Level	86%	
High Nominal	81%	
Nominal	60%	
Low Nominal	55%	
Low Level	45%	
Low-Low Level	35%	
"Photo-Cat Config" Screen	**"pH Addition Constants"**	
Low Acid Pump Speed	1%	
Low NaOH Pump Speed	1%	
Acid-Caustic Deadband	1	
Discharge pH Deadband	1	
"Photo-Cat Config" Screen	**"Filtration Constants"**	
Bag Filter Max Pressure	15	
Cartridge Filter Max Pressure	15	
Disable Photo-Cat "2"	Enabled	
"Photo-Cat Config" Screen	**"CRU Constants"**	
Design Flow	50 gpm	
Min Slurry Flow	2 gpm	
Max DPCV Pressure	65 psi	
Min DPCV Pressure	40 psi	
SLCV Increments	1%	
SFCV Increments	1%	
"Photo-Cat Config" Screen	**"Mass Flow Controller"**	
Full Scale	2 lpm	
UPS Auto Dialer	Enabled	

2.11 **Take Inventory**

2.11.1 _____ SO: Check operating supply inventory against Operating Supply Inventory List. List any supplies needed and the quantity needed in the "Inventory List" at the end of this document.

Product in Supply Cabinet	**Required Stock**	**# currently in stock**
Paper towels	4 rolls	
3% Hydrogen Peroxide	2 bottles	
8 oz Fend All water additive	2 bottles	
Zip ties	1 package	
10, 20, 30 amp fuses	1 box each	
Brightly colored electrical tape	2 rolls	
D batteries	Pack of 4	
Garbage bags	2 boxes	
Silver paint pens	2	
Spill pads	1 pack	
Baking soda	5 boxes	
Vinegar	2 gallons	
pH buffer solution (4.01 and 7.01)	1 box of each	

Product in Conex Box	**Required Supply**	**# currently in stock**
Box of rags	1	
8 micron absolute bag filters	3 boxes	
10 micron nominal bag filters	3 boxes	
1 micron nominal cartridge filters	3 boxes	
55 gallon drums	4	
Plastic sheeting	2 boxes	
Spare Grundfos wet end	1	
Spare Grundfos Impellars	20	
93% Sulfuric Acid	2 gallons	
UV Lamps	40 lamps	
Photo-Cat Ballasts	10	
Sodium hydroxide pellets	1 2-gallon bucket	
Titanium dioxide	5 gal bucket	
pH probe (acid side) 91D	4	
pH probe (caustic side) 11D	4	
Simple green cleaner	1	
Alconox soap	3	
Isopropyl alcohol	2	
Atlas Copco Filters PD9, DD9	2 each	

Product in PPE Cabinet	**Required Supply**	**# currently in stock**
Nitrile Gloves (L and XL)	2 boxes each	
Leather Work Gloves	3 pair	
Safety Goggles	3 pair	
Face Shield	3	
Neoprene Apron	3	
Neoprene Sleeves	3	
Dust Mask	4	
8 Calorie Arc Flash Coveralls	1	
11 Calorie Arc Flash Hood	1	
Hardhat	2	

2.12 **Conduct second round leak check and component check.**

2.12.1 _____ SO: Perform leak and component checks as indicated in the following tables. Check listed equipment for leaks using your hand to check for moisture. If a leak is present, and minor, check the box and record the location of the leak in the "2nd Task List" section at the end of this

document. If there is a leak of any kind outside the treatment system building, shut down the system immediately.

Note: When checking pumps for proper operability, place your hand on top of the motor cover. Note any excessive heat or vibration. If excessive heat or vibration is present, record the condition in the "Task List" section at the end of this document. Check compressors for power and air pressure. Check the VFD fan by placing your hand over the vent on the outside of the VFD cabinet. If no air flow is noted, the treatment system must be shut down as per SOP-003 and the fan must be replaced. Perform DOP-LOTO-011 to lockout the VFD cabinet before replacing the fan.

Manifold										
_	•		•		•		•		•	
102		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
101		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
103		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
104		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
105		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
109		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
108		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
107		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
106		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
110		Flex Hose		Pressure Indicator		Valves		Double Containment Pipe		Flanges
BV-111		Flanges								
FM-201		Flanges								
2-inch Y Strainer		Flanges								

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Aeration System		
	•	
BV-400		Flanges
P-400		Flanges
BV-401		Flanges
BV-403		Flanges
BV-402		Flanges
BV-404		Flanges

Feed/Filter System		
	•	
Influent Pump P-201		Flange
SS/Plastic Transition		Flange
Pump Suction reducer		Flange
Airline to PCV		Connector

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Feed/Filter System								
	•		•		•		•	
Bag Filter BF-210		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-211		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-212		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-213		Lid		Drain Valve		Sample Ports		Pressure Gauge
Bag Filter BF-202		Lid		Drain Valve		Sample Ports		
Bag Filter BF-201		Lid		Drain Valve		Sample Ports		
Cartridge Filter CF-202		Lid		Drain Valve		Sample Ports		
Cartridge Filter CF-201		Lid		Drain Valve		Sample Ports		
Cartridge Filter Outlet		Flanges						

Acid System						
	•		•		•	
Pump P-202		Connectors		Pressure Relief Valve		Tubing
Static Mixer M-201		Static Mixer		Flanges		
Tank T-201		Tank				
pH Sensor AE-201		pH Sensor Connection				
Tank Dual Containment		Containment				
Transition to SS		Flange				
Transition to PVC		Flange				

.

Photo-Cat System		
	•	
Inlet Flange		Flange
A Transfer Outlet Flange		Flange
CRU		Flange
SFCV		Flange
Photo-Cat A Lamps		Flange
B Inlet Flange		Flange
B Outlet Flange		Flange
DPCV		Flange
Photo-Cat B Lamps		Flange
SLP		Flange
Accumulator		Flange
SLCV		Flange

Caustic System		
	•	
P-301		Connectors
P-301		Pressure Relief Valve
P-301		Tubing
T-301		Tank
Static Mixer M-301		Static Mixer
Static Mixer M-301		Flanges
pH sensor AE-301		Sensor connection
Transition to SS		Flange
Transition to PVC		Flange

GAC System								
	•			•			•	
GAC Manifold		Valves						
GAC-301		Valves	GAC-302		Valves	GAC-303		Valves
		Lid			Lid			Lid
		Blind Flange/Spool Piece			Blind Flange/Spool Piece			Blind Flange/Spool Piece
		Air Release			Air Release			Air Release
		Sample Port			Sample Port			Sample Port
		Flanges			Flanges			Flanges
		Underside			Underside			Underside
		Drain Valve			Drain Valve			Drain Valve

.

Component	
•	
	Influent Feed Pump P-201
	Aerator Pump P-400
	Slurry Loop Pump
	Air Compressor AC-600
	Air Compressor AC-601
	Iron Removal Bag Filters
	Sediment Removal Filters
	GAC
	VFD cabinet fan

Influent Tank		
	•	
Effluent Pipe		Double Containment Pipe
Aerator Piping		Double Containment Pipe
T-401 BV-407		Flange, Leak Tray
T-401		Manways
T-401		Flanges
T-401		Pressure Relief Valve
BV-407		Flanges
Influent/Recirc Pipe		Double Containment Pipe
Sump Inlet Pipe		Double Containment Pipe
Feed Pipe		Double Containment Pipe
Vapor Phase Carbon Unit		Check for Excessive Heat

.

Extraction Well Vault Leak Check (Day shift Only)				
	•		•	
EW-101		Cam Lock		Check Valve
EW-102		Cam Lock		Check Valve
EW-103		Cam Lock		Check Valve
EW-104		Cam Lock		Check Valve
EW-105		Cam Lock		Check Valve
EW-106		Cam Lock		Check Valve
EW-107		Cam Lock		Check Valve
EW-108		Cam Lock		Check Valve
EW-109		Cam Lock		Check Valve
EW-110		Cam Lock		Check Valve

2.13 Perform second round filter pressure check

2.13.1 _____ SO: Check pressure drop across iron removal filters and sediment removal filters using the table below. If the differential exceeds those stated in

the table below, record the filter IDs and action in the "2nd Task List" section at the end of this document.

Mid Shift Filters			*Action*
Identification	**Gauge**	**Pressure**	
BF-210 and BF-211	PI-220		If differential exceeds 50 psi, perform DOP-013 "Bag and Cartridge Filter Change."
	PI221		
	Differential		
BF-212 and BF-213	PI-222		If differential exceeds 50 psi, perform DOP-013.
	PI-223		
	Differential		
CF-201 and CF-202	PI-208		If differential exceeds 10 psi, perform DOP-013.
	PI-209		
	Differential		
BF-201 and BF-202	PI-207		If differential exceeds 10 psi, perform DOP-013.
	PI-208		
	Differential		

2.14 Perform second round extraction well balance check

2.14.1 _____ SO: Conduct second round extraction well balance check. Record the drawdown, pressure, and flow for each extraction well. Use the table to determine if the extraction well needs to be balanced. If balancing is needed, record the well name on the "2nd Task List" section at the end of this document. Refer back to this table as a general guide to balance the extraction well.

Drawdown				
	Range	**Draw Down Level**	**If less than**	**If greater than**
EW-101	2 to 24 feet		12, turn GV-101 ¼ turn CCW	22, turn GV-101 ¼ turn CW
EW-102	2 to 38 feet		20, turn GV-102 ¼ turn CCW	30, turn GV-102 ¼ turn CW
EW-103	2 to 20.9 feet		9, turn GV-103 ¼ turn CCW	18, turn GV-103 ¼ turn CW
EW-104	2 to 30.7 feet		19, turn GV-104 ¼ turn CCW	28 turn GV-104 ¼ turn CW
EW-105	2 to 23.8 feet		12, turn GV-105 ¼ turn CCW	22, turn GV-105 ¼ turn CW
EW-106	2 to 31.2 feet		14, turn GV-106 ¼ turn CCW	24, turn GV-106 ¼ turn CW
EW-107	2 to 24 feet		12, turn GV-107 ¼ turn CCW	22, turn GV-107 ¼ turn CW
EW-108	2 to 40 feet		22, turn GV-108 ¼ turn CCW	32, turn GV-108 ¼ turn CW
EW-109	2 to 23.3 feet		12, turn GV-109 ¼ turn CCW	22, turn GV-109 ¼ turn CW
EW-110	2 to 30 feet		18, turn GV-110 ¼ turn CCW	28 turn GV-110 ¼ turn CW
Pressure				
	Range	**Pressure**	**If less than**	**If greater than**
PI-101	10 to 42 psi		20, turn GV-101 ¼ turn CW	50, turn GV-101 ¼ turn CCW
PI-102	10 to 42 psi		20, turn GV-102 ¼ turn CW	50, turn GV-102 ¼ turn CCW
PI-103	15 to 42 psi		20, turn GV-103 ¼ turn CW	50, turn GV-103 ¼ turn CCW
PI-104	15 to 42 psi		20, turn GV-104 ¼ turn CW	50, turn GV-104 ¼ turn CCW
PI-105	15 to 42 psi		20, turn GV-105 ¼ turn CW	50, turn GV-105 ¼ turn CCW
PI-106	15 to 42 psi		20, turn GV-106 ¼ turn CW	50, turn GV-106 ¼ turn CCW
PI-107	15 to 42 psi		20, turn GV-107 ¼ turn CW	50, turn GV-107 ¼ turn CCW
PI-108	15 to 42 psi		20, turn GV-108 ¼ turn CW	50, turn GV-108 ¼ turn CCW
PI-109	15 to 42 psi		20, turn GV-109 ¼ turn CW	50, turn GV-109 ¼ turn CCW
PI-110	15 to 42 psi		20, turn GV-110 ¼ turn CW	50, turn GV-110 ¼ turn CCW
Flow				
	Range	**Flow**	**If less than**	**If greater than**
FIT-101	0.5 to 8 gpm		1.5, turn GV-101 ¼ turn CCW	2.7, turn GV-101 ¼ turn CW
FIT-102	0.5 to 8 gpm		1.5, turn GV-102 ¼ turn CCW	3.7, turn GV-102 ¼ turn CW
FIT-103	0.5 to 8 gpm		0.5, turn GV-103 ¼ turn CCW	2.0, turn GV-103 ¼ turn CW
FIT-104	0.5 to 8 gpm		0.5, turn GV-104 ¼ turn CCW	2.0, turn GV-104 ¼ turn CW
FIT-105	0.5 to 8 gpm		1.0, turn GV-105 ¼ turn CCW	3.0, turn GV-105 ¼ turn CW
FIT-106	0.5 to 8 gpm		0.5, turn GV-106 ¼ turn CCW	2.0, turn GV-106 ¼ turn CW
FIT-107	0.5 to 8 gpm		1.5, turn GV-107 ¼ turn CCW	4.0, turn GV-107 ¼ turn CW
FIT-108	0.5 to 8 gpm		1.5, turn GV-108 ¼ turn CCW	8.5, turn GV-108 ¼ turn CW
FIT-109	0.5 to 8 gpm		0.5, turn GV-109 ¼ turn CCW	2.0, turn GV-109 ¼ turn CW
FIT-110	0.5 to 8 gpm		1.5, turn GV-110 ¼ turn CCW	4.0, turn GV-110 ¼ turn CW

2.15 **Perform second round tank water level**

2.15.1 _____ SO: Retrieve a water level meter from the storage area and bring it to the top of the influent tank. Remove the plug on the flange located on the northwest corner. Measure the depth to water through the flange

opening. Measure to the white mark on the flange. Enter the depth to water into the following table. If the depth to water measurement exceeds the predetermined set points, the table will instruct the operator to shut down the system.

Second round tank water level	
Tank level too high. If depth to water is between these levels, shut down the system immediately. Call lead operator.	0.0 feet to 3.6 feet
Acceptable depth to water range	3.7 feet to 4.9 feet
Tank level too low. If depth to water is between these levels, shut down the system immediately. Call lead operator.	5.0 feet to 8.0 feet

2.16 **Perform tasks listed on 2nd Task List and check with security**

2.16.1 _____ SO: Check with the security guard as per DOP-005. Bring the "2nd Task List" found at the end of this document to the treatment facility. The "2nd Task List" will dictate what tasks are performed. (e.g., filter change, extraction well balancing, repair, catalyst cleaning) Print or copy the appropriate SOP/DOP to perform each task listed on the first shift work order.

2.16.2 _____ SO: Deliver list of any supplies needed to Lead Operator's desk.

2.16.3 _____ SO: If instructed by Lead Operator, perform DOP-011, "Treatment System Sampling." The Lead Operator will instruct as to what sample ports are to be sampled.

2.17 **Complete Daily Log Sheet**

2.18 SO: Approximately one hour before shift change, fill out the daily log sheet below.

Shift Daily Log

Lockheed Martin Tallevast Treatment Facility

Extraction Wells

Equipment	Hours	Pressure (psi)	Rate (gpm)	Total (gallons)*	Operational Status (On/ Off)
EW-101					
EW-102					
EW-103					
EW-104					
EW-105					
EW-106					
EW-107					
EW-108					
EW-109					
EW-110					
System Total					

Photo-Cat

Equipment	Flow Rate (gpm)	Hours	Operational Status (On/ Off)
Unit A			
Unit B			

Chemical Tank Level

Equipment	Flow Rate (gpm)	Hours	Operational Status (On/ Off)
Acid Tank			
Caustic Tank			

Influent Tank Level

Equipment	Water Level (feet)
T-401	

pH Probe Calibration

Equipment	Calibration (Yes/No)	pH Reading	pH Temperature
Influent Probe			
Primary Discharge Probe			
Secondary Discharge Probe			

Chemical Metering Pumps

Equipment	Flow Rate (mL/ hr)	Percent Capacity
Acid Metering Pump		
Caustic Metering Pump		

Aerator

Equipment	Air Flow Rate (lpm)
AR-400	

Compressors

Equipment	Regulator Pressure (psi)	Tank Pressure (psi)
AC-600		
AC-601		

GAC Change -Out

Equipment	Yes/ No
GAC - 301	
GAC - 302	
GAC - 303	

Lamp Replacement

Equipment	Yes/ No
Photo-Cat A	
Photo-Cat B	

Ballast Replacement

Equipment	Yes/ No
Photo-Cat A	
Photo-Cat B	

Chemical Delivery

Equipment	Yes/ No
Acid	
Caustic	

Fuses Replaced

Equipment	Yes/ No
P-400 Disconnect	
Photo-Cat A	
Photo-Cat B	
VFD Cabinet	

Manual Discharge pH Check

Equipment	pH Reading
Manual Reading	

County Meter

Equipment	Task	Total (gallons)
FM-301	Total (gallons)	

Effluent Header

Equipment	Pressure (psi)
PI-301	
PI-302	
PI-303	

Pre-Filters

Equipment	Differential Pressure	Filter Change (Yes/No)
Bag Filters		
Cartridge Filters		

Iron Filters

Equipment	Differential Pressure	Filter Change (Yes/No)
Primary Iron Filter		
Secondary Iron Filter		

Catalyst Color

Group	Equipment_id	Check Catalyst Color
Check Catalyst Color	Check Catalyst Color	

Shift Comments

Operator Name: _____

Operator Signature: _____

Date: _____

Time: _____

*Reading from HMI output.
**Reading from influent header when flow has stabilized from extraction pump.

1st Task List

Equipment ID	Task

2nd Task List

Equipment ID	Task

Inventory List (deliver to lead operator)

Supply needed	Quantity needed

Lockheed Martin Tallevast Treatment Facility	Non-Technical Procedure	**USE TYPE 1**	CR Number:

Manual: Operating and Maintenance Manual

Document Owner: Treatment Systems Operations

CHANGE CONTROL PROCEDURE

DISCIPLINE	CHANGE	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	X	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	X		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	06/24/09	6-10	Revised Log Sheet

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for completing the Daily Logs. Some items on the Daily Log will be entered using a hand-held personal digital assistant (PDA) and will be uploaded to the database every shift. The Operational Summary will be filled out in the Operations Log. This procedure will be performed once every 12-hour shift during the last hour of the shift. The Operational Summary will be reviewed by both the exiting and incoming Shift Operators during the shift change.

1.2 Scope and Applicability

This DOP applies to Daily Logs for the Interim Remedial Action Plan (IRAP) System at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

2.1.2 _____ SO: Refer to the "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent daily rounds. If issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: If the system is not running, verify that the time and reason preventing normal operations have been noted in the Operations Log. If not, consult with previous Shift Operator and record accordingly. **The daily log must be collected every shift even if the system is not operating.**

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 **Equipment Required**

Hand-held PDA, flashlight (night shift only), Operations log book.

3. DAILY LOGS STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

3.1 _____ SO: Retrieve the hand-held PDA from the charger in the Plant Operations Office. If the hand-held PDA is nonoperational, use the paper copy attached to this DOP.

3.2 _____ SO: Return to the treatment system building and power up the hand-held PDA.

3.3 _____ SO: Select "Daily Logs" from the main menu.

3.4 _____ SO: The hand-held PC will now display a list of data to collect. Data will be collected from the HMI screen, components on the extraction well manifold, components on the effluent manifold and the acid and caustic pumps. Manual discharge pH check consists of using the handheld pH meter to verify that the effluent pH meter is accurate.

3.5 _____ SO: In the Operations Log, record the following information: Maintenance performed, problems with the treatment system (if applicable), filters changed, instruments calibrated, components replaced and treatment system shutdown times and explanations.

3.6 _____ SO: Return the hand-held PDA to the Plant Operations Office and place it on the charger/sync device. The handheld device will now sync to the office PC and to the database. The daily log should automatically print. File in the lead operator's cubicle. If, for any reason, the daily log cannot be collected electronically, the operator must collect the data manually (use Log Sheet in Appendix D of the Operations, Maintenance, and Monitoring Manual).

4. COMPLETION

4.1 _____ SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- SOP-002 “Routine System Start Up”
- SOP-003 “Short-Term Treatment System Shutdown”
- Operations, Maintenance, and Monitoring Manual
- Contingency Plan

CHANGE CONTROL PROCEDURE

DISCIPLINE	CHANGE	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	X	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	X		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	4/06/11		Revised to include power monitor

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) is to be followed when responding to the various alarms on the Photo-Cat treatment system. This DOP presents possible alarm causes and troubleshooting assistance. Due to the complex nature of the Photo-Cat system and its various components, this document will not always present the correct solution. A critical alarm will automatically shut down the treatment system. If the critical alarm fails to shut down the system, the system must be manually shut down immediately. Refer to SOP-003, "Short Term System Shut Down" to shut down the system.

1.2 Scope and Applicability

This procedure applies to alarm response at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cat A and B.

2.1.2 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3. PLANNING AND COORDINATION

3.2 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation." in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

Procedure Started: Time _____ Date: _____ SO _____

4. CRITICAL ALARMS

High/high level in extraction wells (LAHH-101 to LAH-110)

High level in tank T-400 (LAH-400A and LAH-400B)

Low/low level in tank T-400 (LALL-401)

High/high level in tank T-400 (LSHH-402B)

High/high/high level in tank T-400 (LAHHH-402A)

High level in interstitial space of tank T-400 (LAH-403)

High/high level in interstitial space of tank T-400 (LAHH-404B)

High/high/high level in interstitial space of tank T-400 (LAHHH-404A)

High level in containment piping for suction feed line from tank T-400 (LAH-405)

High level in containment piping for aeration recirculation line to tank T-400 (LAH-406)

High level in containment piping for building sump discharge line to tank T-400 (LAH-407)

High level in containment piping for influent line to tank T-400 (LAH-408)

High level in treatment building (LAH-409)

High level in treatment building (LAH-410)

High pH at acid injection point (AAH-201)

Low pH at acid injection point (AAL-201)

High pH at caustic injection point (AAH-301)

Low pH at caustic injection point (AAL-301)

High level in treatment building sump (LAH-500)

High/high level in treatment building sump (LAH-501)

Timer fault on P-500 (KA-500)

High differential pH between effluent pH probes (AAH-302)

High water pressure in aerator piping (PAH-400)

High/high water pressure in aerator piping (PAHH-400)

Low water pressure in aerator piping (PAL-400)

High air pressure in aerator airline (PAH-401)

Low air pressure in aerator airline (PAL-401)

High/Low Incoming Voltage (system shut down manually)

5. STEP BY STEP INSTRUCTIONS

5.1 _____ SO: If a critical alarm occurs, verify that the treatment system has automatically shut down. If the critical alarm fails to shut down the system, the system must be manually shut down immediately. Refer to SOP-003, "Short Term System Shut Down" to shut down the system. Never assume that the condition is a false alarm.

5.2 _____ SO: Record the alarm condition and time of the alarm in the operations log.

5.3 _____ SO: Notify the lead operator immediately if the alarm condition is valid, has caused equipment damage, and/or has resulted in a release of any kind. The lead operator can be contacted by phone. Notification numbers are located on the site phone or in the treatment plant office.

CAUTION: Do not restart the system unless the lead operator has given permission and the alarm condition is resolved. If a redundant alarm is triggered, this may indicate a problem with other critical alarms.

5.4 _____ SO: Determine the cause of the alarm. Take appropriate measures to address the cause. The following list offers possible causes that may be related to triggering the alarm. NOTE: Start with the assumption that the alarm was triggered for the purpose it was intended. Do not assume that it is a FALSE alarm. NEVER override any alarm function.

5.5 _____ SO: Make the appropriate repairs by following the specific DOP or implement the appropriate solutions/notifications.

6. ALARMS AND POSSIBLE CAUSES

6.1 **High/High Level in Extraction Wells (LAHH-101 to LAH-110).** The purpose of this alarm is to warn operator of the accumulation of water in the upper section of any of the ten (10) Extraction Wells. This could be an indication of failure of the pump or of influx

of water from an unknown source. If it is determined that water has not accumulated, the following bullets identify false alarm possibilities:

- This alarm could be triggered by a faulty level sensor in the extraction wells. See DOP-015, "Extraction Well Vault Access" to inspect the sensor.

- This alarm could be triggered by a leak in the extraction well piping. See DOP-015, "Extraction Well Vault Access" to visually inspect for leaks.

- This alarm could be triggered by flooding near an extraction well. Visually inspect area for flooding.

- This alarm could be triggered by an incorrect set point. Go to the HMI screen on Photo-Cat A. Tap the "Admin" icon on the touch screen. Enter your password. Tap the "Wet Wells Configuration" icon. Check the "High Level" setting on the extraction well. The appropriate set point is "2 feet below grade" (fbg). If the set point is set to any other setting, reset it to 2 fbg. This alarm condition may also be cause by a faulty analog input card in the VFD cabinet.

6.2 **High Level in Tank T-400 (LAH-400A and LAH-400B).** The purpose of this alarm is to shut down the extraction wells when the water level in the tank reaches the high level set point (4 feet). If the extraction wells continue to run after the water level in the tank has reached 4 feet, there is a problem with this alarm. Verify the high level set point is set to 4 feet on the "tank configuration" screen. If the set point is correct and the extraction wells continue to operate, shut down the system and notify the lead operator immediately.

6.3 **Low/Low Level in Tank T-400 (LALL-401)**. The purpose of this alarm is to prevent operation of the system without the appropriate amount of water for treatment, potentially damaging the pumps and the Photo-Cat system. This alarm will also disable the extraction wells if there is a leak in the influent tank. Measure the water level inside the tank with a water level meter (located in the Conex box). If the water level is below 2 feet from the bottom of the tank, visually inspect the area around the tank for water. If water is noted, perform "spill response" and "spill notifications" in the contingency plan. In the event that water level in the influent tank does not fall below the alarm set point, the following bullets identify false alarm possibilities:

- This alarm could be triggered by a faulty float switch. Retrieve a water level meter from the Conex box, and take a level reading to confirm the level in the tank. Compare this reading to the reading shown on the HMI screen on Photo-Cat A. Tap the "Well Pumps" icon and verify the tank level. This information is displayed in the box inside the illustration of the tank that reads "Tank Level." If the difference between the two readings is substantial, the float switch may need to be replaced.

- If no leaks are found in the tank or surrounding area, check the influent tank dual containment. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 to catch any water that might exit the valve. Slowly open BV-414 on the southwest side of the influent tank (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the influent tank. Close BV-414 and call the lead operator immediately.

- This alarm could be triggered by an extraction well shut down with the continued operation of the Photo-Cat system. Go to the HMI screen on Photo-Cat A. Tap the "Wet Wells" icon. Verify that the extraction wells are operating by looking at the box in the upper right hand corner of this screen labeled "enable well pumps." If the icon in the box is red and reads "enabled," the extraction wells are on. If the icon in the box reads "disabled" and is red, the extraction wells are off and must be enabled. To do this tap the red icon that reads "disabled." The icon should turn from red to green and the extraction wells will now be enabled. If, for any reason, the Photo-Cat system continues to operate when the water level in the tank is lower than 3 feet, shut down the system and call the lead operator immediately.

6.4 **High/High Level in Tank T-400 (LSHH-402B).** The purpose of this alarm is a redundant sensor to prevent overflow of the Influent Tank. Retrieve a water level meter from the Conex box, and take a level reading to confirm the level in the tank. If there is standing water on the top of the tank, and the water level inside the tank has reached the top, perform "spill response" and "spill notifications" in the contingency plan. In the event that water levels in the influent tank do not exceed the alarm set point, the following bullets identify false alarm possibilities:

- This alarm could be triggered by a faulty float switch. Retrieve a water level meter from the Conex box, and take a level reading to confirm the level in the tank. Compare the manual water level reading to the reading shown on the HMI screen on Photo-Cat A. Tap the "Well Pumps" icon and verify the tank level. This information is displayed in the box inside the illustration of the tank that reads "Tank Level." If the readings are significantly different, the switch may need to be replaced. Triggering of this alarm could indicate a failure of the high level in tank T-400 alarm (LAH-400A and LAH 400B).

- This alarm could be triggered by a system shut down with the continued operation of the extraction wells. Go to the HMI screen on Photo-Cat A. Tap the "Wet Wells" icon. Verify that the extraction wells are off by looking at the box in the upper right hand corner of this screen labeled "enable well pumps." If the icon in the box is red and reads "disabled," the extraction wells are off. If the icon in the box reads "enabled" and is green, the extraction wells are on and must be disabled. To do this, tap the green icon that reads "enabled." The icon should turn from green to red and the extraction wells will now be disabled.

6.5 **High/High/High Level in Tank T-400 (LAHHH-402A).** The purpose of this alarm is a triple redundant sensor to prevent overflow of the Influent Tank. Retrieve a water level meter from the Conex box, and take a level reading to confirm the level in the tank. If there is standing water on the top of the tank, and the water level inside the tank has reached the top, perform spill response and spill notifications in the contingency plan. In the event that water levels in the influent tank do not exceed the alarm set point, the following bullets identify false alarm possibilities:

- This alarm could be triggered by a faulty float switch. Retrieve a water level meter from the Conex box, and take a level reading to confirm the level in the tank. Compare this reading to the reading shown on the HMI screen on Photo-Cat A. Tap the "Well Pumps" icon and verify the tank level. This information is displayed in the box inside the illustration of the tank that reads "Tank Level." If there is a significant difference between the manual water level reading and the reading on the HMI, the float switch may need to be replaced. Triggering of this alarm could indicate a failure of the high level in tank T-400 alarm (LAH-400A and LAH 400B) and the high/high level in tank T-400 alarm (LAHHH 402A). These alarms must be tested. See DOP-004, "Critical Alarm Testing."

- This alarm could be triggered by a system shut down with the continued operation of the extraction wells. Go to the HMI screen on Photo-Cat A. Tap the "Wet Wells" icon. Verify that the extraction wells are off by looking at the box in the upper right hand corner of this screen labeled "enable well pumps." If the icon in the box is red and reads "disabled," the extraction wells are off. If the icon in the box reads "enabled" and is green, the extraction wells are on and must be disabled. To do this, hit the green icon that reads "enabled." The icon should turn from green to red and the extraction wells will now be disabled.

6.6 **High Level in Interstitial Space of Tank T-400 (LAH-403).** The purpose of this alarm is to indicate leakage from the primary vessel to the tank secondary containment. This alarm could be triggered by a leak in the influent tank. Visually inspect the tank and surrounding area for leaks. If any leaks are noted, see "Spill Response" and "Spill Notifications" in the contingency plan for appropriate actions. Notify the Operations Manager as soon as practical. If no leaks are found in the tank or surrounding area, check the influent tank dual containment. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 to catch any water that might exit the valve. Slowly open BV-414 on the southwest side of the influent tank (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the influent tank. Close BV-414 and call the Operations Manager immediately.

In the event that water in the influent tank interstitial space is not caused by a leaking primary vessel, the following bullets identify false alarm possibilities:

- This alarm could be triggered by condensation in the interstitial space of the influent tank. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 on the southwest side of the influent tank (T-400) to catch any water that might exit the valve. Slowly open BV-414 and direct any water into the bucket. Reminder: If water continues to exit this valve, there is a possible leak in the influent tank. Close BV-414 and call the Operations Manager immediately.

6.7 **High/High Level in Interstitial Space of Tank T-400 (LAHH-404B).** The purpose of this alarm is a redundant sensor to indicate leakage from the primary vessel to the secondary containment. This alarm could be triggered by a leak in the influent tank. Visually inspect the tank and surrounding area for leaks. If any leaks are noted, see "Spill Response" and "Spill Notifications" in the contingency plan for appropriate actions. Notify the lead operator immediately. If no leaks are found in the tank or surrounding area, check the influent tank dual containment. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 to catch any water that might exit the valve. Slowly open BV-414 on the southwest side of the influent tank (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the influent tank. Close BV-414 and call the lead operator immediately.

In the event there is no water in the secondary containment, the following bullets identify false alarm possibilities:

- Triggering of this alarm may indicate a failure of any of the components (sensor, A/D converter, transmitter, PLC, relay, wiring) of the high level alarm circuit attached to tank T-400 (LAH-403). LAH-403 will require testing. See DOP-004, "Critical Alarm Testing."

- This alarm could be triggered by condensation in the interstitial space of the influent tank. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 on the southwest side of the influent tank (T-400) to catch any water that might exit the valve. Slowly open BV-414 and direct any water into the bucket. Reminder: If water continues to exit this valve, there is a possible leak in the influent tank. Close BV-414 and call the lead operator immediately.

6.8 **High/High/High Level in Interstitial Space of Tank T-400 (LAHHH-404A).** The purpose of this alarm is a triple redundant sensor to indicate leakage from the primary vessel to the secondary containment. This alarm could be triggered by a leak in the influent tank. Visually inspect the tank and surrounding area for leaks. If any leaks are noted, see "Spill Response" and "Spill Notifications" in the contingency plan. Notify the lead operator immediately. If no leaks are found in the tank or surrounding area, check the influent tank dual containment. Don nitrile gloves. Retrieve a 5-gallon bucket

from the Conex box. Place the bucket underneath BV-414 to catch any water that might exit the valve. Slowly open BV-414 on the southwest side of the influent tank (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the influent tank. Close BV-414 and call the lead operator immediately.

In the event there is no water in the secondary containment, the following bullets identify false alarm possibilities:

- Triggering of this alarm may indicate a failure of any of the components (sensor, A/D converter, transmitter, PLC, wiring, relay) of the high level alarm circuit attached to tank T-400 (LAH-403) and/or a failure of any of the components of the high/high level alarm circuit attached to tank T-400 (LAHH-404B). LAH-403 and LAHH-404B will require testing. See DOP-004, "Critical Alarm Testing."

- This alarm could be triggered by condensation in the interstitial space of the influent tank. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 on the southwest side of the influent tank (T-400) to catch any water that might exit the valve. Slowly open BV-414 and direct any water into the bucket. Reminder: If water continues to exit this valve, there is a possible leak in the influent tank. Close BV-414 and call the lead operator immediately.

6.9 **High Level in Containment Piping for Suction Feed Line from Tank T-400 (LAH-405**). This alarm indicates that there may be water in the dual containment piping for the suction feed line from the influent tank (T-400). This alarm could be caused by a leak in the stainless steel suction feed line or by condensation in the dual containment piping. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-413 to catch any water that might exit the valve. Slowly open BV-413 on the west side of the treatment system building (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the suction feed line. Close BV-413 and call the lead operator immediately.

In the event there is no water in the dual containment piping, the following bullets identify false alarm possibilities:

- Triggering of this alarm may indicate a failure of any of the components (sensor, A/D converter, transmitter, PLC, wiring, relay) of the high level alarm. This will require testing in accordance with DOP-004, "Critical Alarm Testing."

6.10 **High Level in Containment Piping for Aeration Recirculation Line to Tank T-400 (LAH-406).** This alarm indicates water in the dual containment piping for the aeration recirculation line from the influent tank (T-400). This alarm could be caused by a leak in the stainless steel recirculation line or by condensation in the dual containment piping. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-411 to catch any water that might exit the valve. Slowly open

BV-411 on the west side of the treatment system building (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the aeration recirculation line. Close BV-411 and call the lead operator immediately.

In the event there is no water in the dual containment piping, the following bullets identify false alarm possibilities:

- Triggering of this alarm may indicate a failure of any of the components (sensor, A/D converter, transmitter, PLC, relay, wiring) of the high level alarm. This will require testing in accordance with DOP-004, "Critical Alarm Testing."

6.11 **High Level in Containment Piping for Building Sump Discharge Line to Tank T-400 (LAH-407).** This alarm indicates water in the dual containment piping for the building sump discharge line from the influent tank (T-400).This alarm could be caused by a leak in the stainless steel discharge line or by condensation in the dual containment piping. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-414 to catch any water that might exit the valve. Slowly open BV-414 on the west side of the treatment system building (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the building sump discharge line. Close BV-414 and call the lead operator immediately.

In the event there is no water in the dual containment piping, the following bullets identify false alarm possibilities:

- Triggering of this alarm may indicate a failure of any of the components (sensor, A/D converter, transmitter, PLC, relay, wiring) of the high level alarm. This will require testing in accordance with DOP-004, "Critical Alarm Testing."

6.12 **High Level in Containment Piping for Influent Line to Tank T-400 (LAH-408).** This alarm indicates water in the dual containment piping for the influent line from the influent tank (T-400). This alarm could be caused by a leak in the stainless steel influent line or by condensation in the dual containment piping. Don nitrile gloves. Retrieve a 5-gallon bucket from the Conex box. Place the bucket underneath BV-412 to catch any water that might exit the valve. Slowly open BV-412 on the west side of the treatment system building (T-401). If more than approximately 1 gallon of water exits this valve, there is a possible leak in the influent line. Close BV-412 and call the lead operator immediately.

In the event there is no water in the dual containment piping, the following bullets identify false alarm possibilities:

- Triggering of this alarm may indicate a failure of any of the components (sensor, A/D converter, transmitter, PLC, wiring, relay) of the high level alarm. This will require testing in accordance with DOP-004, "Critical Alarm Testing."

6.13 **High Level in Treatment Building (LAH-409) or High Level in Treatment Building (LAH-410).** These two alarms indicate flooding or a spill on the treatment building floor. Visually inspect the treatment system building for flooding on the floor. If flooding is present, ensure the system is shut down, isolate the leaking equipment/piping if possible, and sweep/squeegee water toward the building sump (located on the south side of the treatment system building). Notify the Operations Manager immediately.

6.14 **High pH at Acid Injection Point (AAH-201).** Triggering of this alarm indicates an influent pH higher than the predetermined set point. This indicates that the influent water is not receiving the proper amount of acid. This could be caused by air bubbles in the acid injection line. Don the following PPE located in the PPE cabinet: nitrile gloves, neoprene sleeves, neoprene apron, safety goggles and splash shield. With the system shut down, isolate the acid side static mixer. Retrieve a 5-gallon bucket from the Conex box, and place it underneath the acid injection point to catch any water that may be released. Unscrew the acid injection fitting, and direct any acid that may be released from the fitting into the bucket. Push the "100%" button and pull the pressure relief valve on the acid pump with the acid injection fitting over the bucket. This will purge the acid line of any air that it may contain. Dispose of the acidic water in the 5-gallon bucket in the building sump. Rinse this bucket three times to ensure that no acid residue remains. Direct all rinse water into the building sump. Remove PPE and return it to the PPE cabinet.

Triggering of this alarm could indicate a low acid level or a leak in the acid line. Visually inspect the acid side "Saf Tainer" (yellow dual containment) to ensure that there is no acid leak. A leak could cause pooling of acid inside the yellow "Saf Tainer." Don the following PPE located in the PPE cabinet: nitrile gloves, neoprene sleeves, neoprene apron, safety goggles and splash shield. Visually inspect the northwest side of the treatment system building, the acid line and acid injection fitting for any signs of acid. If any acid is present, isolate the tubing/piping/fittings, and retrieve spill kit from the storage shed located outside on the east side of the building. If the spill is on the floor and is less than 5 gallons, use a chemical absorbent sock (inside the spill kit) to contain the leak. See "Spill Response" in the contingency plan (located on the door of the treatment system building) to determine the response to the spill. Notify the lead operator immediately.

Triggering of this alarm could be caused by a faulty acid side pH sensor. Perform DOP-024, "pH sensor calibration" to determine the operability of the pH sensor. If the sensor needs to be replaced, spares can be found in the Conex box.

6.15 **Low pH at Acid Injection Point (AAL-201).** Triggering of this alarm indicates an influent pH lower than the predetermined set point. This alarm generally indicates a faulty acid side pH sensor, but also may be caused by a faulty chemical dosing pump.

Perform DOP-024 "pH Sensor Calibration" to determine operability. If the sensors need to be replaced, there are spares in the Conex box.

6.16 **High pH at Caustic Injection Point (AAH-301).** Triggering of this alarm indicates an effluent pH higher than the predetermined set point. This alarm generally indicates a faulty caustic side pH sensor, but may be caused by a faulty chemical dosing pump. Perform DOP-024 "pH Sensor Calibration" to determine operability. If the sensors need to be replaced, there are spares in the Conex box.

6.17 **Low pH at Caustic Injection Point (AAL-301).** Triggering of this alarm indicates an effluent pH lower than the predetermined set point. This indicates that the effluent water is not receiving the proper amount of caustic (sodium hydroxide). This could be caused by air bubbles in the caustic injection line that cause the pump to lose prime. Don the following PPE located in the PPE cabinet: nitrile gloves, neoprene sleeves, neoprene apron, safety goggles and splash shield. With the system shut down, isolate the caustic side static mixer. Retrieve a 5-gallon bucket from the Conex box, and place it underneath the caustic injection point to catch any water that may be released. Unscrew the caustic injection fitting and direct any caustic that may be released from the fitting into the bucket. Push the "100%" button, and pull the pressure relief valve on the caustic pump with the caustic injection fitting over the bucket. This will purge the caustic line of any air that it may contain. Dispose of the high pH water in the 5-gallon bucket in the building sump. Rinse this bucket three times to ensure that no caustic residue remains. Direct all rinse water into the building sump. Remove PPE and return it to the PPE cabinet.

Triggering of this alarm could indicate a low caustic level or a leak in the caustic line. Visually inspect the caustic side "Saf Tainer" (yellow dual containment) to ensure that there is no caustic leak. A leak could cause pooling of caustic inside the yellow "Saf Tainer." Don the following PPE located in the PPE cabinet: nitrile gloves, neoprene sleeves, neoprene apron, safety goggles and splash shield. Visually inspect the northeast side of the treatment system building, the caustic line and caustic injection fitting for any signs of sodium hydroxide. If any caustic is present and is determined to be less than 5 gallons, isolate the tubing/piping/fittings and retrieve a spill kit from the storage shed located outside on the east side of the building. If the spill is on the floor, use a chemical absorbent sock (inside the spill kit) to contain the leak. See "Spill Response" in the contingency plan (located on the door of the treatment system building) to determine the response to the spill. Notify the lead operator immediately.

Triggering of this alarm could be caused by a faulty caustic side pH sensor. Perform DOP-024, "pH sensor calibration" to determine the operability of the pH sensor. If the sensor needs to be replaced, spares can be found in the Conex box.

6.18 **High Level in Treatment Building Sump (LAH-500).** Triggering of this alarm indicates a high water level in the treatment system building sump. This could be

caused by a leak in the piping/components of the treatment system. Visually inspect the treatment system building for signs of a leak. If leaks are found, isolate the leaking piping/components if possible and insure that the system is shut down. Notify the lead operator immediately.

Triggering of this alarm could indicate overfilling of the sump while performing another task. If this is the case, shut off any influent water source to the sump, and allow the sump pump to evacuate the water from the sump before continuing the task.

Triggering of this alarm could indicate a sticking float in the sump. Gently lift and shake the float (LAH-500) to correct this problem.

Triggering of this alarm could indicate a faulty sump pump/sump pump float. Inspect the sump pump and float for any problems. If a new sump pump is needed notify the lead operator immediately.

6.19 **High/High Level in Treatment Building Sump (LAH-501).** Triggering of this alarm indicates a high water level in the treatment system building sump. This could be caused by a leak in the piping/components of the treatment system. Visually inspect the treatment system building for signs of a leak. If leaks are found, isolate the leaking piping/components if possible and insure that the system is shut down. Notify the lead operator immediately.

Triggering of this alarm could indicate overfilling of the sump while performing another task. If this is the case, shut off any influent water source to the sump, and allow the sump pump to evacuate the water from the sump before continuing the task.

Triggering of this alarm could indicate a sticking float in the sump. Gently lift and shake the float (LAH-500) to correct this problem.

Triggering of this alarm could indicate a faulty sump pump/sump pump float. Inspect the sump pump and float for any problems. If a new sump pump is needed notify the operations manager immediately.

Triggering of this alarm could indicate the failure of the high level in treatment building sump (LAH-500).This alarm must be tested. Refer to DOP-004, “Critical Alarm Testing” to perform this task.

6.20 **Timer Fault on P-500 (KA-500).** Triggering of this alarm is indicative of 15 minutes or more of continuous sump pump operation. This could be caused by a leak in the piping/components of the treatment system. Visually inspect the treatment system building for signs of a leak. If leaks are found, isolate the leaking piping/components if possible and ensure that the system is shut down. Notify lead operator immediately.

Triggering of this alarm could indicate 15 or more minutes of sump pump operation while performing another task. If this is the case, shut off any influent water source to the sump, and allow the sump pump to evacuate the water from the sump before continuing the task.

6.21 **High Differential pH Between Effluent pH Probes (AAH-302).** Triggering of this alarm indicates a differential between the primary and secondary pH sensors on the effluent side. This alarm generally indicates a faulty caustic side pH sensor. Perform DOP-024, "pH Sensor Calibration" on both caustic side sensors to determine operability. If the sensors need to be replaced, there are spares in the Conex box.

6.22 **High Water Pressure in Aerator Piping (PAH-400).** Triggering of this alarm indicates high water pressure in the aerator line. This could be caused by iron fouling inside of the aerator or an obstruction in the piping. Perform DOP-028, "Aerator Cleaning" to remove the iron buildup. This could also be caused by a faulty pressure sensor.

6.23 **High/High Water Pressure in Aerator Piping (PAH-400).** Triggering of this alarm indicates high water pressure in the aerator line. This could be caused by iron fouling inside of the aerator. Perform DOP-028, "Aerator Cleaning" to remove the iron buildup. Triggering of this alarm could indicate the failure of the high water pressure in aerator piping alarm (PAH-400).

6.24 **Low Water Pressure in Aerator Piping (PAL-400).** Triggering of this alarm indicates low water pressure in the aerator line. This could be caused by a leak in the aeration system piping. Ensure the system is shut down, and look for any signs of a leak in the aeration system piping. If no signs are present, the most likely cause is a loss of prime on P-400 (aeration system pump). Remove the air by priming the system. Retrieve the shop vac from the Conex box. Don nitrile gloves. Use the shop vac to pull water through the aerator line. Switch the aeration pump to "Hand" mode. This will allow manual operation of the aeration pump. Put the vacuum hose over the aerator drain line, and slowly open BV-402. Use your hands to seal the vac hose and aerator drain line to the best of your ability. Operate the shop vac for about 3 minutes, then close BV-402. Verify water pressure on the pressure gauge. Once the water pressure is within limits, take the aeration pump out of "Hand" mode, and return it to "Auto." This may also be caused by iron fouling of P-400. Replace wet end with spare and have the fouled pump cleaned and resealed.

6.25 **High Air Pressure in Aerator Airline (PAH-401).** Triggering of this alarm indicates high air pressure in the aerator line. This could be caused by iron fouling inside of the aerator. Perform DOP-028, "Aerator Cleaning" to remove the iron buildup.

6.26 **Low Air Pressure in Aerator Airline (PAL-401).** Triggering of this alarm indicates low air pressure in the aerator line. This could be caused by a leak in the airline, a faulty

compressor, or a faulty mass air flow controller. Retrieve a spray bottle labeled "potable water." Methodically spray each fitting on the stainless steel airline from the aeration system to the compressor. A leaking fitting will cause the sprayed water to bubble up. Take note of any air leaks, as they will need repair.

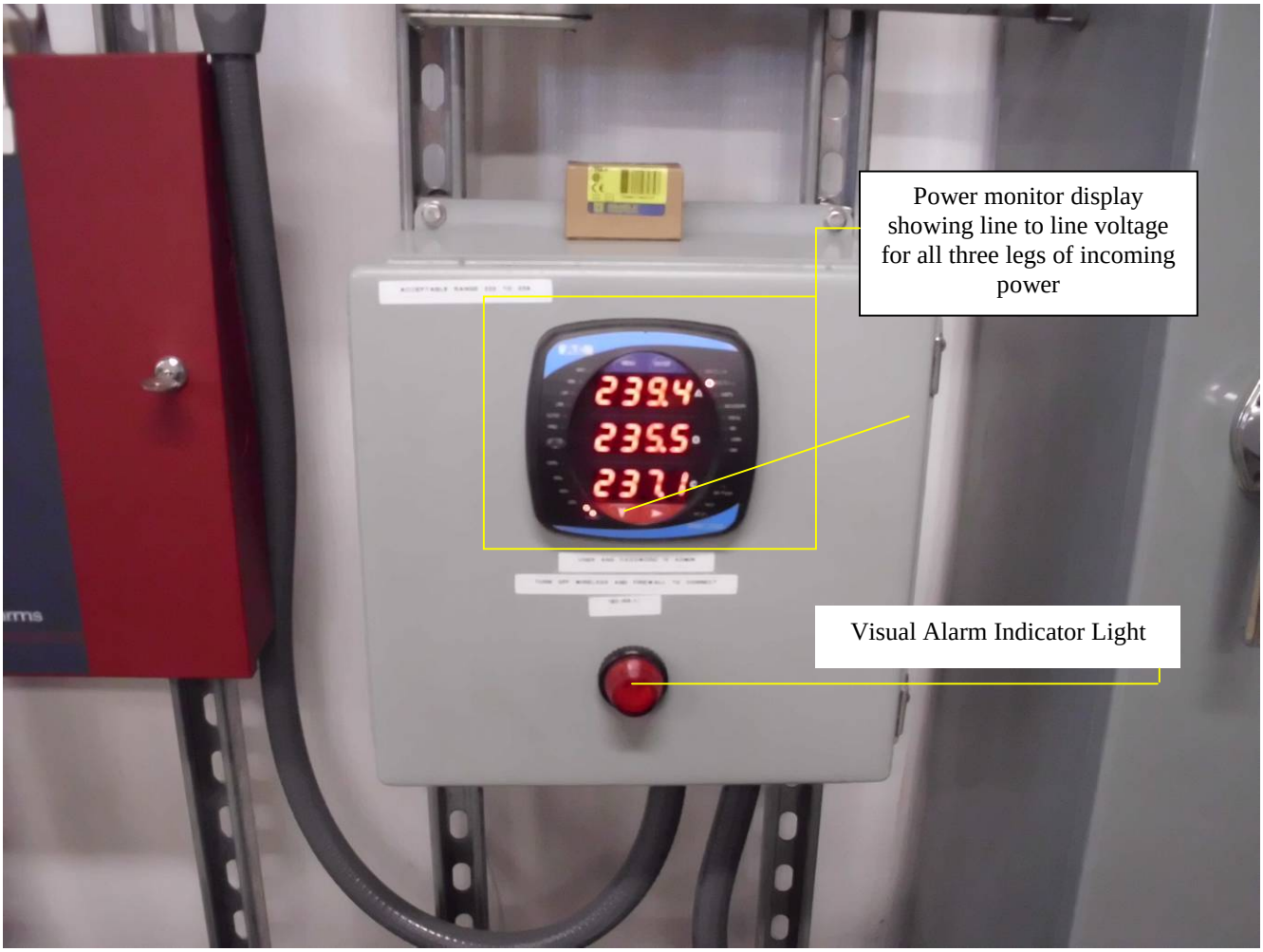
Triggering of this alarm could be cause by nonoperational compressor (AC-601). Verify that there is power to the compressor. Check the manual pressure gauges to verify appropriate pressure.

6.27 **High/Low Voltage Incoming Power Alarm.** The triggering of this alarm indicates that a power surge or power sag has caused the incoming voltage to exceed the cautionary limits (less than 228 volts or more than 252 volts) for more than three seconds.

Cautionary limits – Incoming voltage that is **lower than 228 volts or higher than 252 volts on any of the three legs** will trigger a cautionary alarm. This is our first line of defense from potentially damaging power surges or power sags. If the voltage is within the "action limit range" between 222 volts and 258 volts, there is no immediate threat to equipment, but voltages that exceed the cautionary limits will be actively monitored at the power monitoring station, and the operator will be ready to act if the voltage surpasses the action limits on any of the three legs.

Action limits – If the voltage on any of the three legs exceeds action limits, a complete system shut down is required. The action limits have been exceeded if the incoming voltage is **higher than 258 volts or lower than 222 volts on any of the three legs**. If the incoming voltage is higher or lower than the action limits for any amount of time, equipment may be damaged unless the equipment is protected by donning the required arc flash PPE and shutting the equipment off at the breaker.

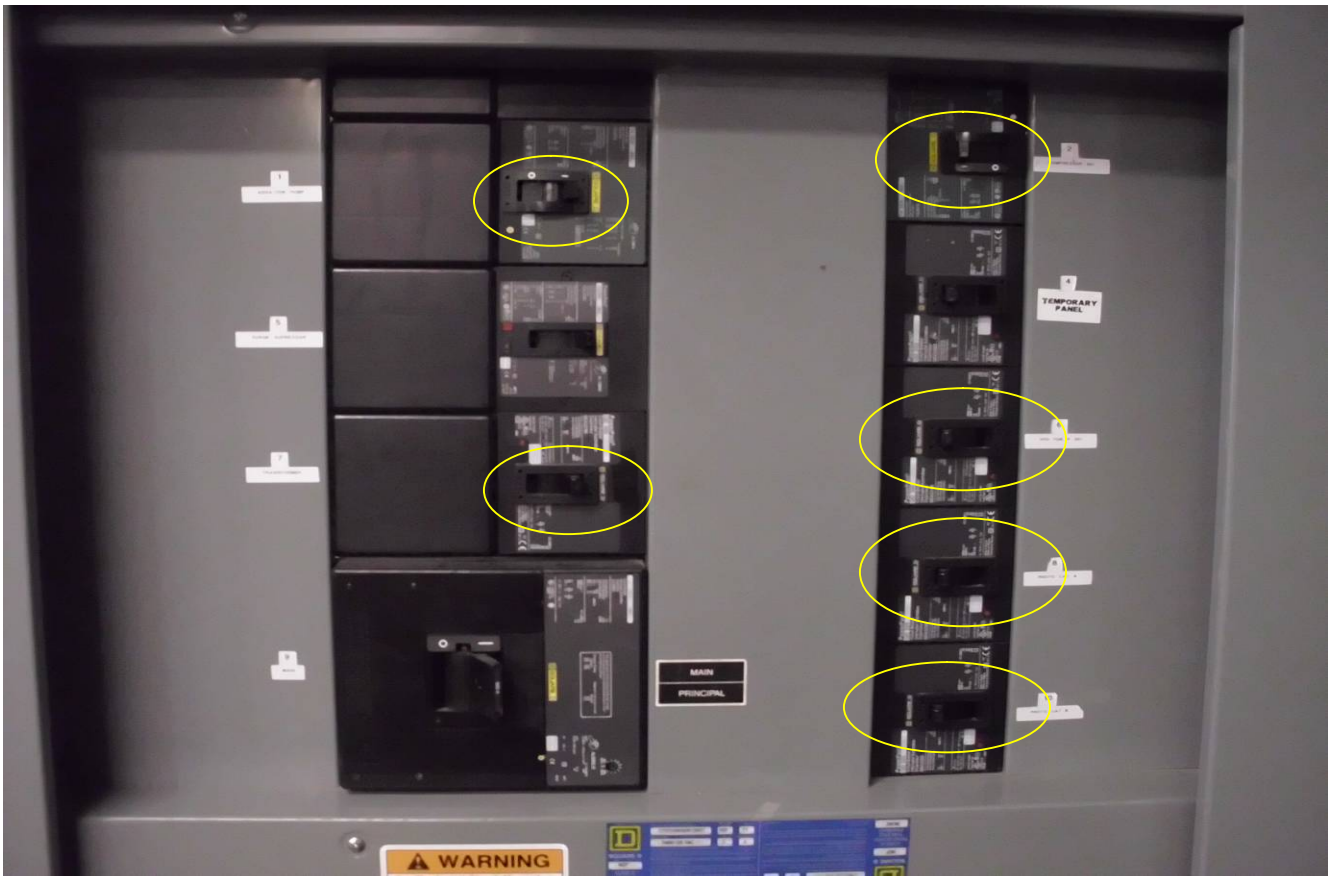
6.27.1 SO___ The shift operator will receive a call from the auto-dialer to the site phone. Acknowledge the auto-dialer call by pressing the disarm button twice. Ensure that the auto-dialer is armed. Go to the power monitoring station located on the southwest wall of the treatment center. **If the visual alarm indicator light is off,** scroll down using the arrow keys on the power monitor until the LED light next to "VOLTS L-L" is on as shown below. Confirm that the voltage is **higher than 228 volts** and **lower than 252** volts on all three legs. If the voltage is within this range, take no further action and end this procedure. **If the visual alarm indicator light is on, proceed to the next step.**



Power Monitoring Station

6.27.2 SO __ **If the visual alarm indicator light is on**, scroll down using the arrow keys on the monitor until the LED light next to "VOLTS L-L" is on. The line to line voltage should now be displayed. **If the voltage is within the cautionary limit range (222 volts to 258 volts), remain at the power monitor until the visual indicator light is off.** Once the visual indicator light is off, confirm that the voltage is higher than 228 volts and lower than 252 volts. **If the voltage has exceeded the action limits (higher than 258 volts and lower than 222 volts on any of the three legs), proceed to the next step.**

6.27.3 SO ___ **If the action limit has been exceeded, shut down the system as per SOP-003 "Short Term Treatment System Shutdown." Don the appropriate arc flash PPE, and shut off power to the system components in the following order.** Don the category 4 arc flash PPE as indicated on the main electrical cabinet arc flash label. Shut off Photo-Cat A using the local disconnect switch. Shut off Photo-Cat B using the local disconnect switch. Shut off the VFD cabinet using the local disconnect switch. Go to the main electrical cabinet. See picture below, and shut off the breakers circled in yellow. They are labeled as follows. **1**. Aeration pump, **2**. Compressor 601, **6**. VFD, **7**. Transformer, **8**. Photo-Cat A, **10**. Photo-Cat B. After the breakers are shut off, remove the arc flash PPE.



Main Electrical Cabinet

6.27.4 SO_____ Wait 10 minutes. **If** the incoming **voltage on all three legs is higher than 222 and lower than 258 (within action limits), proceed with this step. If not, leave the system off and proceed to the next step.** Restart the system as follows**.** Don the category 4 arc flash PPE as

indicated on the main electrical panel arc flash label. Turn on the breakers circled in yellow in the photo above. Close the main electrical cabinet. Turn on power to Photo-Cat A using the local disconnect switch. Turn on power to Photo-Cat B using the local disconnect switch. Turn on power to the VFD cabinet using the local disconnect switch. Restart the system as per SOP-002 "Routine Start Up."

6.27.5 SO ____**Leave the system off until the voltage is within action limits (between 222 volts and 258 volts)** Call the power company if the voltage exceeds action limits for more than 30 minutes and inform them of the condition. FP&L's phone number is 1-800-226-3545.

7. COMPLETION

7.1 _____ SO: Verification of completion.

Signature _____ Date _____

8. REFERENCES

- DOP-LOTO-003 "Well Pumps P-101 through P-110"
- DOP-015 "Extraction Well Vault Access"
- DOP-016 "Extraction Well Pump Pull"
- DOP-FT-006 "Cleaning and Decontaminating Equipment"
- DOP-FT-003 "Trash Procedures"

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/04/08	All	New Procedure
1	06/30/10	All	Revisions for sensor upgrade
2	08/18/11	36,42	Corrections

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) presents procedures for performing critical alarm testing. Critical alarm testing will be performed quarterly.

1.2 Scope and Applicability

This DOP applies to the testing of critical alarms installed on the IRAP system at the Lockheed Martin Treatment Facility in Tallevast, Florida.

Critical Alarms

High/high level in extraction wells (LAHH-101 to LAHH-110)

High level in tank T-400 (LAH-400A and LAH-400B)

Low/low level in tank T-400 (LALL-401)

High/high level in tank T-400 (LSHH-402B)

High/high/high level in tank T-400 (LAHHH-402A)

High level in interstitial space of tank T-400 (LAH-403)

High/high level in interstitial space of tank T-400 (LAHH-404B)

High/high/high level in interstitial space of tank T-400 (LAHHH-404A)

High level in containment piping for suction feed line from tank T-400 (LAH-405)

High level in containment piping for aeration recirculation line to tank T-400 (LAH-406)

High level in containment piping for building sump discharge line to tank T-400 (LAH-408)

High level in containment piping for influent line to tank T-400 (LAH-407)

High level in treatment building (LAH-409)

High level in treatment building (LAH-410)

High pH at acid injection point (AAH-201)

Low pH at acid injection point (AAL-201)

High pH at caustic injection point (AAH-301)

Low pH at caustic injection point (AAL-301)

High level in treatment building sump (LAH-500)

High/high level in treatment building sump (LAH-501)

Timer fault on P-500 (KA-500)

High differential pH between effluent pH probes (AAH-302)

High water pressure in aerator piping (PAH-400)

High/high water pressure in aerator piping (PAHH-400)

Low water pressure in aerator piping (PAL-400)

High air pressure in aerator airline (PAH-401)

Low air pressure in aerator airline (PAL-401)

North side emergency stop

East side emergency stop

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ LO/SO: Obtain current working edition of "Operations Log."

2.1.2 _____ LO/SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent a normal system start up or the testing of critical alarms. If issues are noted, then exit this procedure until resolution is obtained**. Verify that no third party is logged into the Tallevast IRA HMI through PC Anywhere. If so, unplug cat 5 cable.**

2.1.3 _____ LO/SO: Verify that no emergency stops are in effect (e.g. hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure**:**

A. A hurricane event requiring a treatment system shutdown; refer to the "Hurricane Preparation" plan in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to the "Flood Preparation" plan in the Contingency Plan.

2.3 Approvals and Notifications

2.3.1 _____ Approval to perform this procedure has been obtained from the OM.

OM Signature _____ Date _____

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

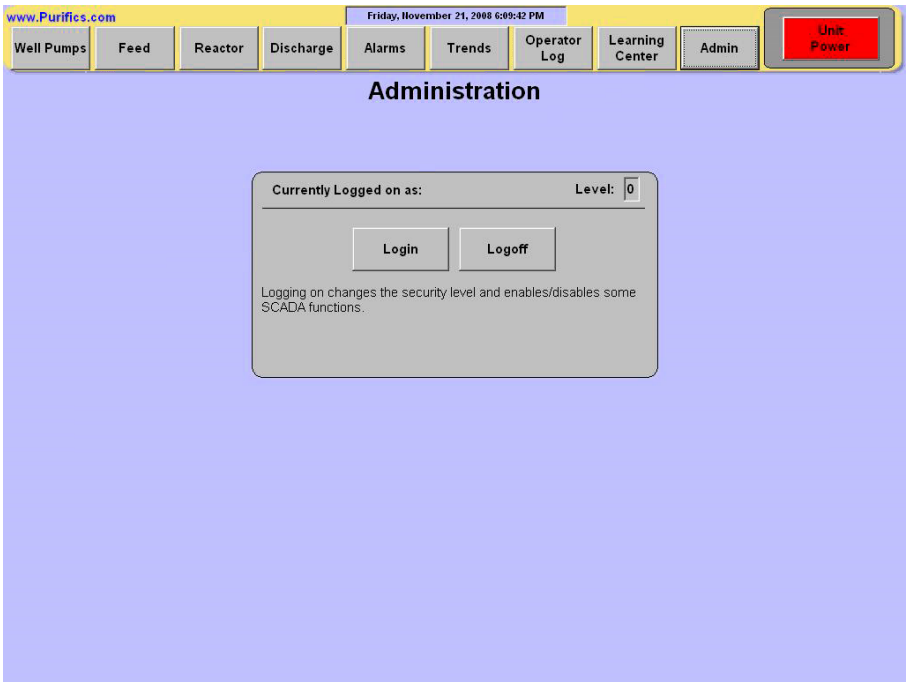
3.1 Introduction to Critical Alarm Testing

Set points adjusted for a test must be returned to the original set point immediately after the test. Note in the field copy of this SOP if the alarm worked correctly. If any alarm does not operate correctly, note it as nonoperational in the field copy of this SOP, and complete critical alarm testing. Notify the OM at the completion of testing regardless of results. Select alarms will be tested without operating the Photo-Cat system to avoid repeated starting and stopping of the Photo-Cat equipment which results in operational problems and excessive wear. Instead, the aeration system will be utilized to determine if the alarm is functional since the aeration system operation is tied to the AOP system operation. Remember to manually acknowledge the auto dialer after each alarm test.

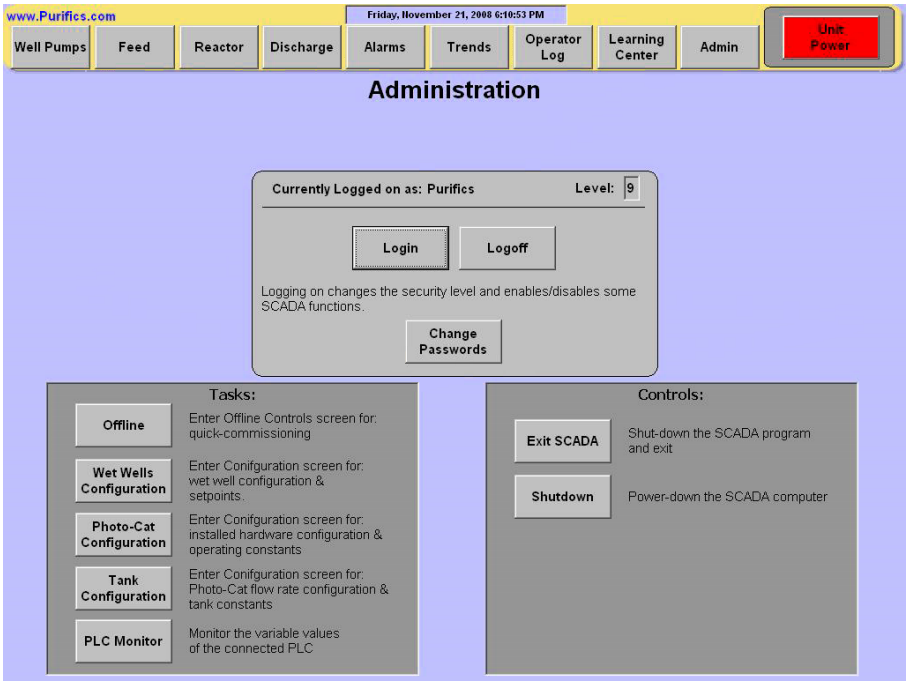
3.2 High/High Level in Extraction Wells (LAHH-101 to LAH-110) Alarm

Test the high/high level alarms in each respective well by decreasing the high/high set point on the Human Machine Interface (HMI) to a level within the operational level of the extraction well. When this parameter is changed, the extraction system wells should display "high level" on wells screen and the auto-dialer should call the site phone. When completed, change the parameter back to the original setting and restart the treatment system as described in SOP-002, "System Start Up." Complete the process for every extraction well. The treatment system will remain on during this testing because the high/high level alarms in the extraction wells do not effect treatment system operations.

3.2.1 _____ LO/SO: Press the "Admin" button at the top of the HMI screen and log on by entering your Username and Password, press "OK" on the username window and enter on the keyboard displayed on the screen.

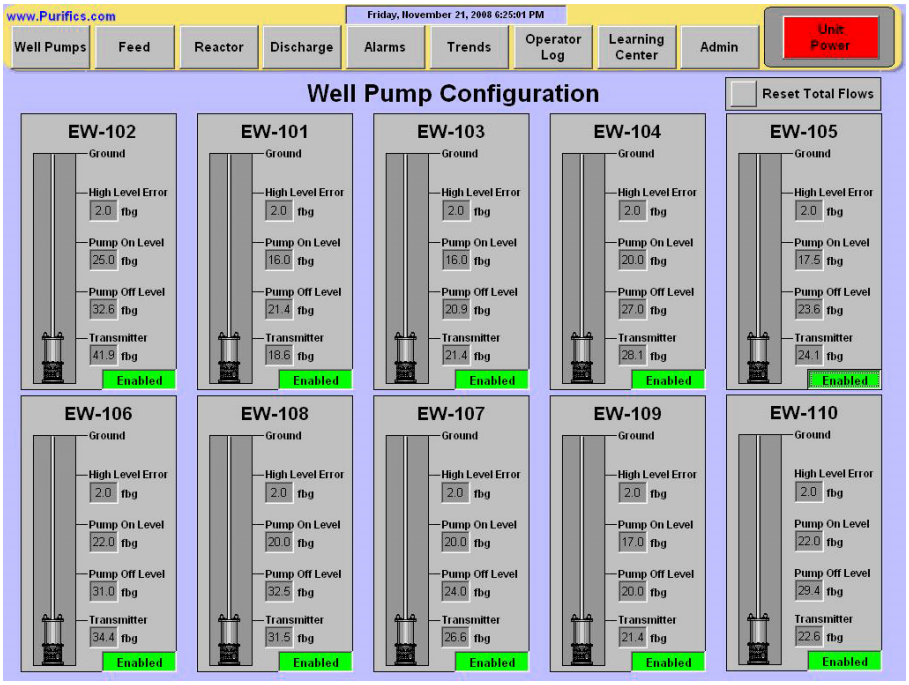


3.2.2 _____ LO/SO: The Admin screen will now display task buttons on the bottom left of the screen**.**

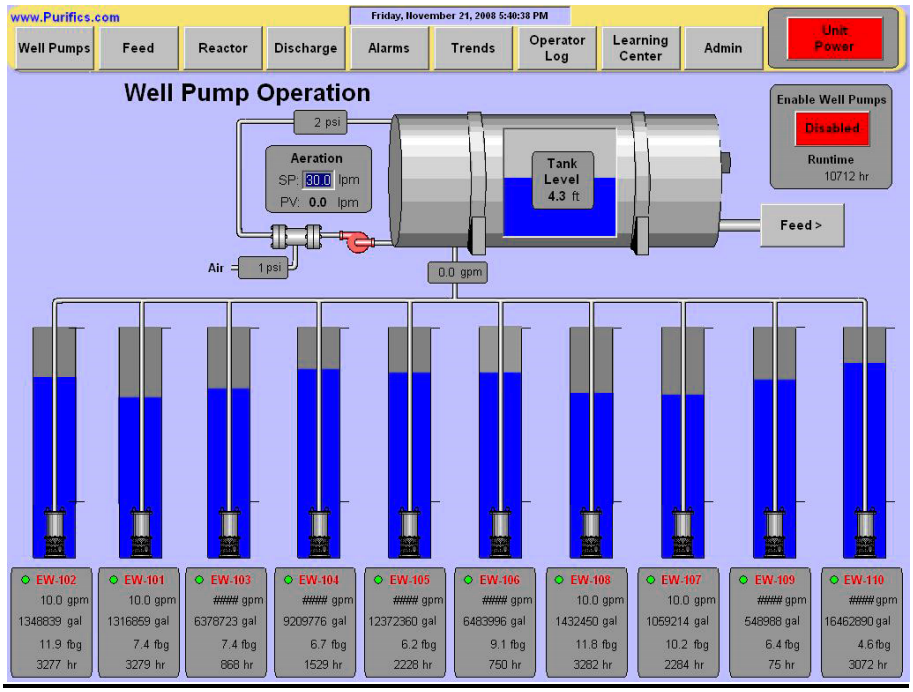


3.2.3 _____ LO/SO: Touch the Wet Well configuration button and the Well Pump Configuration screen will appear. When in the Well Pump Configuration screen, notice that each well shows a “High Level Error,” a “Pump On Level,” a “Pump Off Level” and “Transmitter.” Change the “High Level Error” set

point to a value 5 feet less than the "Pump On Level" (i.e., if the "Pump On Level" is 25 feet, change the "High Level Error" to 20 feet). Disable the pump by pressing the green "Enabled" button located at the bottom of the respective well. The button will turn red and read "Disabled." The pump in the respective well will shut off and the water level in the well will rise above the "High Level Error" set point.



3.2.4 _____ LO/SO: Press the "Well Pumps" button on the HMI and the "Well Pump Operation" screen will be displayed. Watch the water level in the well rise; as the water level rises above the newly set "High Level Error" set point, a high level error will display of the respective well display and will transmit a signal to the auto-dialer. The auto-dialer will dial the site phone to inform of fault condition.



3.2.5 _____ LO/SO: Press the “Admin” button on the top of the HMI screen and then the “Wet Well Configuration” button to return to the “Well Pump Configuration” screen. Change the “High Level Error” set point back to the original set point.

3.2.6 _____ LO/SO: Press the “Well Pumps” button to return to the “Well Pump Operation” display and press the red “Enable Well Pumps” button, which will turn green and display “Enabled,” and the extraction system will restart.

3.2.7 _____ LO/SO: Press the “Admin” button on the top of the HMI screen and then the “Wet Well Configuration” button to return to the Well Pump Configuration screen. Continue testing as described in 3.2.1 through 3.2.7 with the next well to be tested. When all wells have been tested, return the HMI display to the “Well Pump Operation” screen and note if any errors are displayed.

3.2.8 _____ LO/SO: Note in the table below required data.

Well ID	Initial High/High Level Error (feet)	Tested High/High Level Error (feet)	Alarm Function (Y/N)	Final High/High Level Error (feet)	Comments
EW-101 / LAL-101					
EW-102 / LAL-102					
EW-103 / LAL-103					
EW-104 / LAL–104					
EW-105 / LAL–105					
EW-106 / LAL-106					
EW-107 / LAL–107					
EW-108 / LAL-108					
EW-109 / LAL-109					
EW-110 / LAL-110					

Alarms worked correctly if:

HMI	Extraction Well	Treatment System	Aeration System	Auto dialer
Displays alarm	Continues to run	Continues to run	Continues to run	Calls site phone

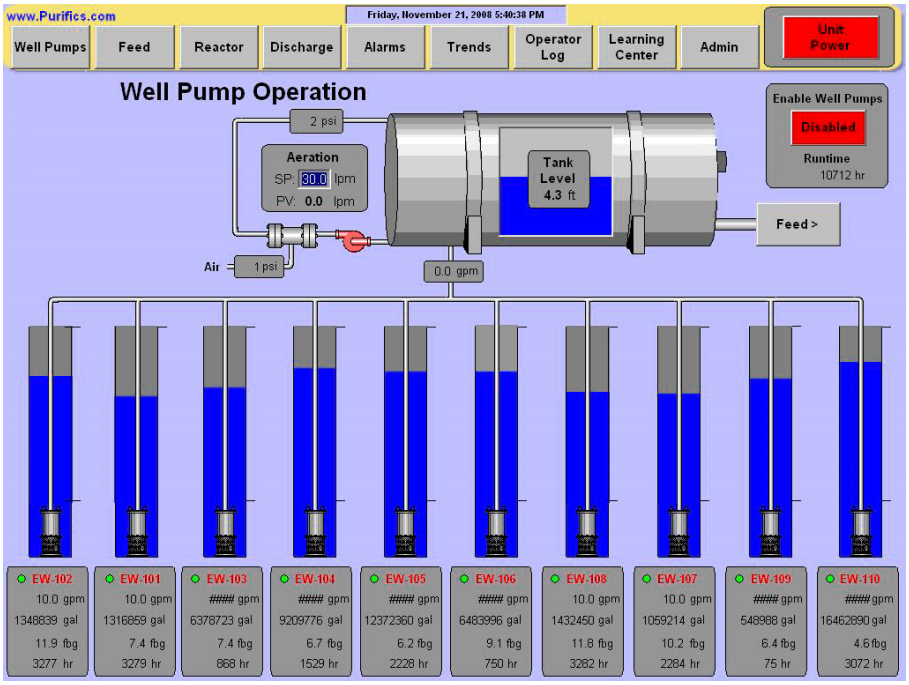
3.3 High Level in Tank T-400 (LAH-400A and LAH-400B) Ultrasonic Sensor

LAH-400A is the water level set point measured by the ultrasonic sensor at which the extraction system will shut down. LAH-400B is the water level set point measured by the ultrasonic senor at which the treatment system will shut down. During normal operations, these set points are different; for this test, the set points will be the same. Test the alarm by operating the treatment system in a recirculation mode and allowing the extraction wells to continue to operate. As the extraction wells fill the tank, the high level alarms will be triggered. The extraction and treatment system should shut down.

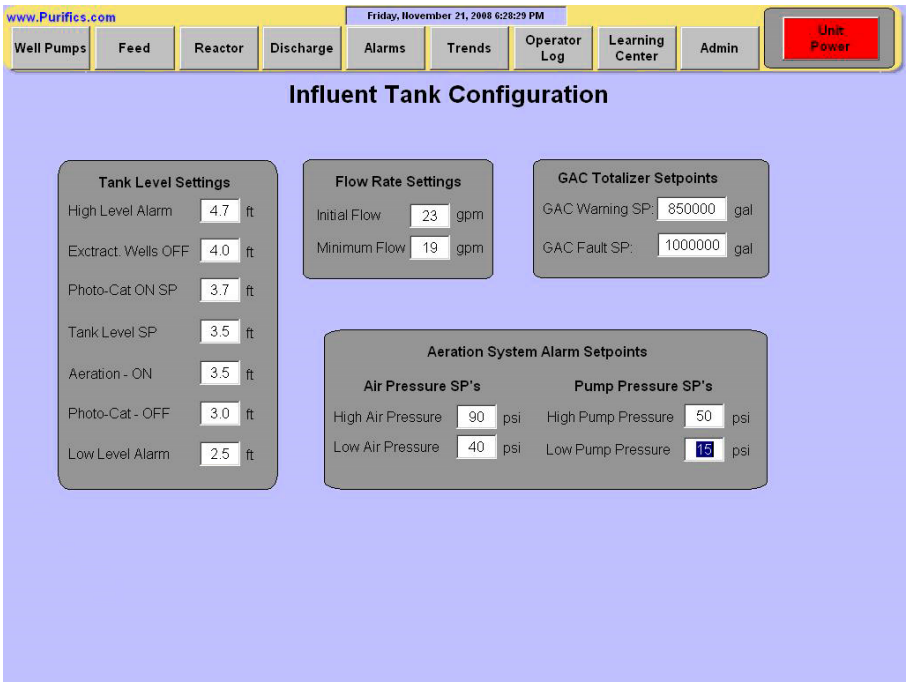
3.3.1 _____ LO/SO: On the system effluent manifold located on the east side of the building, configure the system in recirculation mode. To do this, close BV-305 and open BV-307. This will allow the water to re-circulate back into the Baker tank.

When the treatment system is operational in recirculation mode, continue with the testing procedure.

3.3.2 _____ LO/SO: Press the "Well Pumps" button on the HMI and the "Well Pump Operation" screen will appear. Confirm that the extraction system is enabled and the wells are operating. Note the water level in the tank.



3.3.3 _____ LO/SO: Press the "Admin" button at the top of the display and log on as described in Sections 3.2.1 and 3.2.2. Press the "Tank Configuration" button and the "Influent Tank Configuration" screen will display.



3.3.4 _____ LO/SO: Note the "Extraction Well Off" and the "High Level Alarm" set points on the screen. Change the "Extraction Wells Off" set point to within 0.1 foot of the current water level in the tank (i.e., if the water level in the tank is 3.2 feet, change the set point to 3.3 feet). Allow the treatment system to continue to operate and the water level in the tank will rise. When the water level in the tank has reached the "Extraction Wells Off" set point, the extraction system will shut down and the treatment system will continue to run. Note the results of the test in the table below.

Change the "High Level Alarm" set point to within 0.1 foot of the current water level in the tank (i.e., if the water level in the tank is 3.2 feet, change the set point to 3.3 feet). Allow the treatment system to continue to operate and the water level in the tank will rise. When the water level in the tank has reached the "High Level Alarm" set point, the extraction and treatment systems will shut down. Note the results of the test in the table below.

	High Level Alarm (feet)	**Extraction Wells OFF (feet)**	**Tank Level (feet)**	**Comment**
Initial				
Test				
Completed				

Alarm	**Alarms Function (Y/N)**	**Comment**
LAH-400		

LAH-400A

Treatment System	Aeration System	Sump Pump	Extraction Wells	Auto Dialer
Continues to run	Continues to run	Remains operational	Shut Down	No action

LAH-400B

Treatment System	Aeration System	Sump Pump	Extraction wells	Auto Dialer
Shuts down	Shuts down	Remains operational	Shut down	Calls site phone

3.3.5 _____ LO/SO: When the alarm test has been completed, return to the "Influent Tank Configuration" screen and return all set points to the initial settings.

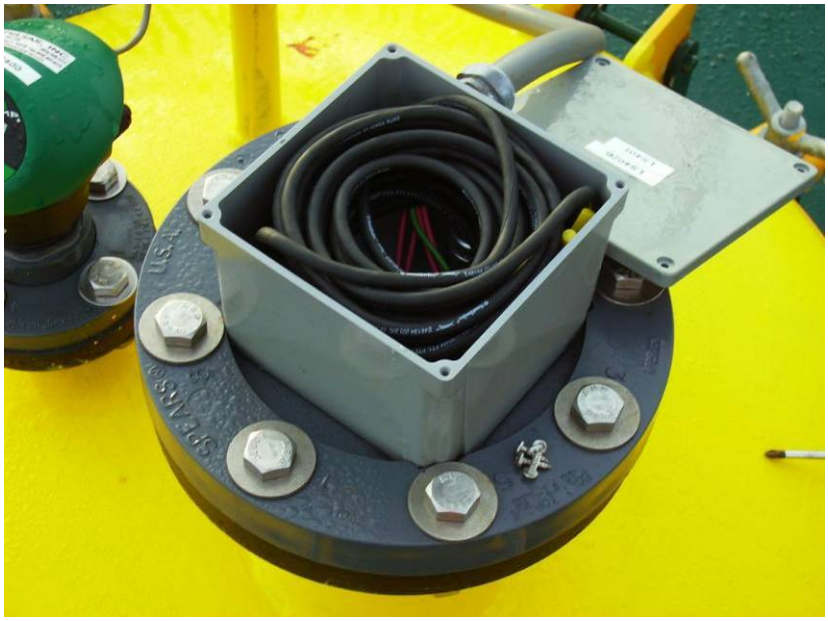
3.3.6 _____ LO/SO: Take the treatment system out of recirculation mode by opening BV-305 and BV-307.

3.4 Low/Low Level in Tank T-400 (LALL-401) Float Switch

This float switch is located on the tank's southern man way. The alarm when triggered during normal operations should shut down the extraction, treatment, and aeration systems. For this test, the alarm will be tested with the extraction and aeration system in operation. The alarm will be triggered by manually raising the float switch above the water level in T-400. When the alarm is activated, the extraction and aeration systems will shut down. Note that the aeration system will operate for one minute before the Photo-Cat system begins operating. This test should be performed within this one minute aeration system dwell time.

3.4.1 _____ LO/SO: Access the top of Tank T-400. Locate the gray junction box on the southern man way. Open the junction box by removing the four Philips head screws in the lid of the box. Remove the lid and place the lid and screws in a secure location.

3.4.2 _____ LO/SO: The cable connected to LALL-401 is identified as shown in the photograph below. Before proceeding, verify that the cable is marked for the correct depth with a cable tie wrapped around the cable and located directly adjacent to the Myers Hub fitting.



3.4.3 _____ LO/SO: Unscrew the top of the Myers Hub fitting. Instruct the shift operator to start the system. Within the one minute aeration system dwell time, pull the cable upward until the float is above the water level in the tank. Hold the float in this position until the test is completed. This will activate the alarm and the aeration and extraction systems should shut down. Note in the space provided in the table below if the alarm operated correctly.

Alarm	Alarm Function (Y/N)	Comment
LSLL-401		

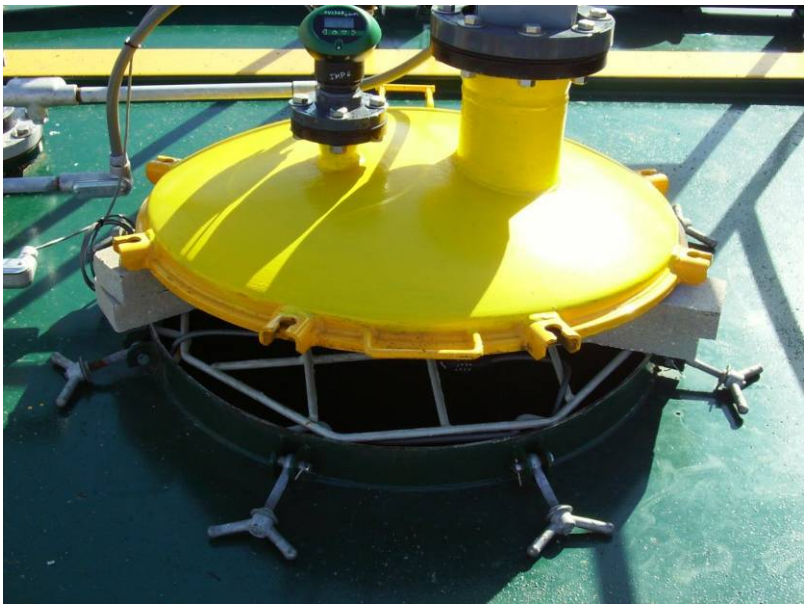
Extraction Wells	Treatment System	Aeration System	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

3.4.4 _____ LO/SO: When completed with the test, lower the cable back to its initial position and tighten the top of the Myers Hub such that the cable is secured. Replace the lid onto the top of the junction box and install the screws.

3.5 High/High Level in Tank T-400 (LAHH-402B) Float Switch

During normal operations, this alarm should shut down the treatment, extraction, aeration systems, and the sump pump. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually activating the float switch by physically turning the float switch upside down. When activated, the extraction, aeration system, and sump pump (P-500) should shut down.

3.5.1 _____ LO/SO: Access the top of Tank T-400 and locate the southern man way. Open the man way slightly and place concrete bricks in the opening, as shown in the photograph below. Concrete bricks are located on top of the tank for this testing



3.5.2 _____ LO/SO: Identify the float associated with LAHH-402B. The float is easily identified because it should be located above the water level in the tank. Instruct the shift operator to start the system. Within the one minute aeration system dwell time, grab the cable attached to the float and pull the float out of the tank.

3.5.3 _____ LO/SO: With the float in your hand, turn the float upside down and hold it in that position. Maintain the float in this position until the test is completed. This will activate the alarm and the extraction and aeration systems should shut down.

3.5.4 _____ LO/SO: Note in the space provided below if the alarm functioned correctly.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut Down	Disabled	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
LAHH-402B		

3.5.5 _____ LO/SO: Lower this float back into the tank. Remove the bricks holding the man way lid open and slowly lower the lid back into a closed position.

3.6 High/High/High Level in Tank T-400 (LAHHH-402A) Gems Float Switch

3.6.l _____ LO/SO: This test is for the float switch installed in a port on the tank's southern man way. This alarm will be triggered by manually lifting the float. To test LAHHH-402A, disconnect the float from the tank port at the union.

3.6.2 _____ LO/SO: Disconnect the float from mounting at the union fitting. Carefully remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early. See photograph below.

3.6.3 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time. Once the system is started, manually lift the float mechanism. This alarm should provide a global shutdown of all systems.

3.6.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should not operate. Record the results of this test in the tables below.

3.6.5 _____ LO/SO: Carefully reinstall the float back into the tank port. Coil the flexible conduit neatly, and use a zip tie to secure.

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Disabled	Calls site phone

Alarm	**Extraction system off Y/N**	**Aeration System off Y/N**	**Sump pump disabled**	**Auto-dialer calls site phone Y/N**
LAHHH-402A				

Alarm	**Alarm Function (Y/N)**	**Comment**
LAHHH-402A		

3.6.6 _____ LO/SO: Acknowledge the alarm by pressing the unit power icon on the HMI screen. Manually acknowledge the auto-dialer.

Typical GEMS float switch installation

3.7 High Level in the Interstitial Space of Tank T-400 (LAH-403) Gems Float Switch

The alarm will be tested with the extraction and aeration system in operation. The alarm will be triggered by manually by lifting the float. When activated, the extraction system, sump pump, and aeration system should shut off.

3.7.1_____ LO/SO**:** Locate LAH-403 on the southern end of tank T-401**.** To test LAH-403, disconnect the float from the float mounting at the union fitting. Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.7.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.7.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown of all systems.

3.7.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should not operate. Record the results of this test in the table below.

3.7.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting.

3.7.6 _____ LO/SO: When the alarm is activated, the extraction and aeration systems should shut down, and the sump pump should be disabled. Note in the space provided below if the alarm functioned correctly.

Treatment System	**Aeration System**	**Extraction wells**	**Sump Pump**	**Auto Dialer**
Shuts down	Shuts down	Shut down	Disabled	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-403		

3.7.7 _____ LO/SO: Acknowledge the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer.

3.8 High/High Level in the Interstitial Space of Tank T-400 (LAHH-404B) Gems Float Switch

The alarm will be tested with the extraction and aeration system in operation. The alarm will be triggered by manually by lifting the float. When activated, the extraction system, sump pump, and aeration system should shut off.

3.8.1_____ LO/SO**:** Locate LAHH-404B on the southern end of tank T-401**.** To test LAHH-404B, disconnect the float from the float mounting at the union fitting. Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.8.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.8.3_____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown of all systems.

3.8.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should not operate. Record the results of this test in the table below.

3.8.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting.

3.8.6_____ LO/SO: When the alarm is activated, the extraction and aeration systems should shut down, and the sump pump should be disabled. Note in the space provided below if the alarm functioned correctly.

Treatment System	**Aeration System**	**Extraction wells**	**Sump Pump**	**Auto Dialer**
Shuts down	Shuts down	Shut down	Disabled	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAHH- 404B		

3.8.7 _____ LO/SO: Acknowledge the alarm by pressing the unit power icon on the HMI screen. Manually acknowledge the auto-dialer.

3.9 High/High/High Level in the Interstitial Space of Tank T-400 (LAHHH-404A)

During normal operations this alarm should shut down the treatment, aeration, and extraction systems and disable the sump pump. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually by lifting the float. When activated, the extraction system, sump pump, and aeration system should shut off.

3.9.1_____ LO/SO**:** Locate LAHHH-404A on the northern end of tank T-401 on top of the tank**.** To test LAHHH-404A, disconnect the float from the float mounting at the union fitting.

3.9.2 _____ LO/SO: Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.9.3 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.9.4 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown of all systems.

3.9.5 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should not operate. Record the results of this test in the table below.

3.9.6 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting.

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Shut down	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
LAHHH- 404A		

3.9.7 _____ LO/SO: Acknowledge the alarm by pressing the "Unit Power" button on the HMI. Manually acknowledge the auto-dialer.

3.10 High Level in Containment Piping for Suction Feed Line from Tank T-400 (LAH-405) Gems Float Switch

During normal operations, this alarm should shut down the treatment, extraction, and aeration systems. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually lifting the float. When activated, the extraction wells, and aeration system should shut down.

3.10.1_____ LO/SO**:** Locate LAH-405 inside the treatment building on the western side**.** To test LAH-405, disconnect the float from the float mounting at the union fitting. Carefully lift and remove the float switch from the port. There will be

enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.10.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.10.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown.

3.10.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should continue to be operational. Record the results of this test in the table below.

3.10.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting.

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-405		

3.10.6_____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer.

3.11 High Level in Containment Piping for Aeration Recirculation Line to Tank T-400 (LAH-406) Gems Float Switch

During normal operations, this alarm should shut down the treatment, extraction, and aeration systems. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually lifting the float. When activated, the extraction wells, and aeration system should shut down.

3.11.1_____ LO/SO**:** Locate LAH-406 inside the treatment building on the western side**.** To test LAH-406, disconnect the float from the float mounting at the union

fitting. Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.11.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.11.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown.

3.11.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should continue to be operable. Record the results of this test in the table below.

3.11.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting.

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-406		

3.11.6 _____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer.

3.12 High Level in Containment Piping for Building Sump Discharge Line to Tank T-400 (LAH-408) Gems Float Switch

During normal operations, this alarm will provide a global shut down of all systems and disable the sump pump. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually lifting the float. When activated, the extraction wells, and aeration system, and sump pump should shut down.

3.12.1_____ LO/SO**:** Locate LAH-408 inside the treatment building on the western side**.** To test LAH-408, disconnect the float from the float mounting at the union

fitting. Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.12.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.12.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown.

3.12.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should not be operational. Record the results of this test in the table below.

3.12.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting**.**

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Disabled	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-408		

3.12.6 _____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer.

3.13 High Level in Containment Piping for Influent Line to Tank T-400 (LAH-407) Gems Float Switch

During normal operations, this alarm will provide a global shut down of all systems. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually lifting the float. When activated, the extraction wells and aeration system should shut down and the sump pump should remain operable.

3.13.1_____ LO/SO**:** Locate LAH-407 inside the treatment building on the western side**.** To test LAH-407, disconnect the float from the float mounting at the union fitting. Carefully lift and remove the float switch from the port. There will be

enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.13.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.13.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown.

3.13.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should be operable. Record the results of this test in the table below.

3.13.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting**.**

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Remains operable	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-407		

3.13.6 _____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer

3.14 High Level in Treatment Building (LAH-409) Gems Float Switch

During normal operations, this alarm will shut down the extraction, treatment, and aeration systems and leave the sump pump operational. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually lifting the float. When activated, the extraction wells and aeration system should shut down and the sump pump should remain operable.

3.14.1_____ LO/SO**:** Locate LAH-409 inside the treatment building on the southern side**.** To test LAH-409, disconnect the float from the float mounting at the union

fitting. Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.14.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.14.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown.

3.14.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should be operable. Record the results of this test in the table below.

3.14.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting**.**

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-409		

3.14.6_____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer.

3.15 High Level in Treatment Building (LAH-410) Gems Float Switch

During normal operations, this alarm should shut down the extraction, treatment, and aeration systems and leave the sump pump operational. For this test, the alarm will be tested with only the extraction and treatment system in operation. The alarm will be triggered by manually lifting the float. When activated, the extraction wells and aeration system should shut down and the sump pump should remain operable.

3.15.1_____ LO/SO**:** Locate LAH-410 inside the treatment building on the northern side**.** To test LAH-410, disconnect the float from the float mounting at the union fitting. Carefully lift and remove the float switch from the port. There will be enough slack in the flexible conduit to allow the float to be removed from the port. Keep in an upright position so the alarm is not triggered early.

3.15.2 _____ LO/SO: Once the float is removed, instruct a second person to start the system. This test will be performed with only the aeration and extraction systems in operation during the one minute aeration dwell time.

3.15.3 _____ LO/SO: After the system is started, manually lift the float. This alarm should provide a global shutdown.

3.15.4 _____ LO/SO: Check the sump pump for operability by lifting the float in the sump. The sump pump should be operable. Record the results of this test in the table below.

3.15.5 _____ LO/SO: Carefully reinstall the float back into the port and tighten the union fitting**.**

3.15.6 _____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Manually acknowledge the auto-dialer.

Treatment System	**Aeration System**	**Extraction Wells**	**Sump Pump**	**Auto Dialer**
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
LAH-410		

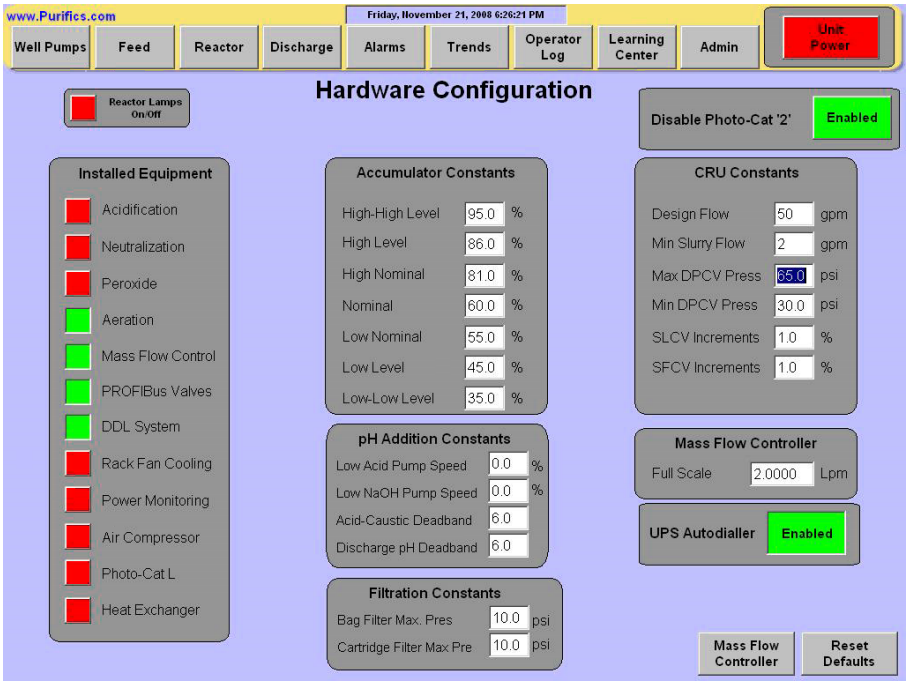
3.16 High pH at Acid Injection Point (AAH-201)

The alarm will be tested with the extraction and treatment system in operation. The alarm will be triggered by temporarily disabling the acid injection pump and allowing the pH to rise. The pH will rise and after approximately 10-12 minutes the treatment system should shut down, but the extraction system should continue to operate. Note: This alarm may take more

than five minutes to fault. The alarm will shut down the system 10-12 minutes after the pH event begins.

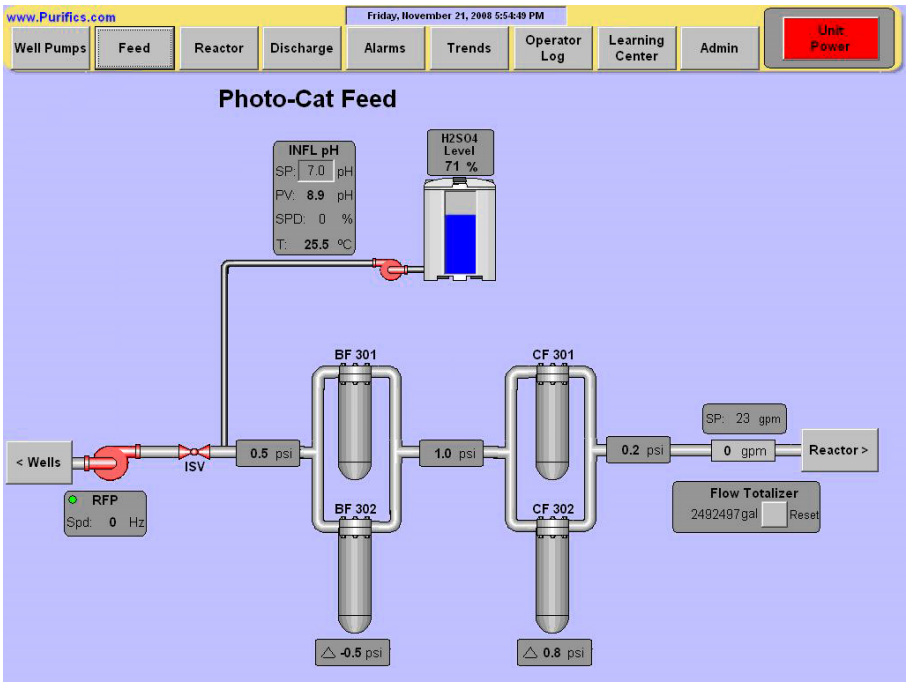
3.16.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.16.2 _____ LO/SO: Press the "Photo-Cat Configuration" button on the "Admin" screen and the Hardware Configuration screen will display on the HMI screen.



3.16.3 _____ LO/SO: Note the Low Acid Pump Speed and Acid-Caustic Dead Band on the screen. Change the value of the Low Acid Pump Speed to 0% and the Acid-Caustic Dead Band to 2. Verify that the "Acidification System" button in the "Installed Equipment" box is green.

3.16.4 _____ LO/SO: Press the "Feed" button on the top left of the HMI and the "Photo-Cat Feed" screen will display on the HMI screen.



3.16.5 _____ LO/SO: Note the Influent pH Set Point and change it to 3.5.

3.16.6 _____ LO/SO: Unplug the acid metering pump from its receptacle.

3.16.7 _____ LO/SO: Start the treatment system following SOP-002, "System Start Up," but make no adjustment to the pH system. The treatment system will operate for approximately 7 minutes before it will shut down on a high influent pH fault. If the treatment system continues to operate after 12 minutes, the alarm test has failed. Note the results of the test in the table provided below.

	Low Acid Pump Speed (%)	**Acid-Caustic Dead Band**	**Influent pH Set Point (SU)**	**Comment**
Initial				
Test				
Completed				

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Remain operational	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
AAH-201		

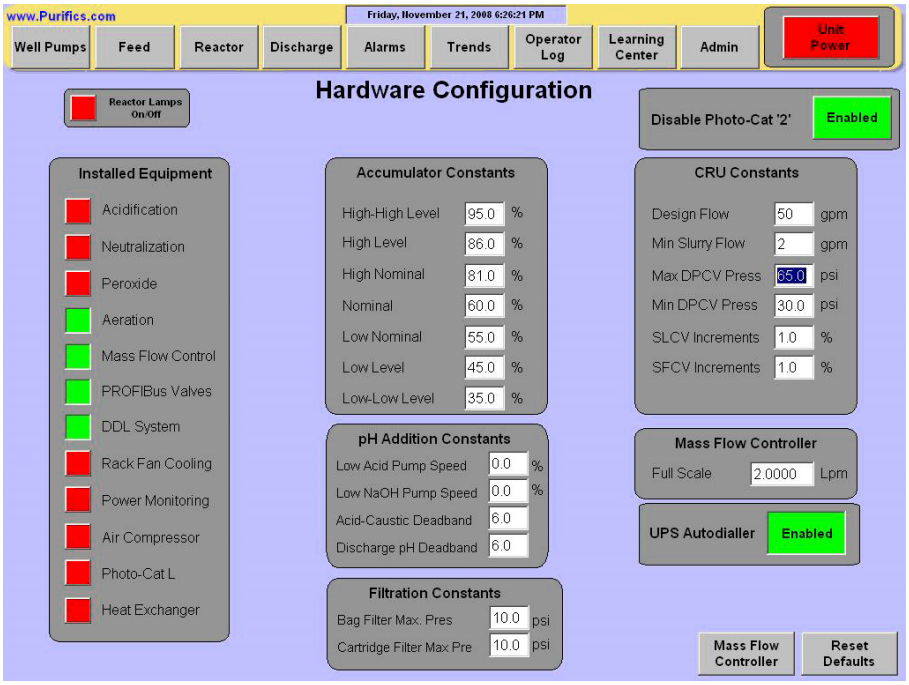
3.16.8 _____ LO/SO: After completing the alarm test, return all set points to the initial settings. Plug in the acid metering pump to the proper receptacle.

3.17 Low pH at Acid Injection Point (AAL-201)

The alarm will be tested with the extraction and treatment system in operation. The alarm will be triggered by temporarily raising the influent pH set point to 10 SU, which is above the natural pH of the influent water. After approximately 7 minutes of operation, the treatment system should shut down but the extraction system should continue to operate.

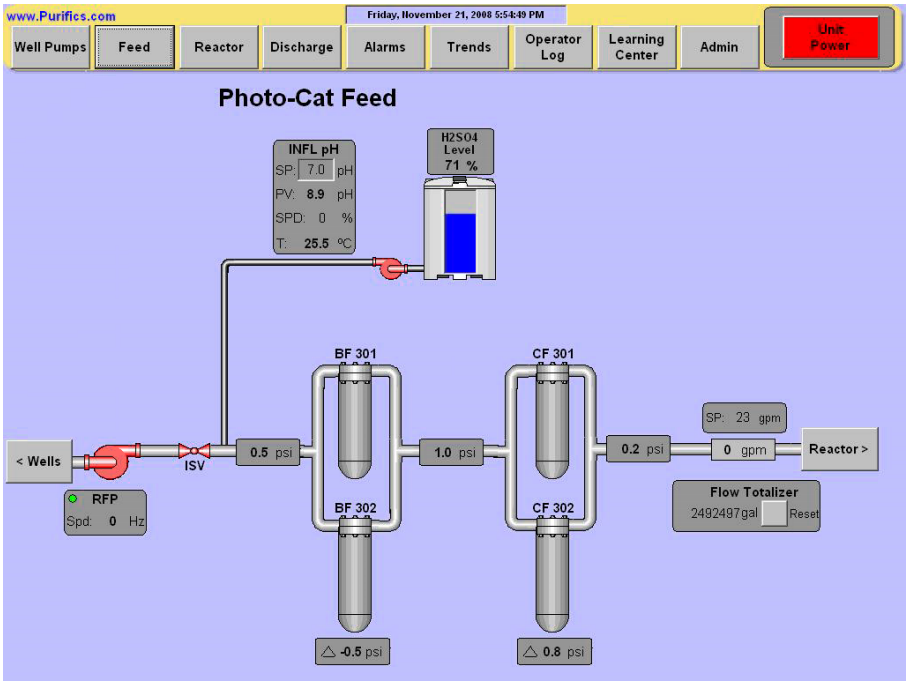
3.17.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.17.2 _____ LO/SO: Press the "Photo-Cat Configuration" button on the "Admin" screen and the "Hardware Configuration" screen will display on the HMI screen.



3.17.3 _____ LO/SO: Note the Low Acid Pump Speed and Acid-Caustic Dead Band on the screen. Change the value of the Low Acid Pump Speed to 0% and the Acid-Caustic Dead Band to 2. Verify that the Acidification System button in the "Installed Equipment" box is green.

3.17.4 _____ LO/SO: Press the "Feed" button on the top left of the HMI, and the "Photo-Cat Feed" screen will display on the HMI screen.



3.17.5 _____ LO/SO: Note the Influent pH Set Point and change it to 10.

3.17.6 _____ LO/SO: Start the treatment system following SOP-002, "System Start Up," but make no adjustment to the pH system. The treatment system will operate for approximately 7-8 minutes before it will shut down on a low influent pH fault. If the treatment system continues to operate after 10 minutes the alarm test has failed. Note the results of the test in the table provided below.

	Low Acid Pump Speed (%)	**Acid-Caustic Dead Band**	**Influent pH Set Point (SU)**	**Comment**
Initial				
Test				
Completed				

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Remain Operational	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
AAL-201		

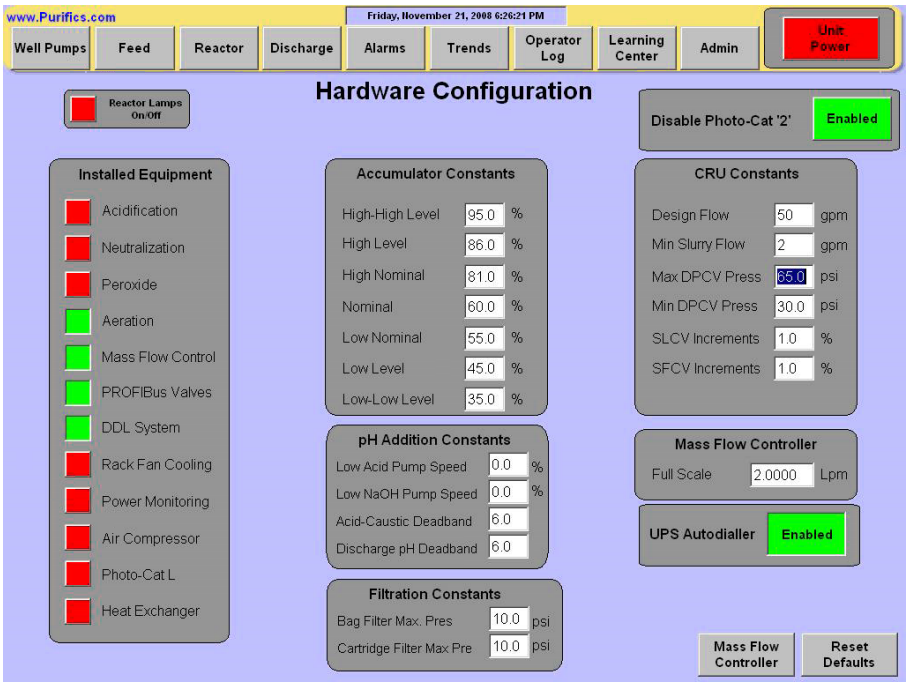
3.17.7 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.18 High pH at Caustic Injection Point (AAH-301)

The alarm will be tested with the extraction and treatment system in operation. The alarm will be triggered by temporarily lowering the effluent pH set point to 1 SU, which is below the typical operating pH of the process water. After approximately 5 minutes of operation, the treatment system should shut down but the extraction system should continue to operate.

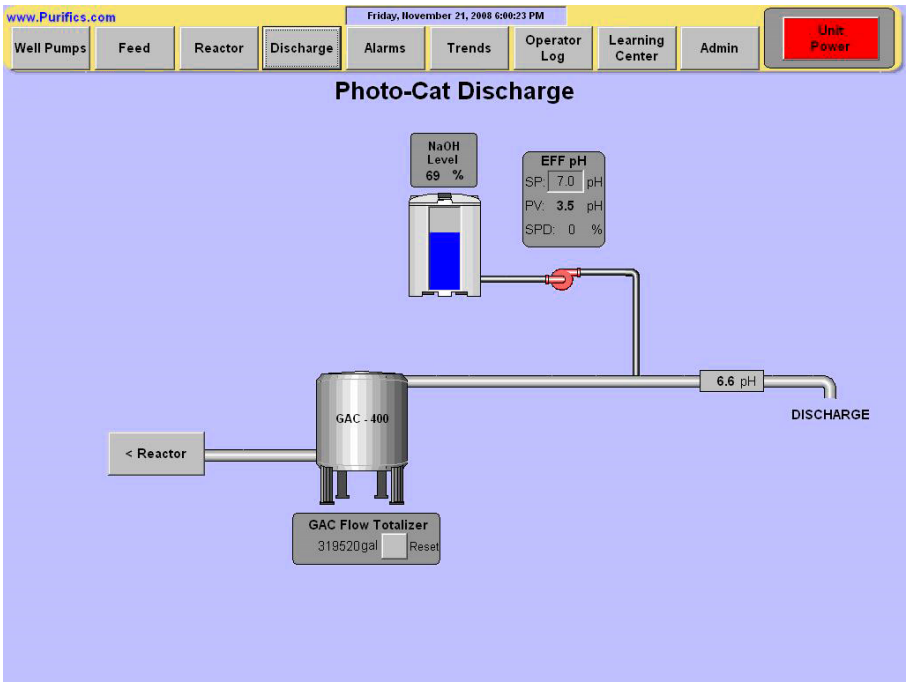
3.18.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.18.2 _____ LO/SO: Press the "Photo-Cat Configuration" button on the "Admin" screen and the "Hardware Configuration" screen will display on the HMI screen.



3.18.3 _____ LO/SO: Note the Low NaOH Pump Speed and Acid-Caustic Dead Band on the screen. Change the value of the Low NaOH Pump Speed to 0% and the Acid-Caustic Dead Band to 0.2. Verify that the “Neutralization System” button in the “Installed Equipment” box is green.

3.18.4 _____ LO/SO: Press the “Discharge” button on the top left of the HMI, and the “Photo-Cat Discharge” screen will display on the HMI screen.



3.18.5 _____ LO/SO: Note the Effluent pH Set Point and change it to 1. On the system effluent manifold located on the east side of the building, configure the system in recirculation mode. To do this, close BV-305 and open BV-307. This will allow the water to re-circulate back into the Baker tank.

3.18.6 _____ LO/SO: Start the treatment system following SOP-002, "System Start Up," but make no adjustment to the pH system. The treatment system will operate for approximately 7 minutes before it will shut down on a high effluent pH fault. If the treatment system continues to operate after 10 minutes, the alarm test has failed. Note the results of the test in the tables provided below.

	Low NaOH Pump Speed (%)	**Acid-Caustic Dead Band**	**Effluent pH Set Point (SU)**	**Comment**
Initial				
Test				
Completed				

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Remain Operational	Remains operational	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
AAH-301		

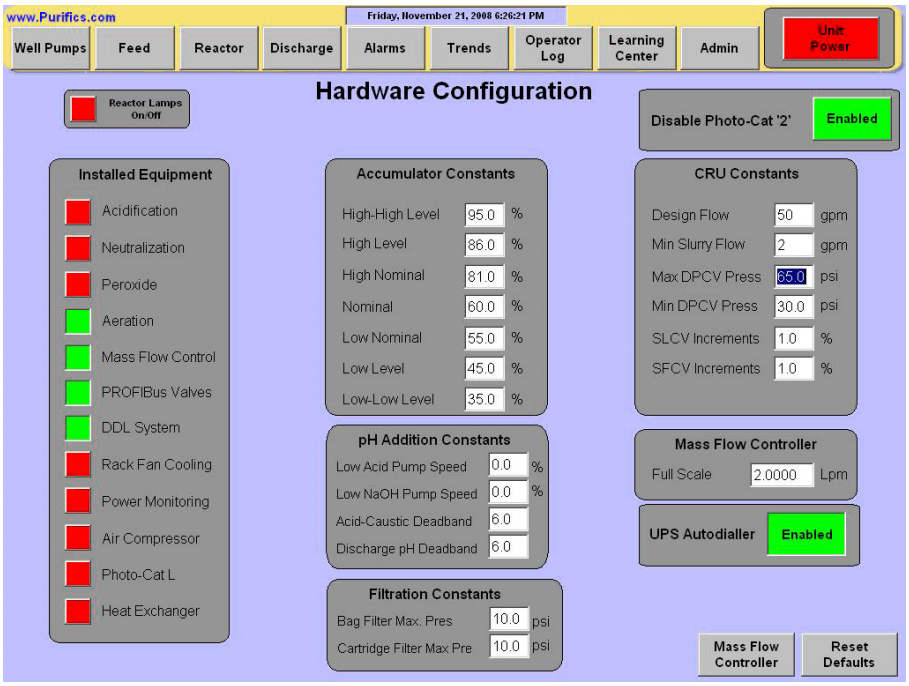
3.18.7 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.19 Low pH at Caustic Injection Point (AAL-301)

The alarm will be tested with the extraction and treatment system in operation. The alarm will be triggered by temporarily disabling the caustic injection pump and allowing the effluent pH to fall. The pH will fall and after approximately 7 minutes, the treatment system should shut down but the extraction system should continue to operate.

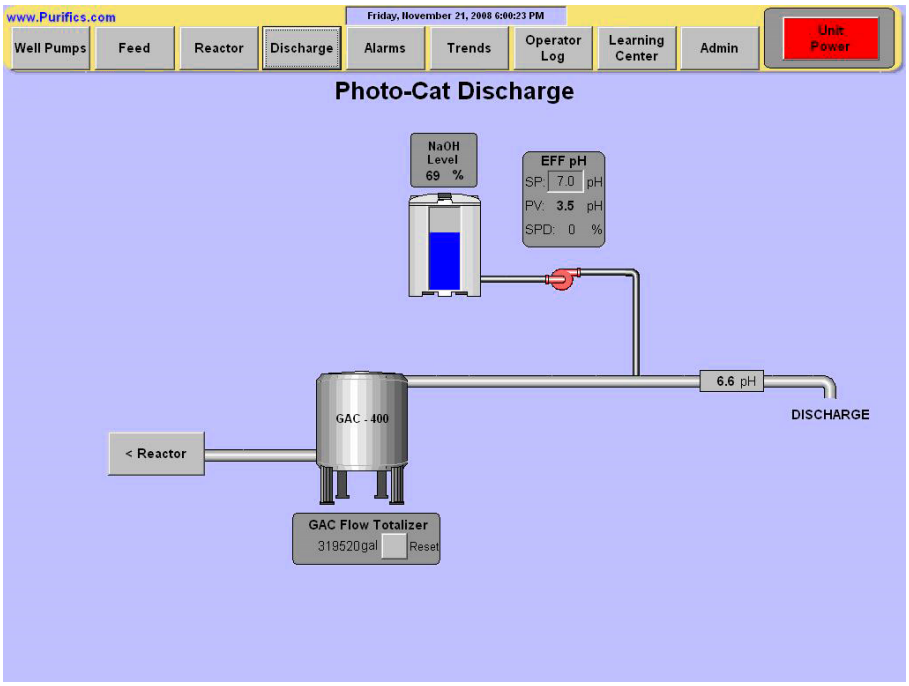
3.19.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.19.2 _____ LO/SO: Press the "Photo-Cat Configuration" button on the "Admin" screen and the "Hardware Configuration" screen will display on the HMI screen.



3.19.3 _____ LO/SO: Note the Low NaOH Pump Speed and Acid-Caustic Dead Band on the screen. Change the value of the Low NaOH Pump Speed to 0% and the Acid-Caustic Dead Band to 2. Verify that the "Neutralization System" button in the "Installed Equipment" box is green.

3.19.4 _____ LO/SO: Press the "Discharge" button on the top left of the HMI, and the "Photo-Cat Discharge" screen will display on the HMI screen.



3.19.5 _____ LO/SO: Note the Effluent pH Set Point and change it to 7.

3.19.6 _____ LO/SO: Unplug the caustic metering pump from its receptacle.

3.19.7 _____ LO/SO: Start the treatment system following SOP-002, “System Start Up,” but make no adjustment to the pH system. The treatment system will operate for approximately 7 minutes before it will shut down on a low effluent pH fault. If the treatment system continues to operate after 10 minutes, the alarm test has failed. Note the results of the test in the tables provided below.

	Low NaOH Pump Speed (%)	**Acid-Caustic Dead Band**	**Effluent pH Set Point (SU)**	**Comment**
Initial				
Test				
Completed				

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Remain Operational	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
AAL-301		

3.19.8 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.20 High Level in Treatment Building Sump (LAH-500)

During normal operations, this alarm should shut down the treatment, aeration, and extraction systems leaving the sump pump operational. For this test, the alarm will be tested with only the extraction and aeration systems in operation. The switch will be manually triggered by physically turning the switch upside down. When the alarm is triggered, the extraction wells and aeration system should both shut down and the sump pump should remain operational. Prior to beginning this test, check the sump level float for any debris and rust. Remove any debris and/or clean the float switch of rust or residue before proceeding further.

3.20.1 _____ LO/SO: Locate the high level sump alarm (LAH-500) float inside the treatment building sump. The float is easily identifiable because it is installed at a lower elevation in the sump than the other sump alarm float.

3.20.2 _____ LO/SO: Instruct the shift operator to start the system. Within the one minute aeration system dwell time, pull the float switch out of the sump. The grating is large enough that it can stay in place while this is done. With the float in your hand, turn the entire float upside down, as shown in the photograph below.

3.20.3 _____ LO/SO: With the float activated, the extraction and treatment systems should shut down within 10 seconds. If the extraction and treatment systems have not shut down within 10 seconds of the float being activated, then the alarm test has failed. Note the results of the alarm test in the space provided in the table below.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
LAH-301		

3.20.4 _____ LO/SO: With alarm activated, test operability of sump pump by lifting P-500 float. After completing the alarm test, install the float switch back into the sump as it was prior to the test.

3.20.5 _____ LO/SO: Clear the alarm on the HMI screen by pressing the “Unit Power” button on the top right corner of the screen. Verify that the alarm does not reactivate on the alarm screen of the HMI. If the alarm does reactivate, check the installation of the float switch. When the alarm no longer activates, the test is completed.

3.21 High/High Level in Treatment Building Sump (LAH-501)

During normal operations, this alarm should shut down the treatment, aeration, and extraction systems while leaving the sump pump operational. For this test, the alarm will be tested with only the extraction and aeration systems in operation. The switch will be manually triggered by physically turning the switch upside down. When the alarm is triggered, the extraction wells and treatment system should both shut down while the sump pump should remain operational. Prior to beginning this test, check the sump level float for any debris and rust. Remove any debris and/or clean the float switch of rust or residue before proceeding further.

3.21.1 _____ LO/SO: Locate the high/high level sump alarm (LAHH-501) float inside the treatment building sump. The float is easily identifiable because it is installed at a higher elevation in the sump than the other sump alarm float.

3.21.2 _____ LO/SO: Follow procedures described in Steps 3.20.2 through 3.21.5 for testing alarm LAHH-501. Note in the space provided in the table below if the alarm functioned correctly. With alarm activated, test operability of sump pump by lifting P-500 float.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

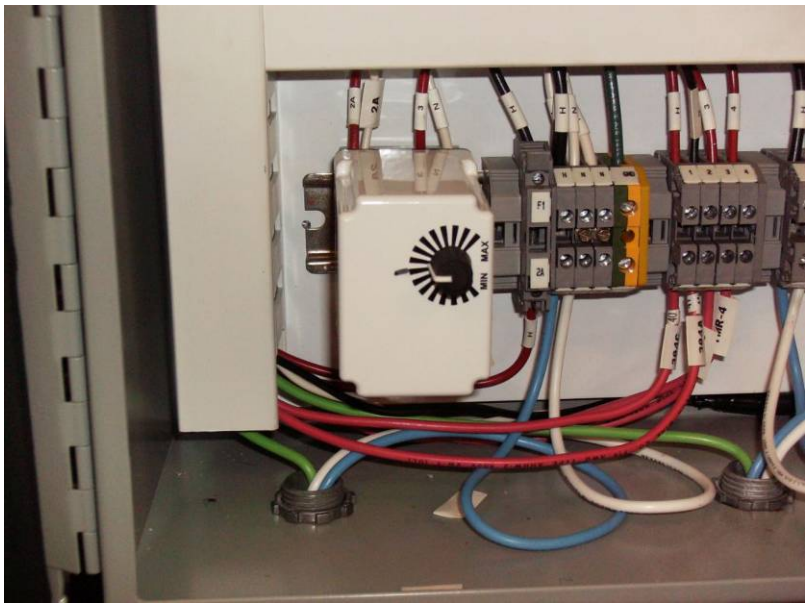
Alarm	Alarm Function (Y/N)	Comment
LAHH-501		

3.22 Timer Fault on P-500 (KA-500)

During normal operations, this alarm should shut down the treatment, aeration, and extraction systems while leaving the sump pump operational. For this test, the alarm will be tested with only the extraction and aeration systems in operation. The switch will be triggered by changing the timer in the sump control panel from 30 minutes to 20 seconds (minimum timer set point). When the alarm is triggered, the extraction wells and aeration system should both shut down while sump pump should remain operational.

3.22.1 _____ LO/SO: Locate the sump pump (P-500) panel along the southern wall of the treatment building, close to the treatment building sump. Open the sump pump

panel and turn the timer dial all the way to the left, as shown in the photograph below.



3.22.2 _____ LO/SO: Use the treatment plant potable water hose or sink to fill the treatment building sump. The sump pump (P-500) will turn on when the water level in to sump is high enough to activate the pump float. After the sump pump turns on, instruct the shift operator to start the system. With the timer turned down to the minimum, the pump should stay on long enough to activate the timer switch. When the timer switch is activated, the extraction and aeration systems should shut down. Note the results of the test in the space provided in the table below.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
KA-500		

3.22.3 _____ LO/SO: After completing the alarm test, turn the timer dial back to the 30-minute set point as it was prior to the test. With alarm activated, test operability of sump pump by lifting P-500 float.

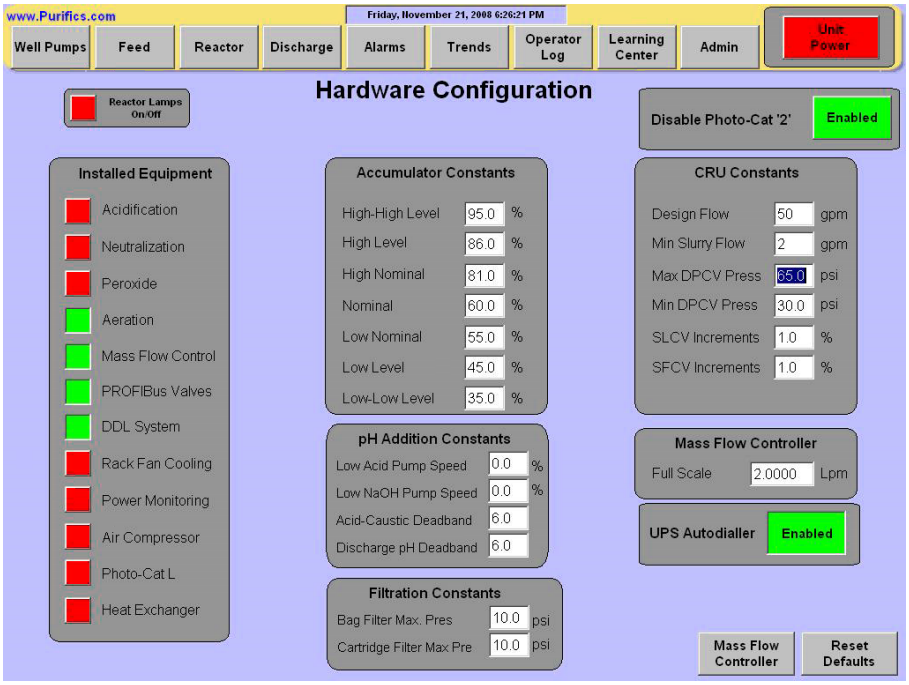
3.22.4 _____ LO/SO: Clear the alarm on the HMI screen by pressing the "Unit Power" button on the top right corner of the screen. Verify that the alarm does not reactivate on the alarm screen of the HMI. If the alarm does reactivate, check the timer. When the alarm no longer activates, the test is completed. Restart the treatment system following SOP-002, "System Start Up."

3.23 High Differential pH Between Effluent pH Probes (AAH-302)

During normal operations, this alarm should shut down the treatment and aeration systems while leaving the extraction system and sump pump operational. For this test, the alarm will be tested with the extraction and treatment systems in operation. The alarm will be triggered by temporarily disabling the secondary pH probe. The secondary pH probe is disabled by removing the magnetic quick connect on top of the probe. When the alarm is triggered the treatment system should shut down after approximately 7 minutes of operation, but the extraction system should continue to operate.

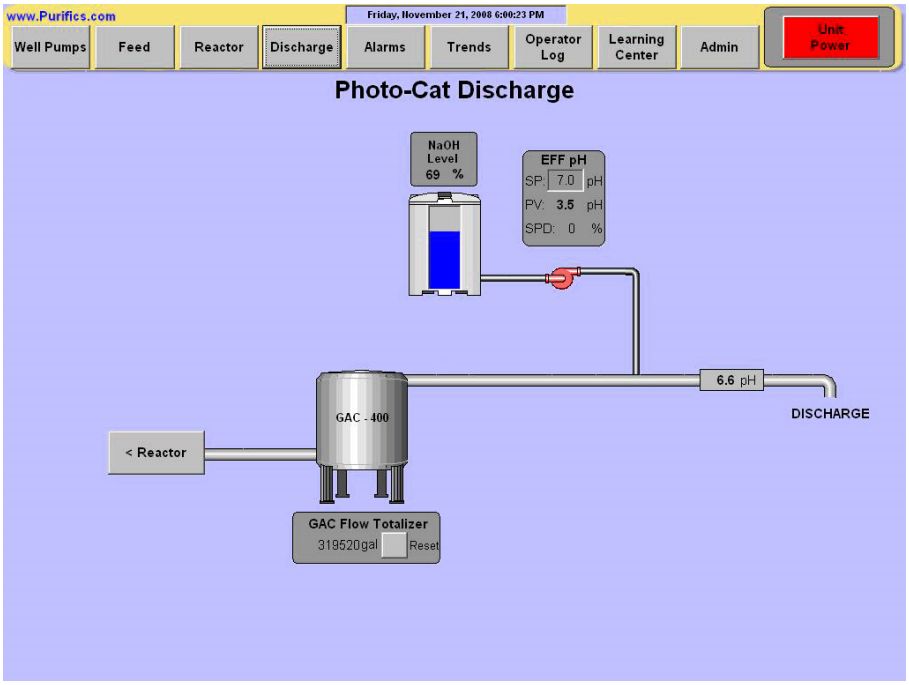
3.23.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.23.2 _____ LO/SO: Press the "Photo-Cat Configuration" button on the "Admin" screen and the "Hardware Configuration" screen will display on the HMI screen.



3.23.3 _____ LO/SO: Note the Low NaOH Pump Speed and Discharge pH Dead Band on the screen. Change the value of the Low NaOH Pump Speed to 0% and the Acid-Caustic Dead Band to 0.2. Verify that the "Neutralization System" button in the "Installed Equipment" box is green.

3.23.4 _____ LO/SO: Press the “Discharge” button on the top left of the HMI, and the “Photo-Cat Discharge” screen will display on the HMI screen**.**



3.23.5 _____ LO/SO: Note the Effluent pH Set Point and change it to 9.

3.23.6 _____ LO/SO: Disconnect the secondary pH probe magnetic quick connect from the probe, as shown in the photograph below.

3.23.7 _____ LO/SO: The treatment system will operate for approximately 7 minutes before it will shut down on a high differential effluent pH fault. If the treatment system continues to operate after 10 minutes, the alarm test has failed. Note the results of the test in the tables provided below.

	Low NaOH Pump Speed (%)	**Discharge pH Dead Band**	**Effluent pH Set Point (SU)**	**Comment**
Initial				
Test				
Completed				

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Remain Operational	Remains operational	Calls site phone

Alarm	**Alarm Function (Y/N)**	**Comment**
AAH-302		

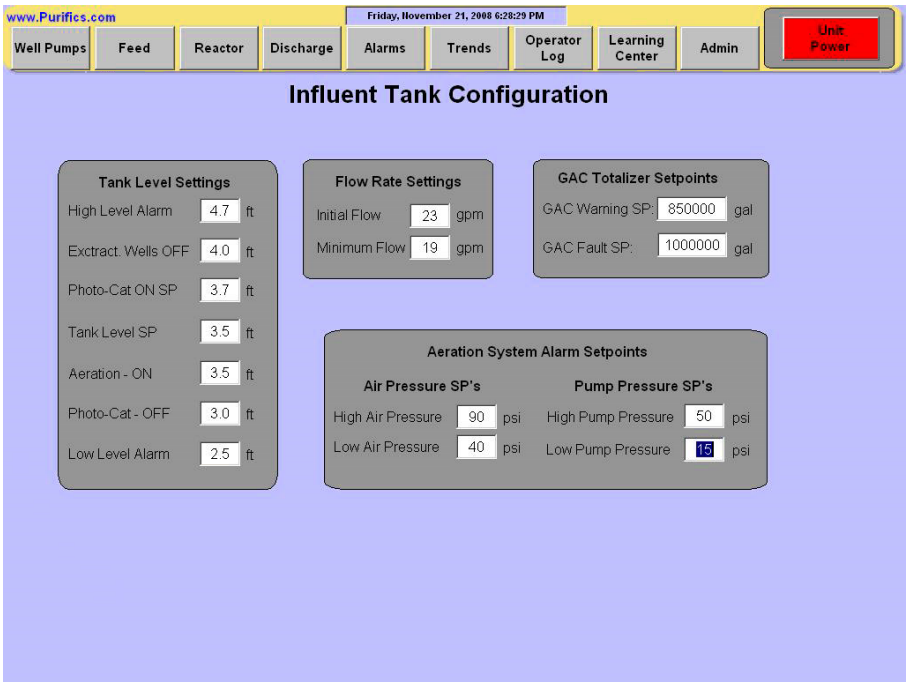
3.23.8 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.24 High Water Pressure in Aerator Piping (PAH-400)

During normal operations, this alarm should shut down the treatment, extraction, and aeration systems while leaving the sump pump operational. For this test, the alarm will be tested with only the extraction and aeration systems in operation. The alarm will be triggered by closing valves BV-401 and BV-402 while the aerator system is in operation. The dead head pressure of the pump should trigger the alarm and cause the extraction and aeration systems to shut down.

3.24.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.24.2 _____ LO/SO: Press the “Tank Configuration” button on the “Admin” screen and the “Influent Tank Configuration” screen will display on the HMI screen.



3.24.3 _____ LO/SO: Note the “Pump Pressure Set Point‘s High Pump Pressure” and change it to 30 pounds per square inch (psi).

3.24.4 _____ LO/SO: Start the aeration system.

3.24.5 _____ LO/SO: Slowly close BV-401 and BV-402, so that the pressure on PT-400 reads approximately 35 psi. The treatment system will operate for approximately 20 seconds before it will shut down on a High Aeration Pump Pressure. If the treatment system continues to operate after 2 minutes, the alarm test has failed. Note the results of the test in the table provided below.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
PAH-400		

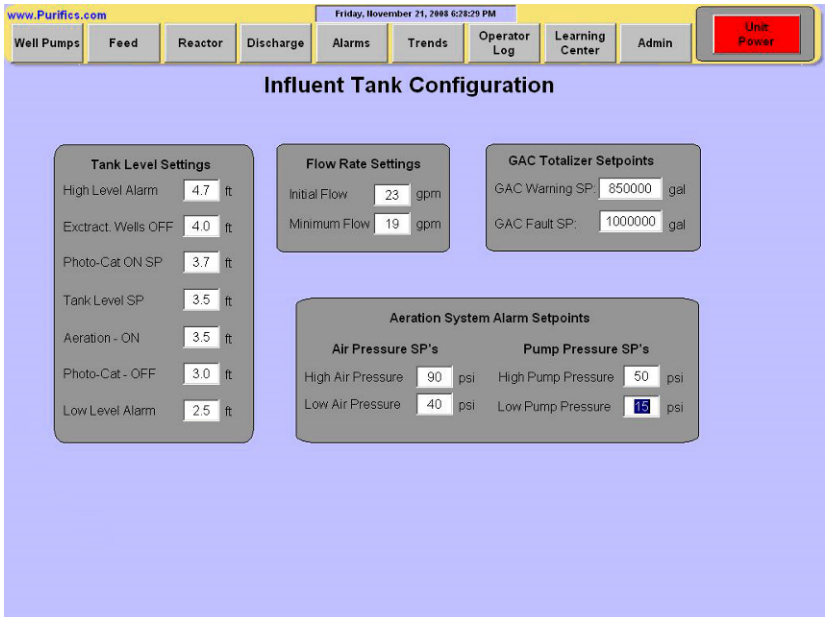
3.24.6 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.25 High/High Water Pressure in Aerator Piping (PAHH-400)

During normal operations, this alarm should shut down the treatment, aeration, and extraction systems while leaving the sump pump operational. For this test, the alarm will be tested with only the extraction and aeration systems in operation. The alarm will be triggered by closing valves BV-401 and BV-402 while the aerator system is in operation. The dead head pressure of the pump should trigger the alarm and cause the extraction and aeration systems to shut down.

3.25.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.25.2 _____ LO/SO: Press the "Tank Configuration" button on the "Admin" screen and the "Influent Tank Configuration" screen will display on the HMI.



3.25.3 _____ LO/SO: Note the "Pump Pressure Set Points, High Pump Pressure" and change it to 80 psi.

3.25.4 _____ LO/SO: Start the aeration system following SOP-002, "System Start Up," but make no adjustment to the Aeration System Set Points.

3.25.5 _____ LO/SO: Slowly close BV-401 and BV-402, so that the pressure on PT-400 reads approximately 55 psi. The treatment system will operate for approximately 2 minutes before it will shut down on a High/High Aeration Pump Pressure. If the treatment system continues to operate after 2 minutes, the alarm test has failed. Note the results of the test in the table provided below.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
PAHH-400		

3.25.6 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.26 Low Water Pressure in Aerator Piping (PAL-400)

During normal operations, this alarm should shut down the treatment, extraction, and aeration systems while the sump pump remains operational. For this test, the alarm will be tested with only the extraction and aeration system in operation. The alarm will be triggered by manually closing the valve to PT-400 (BV-409) and operating the system. PT-400 will read a low pressure and the extraction and aeration systems should both shut down.

3.26.1 _____ LO/SO: With the treatment system off, close BV-409.

3.26.2 _____ LO/SO: Start the treatment system following SOP-002, “System Start Up,” but leave BV-409 closed. After approximately 2 minutes of operation the aeration and extraction systems should shut down on a Low Aerator Pump Pressure. If the aeration system continues to operate after 2 minutes, then the alarm test has failed. Note the results of the test in the space provided in the table below.

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

Alarm	Alarm Function (Y/N)	Comment
PAL-400		

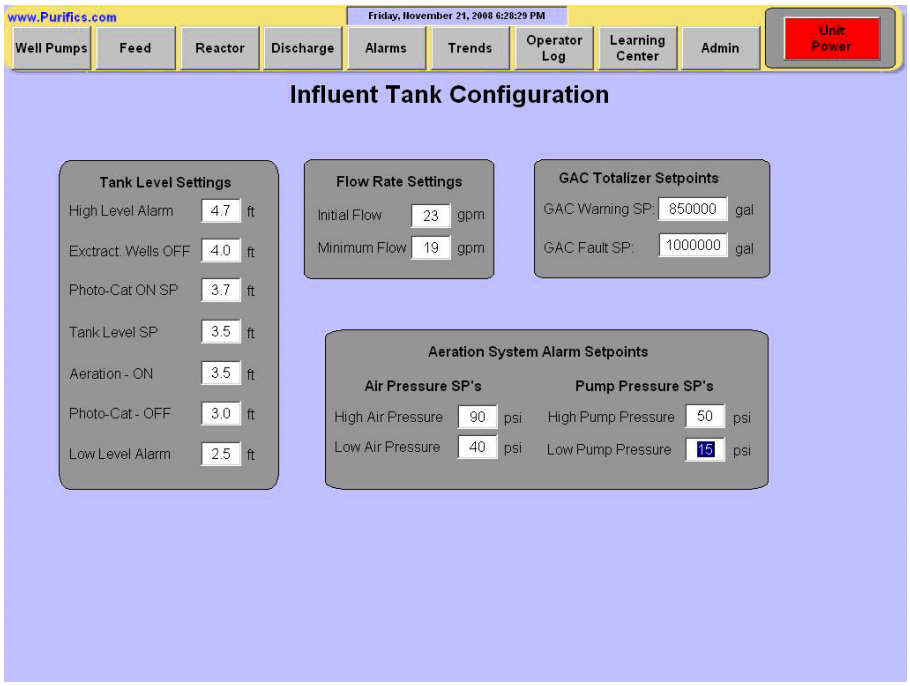
3.26.3 _____ LO/SO: After completing the alarm test, open BV-409 as it was prior to the testing.

3.27 High Air Pressure in Aerator Airline (PAH-401)

The alarm will be tested with the extraction and aeration systems in operation. The alarm will be triggered by temporarily changing the high pressure set point on the HMI screen to a value lower than the typical operating pressure. With the change in set points, the normal operating pressure of the aeration system will trigger the alarm and the extraction and aeration systems should shut down.

3.27.1 _____ LO/SO: With the treatment system off, log on to the "Admin" screen on the HMI, as described in Steps 3.2.1 and 3.2.2.

3.27.2 _____ LO/SO: Press the "Tank Configuration" button on the "Admin" screen and the "Influent Tank Configuration" screen will display on the HMI.



3.27.3 _____ LO/SO: Note the "Air Pressure Set Points, High Air Pressure" and change it to 60 psi.

3.27.4 _____ LO/SO: Start the aeration system following SOP-002, "System Start Up," but make no adjustment to the Aeration System Set Points.

3.27.5 _____ LO/SO: The aeration system will operate for approximately 2 minutes before it will shut down on a High Aeration Air Pressure. If the aeration system continues to operate after 2 minutes, the alarm test has failed. Note the results of the test in the table provided below.

Alarm	**Alarm Function (Y/N)**	**Comment**
PAH-401		

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

3.27.6 _____ LO/SO: After completing the alarm test, return all set points to the initial settings.

3.28 Low Air Pressure in Aerator Airline (PAL-401)

The alarm will be tested with the extraction and aeration system in operation. The alarm will be triggered by manually closing the valve to PT-401 (BV-408) and operating the system. PT-401 will read a low pressure and the extraction and aeration systems should both shut down.

3.28.1 _____ LO/SO: With the treatment system off, close BV-408.

3.28.2 _____ LO/SO: Start the aeration system following SOP-002, "System Start Up," but leave BV-408 closed. After approximately 2 minutes of operation the treatment will shut down on a Low Aerator Air Pressure. If the aeration system continues to operate after 2 minutes, then the alarm test has failed. Note the results of the test in the space provided in the table below.

Alarm	Alarm Function (Y/N)	Comment
PAL-401		

Treatment System	Aeration System	Extraction Wells	Sump Pump	Auto Dialer
Shut down	Shut down	Shut down	Remains operational	Calls site phone

3.28.3 _____ LO/SO: After completing the alarm test, open BV-408 as it was prior to the test. Restart the treatment system following SOP-002, "System Start Up."

3.29 Emergency Stops

When the emergency stops are pushed during normal operations, this alarm should provide a global shutdown of all systems. For this test, the emergency stops will be pushed with only the extraction and aeration system operating. During this test, both the extraction and aeration systems should be shut down after pressing the emergency stop button. If not, the emergency stop has test failed this test.

3.29.1 _____ LO/SO: Instruct the shift operator to start the system. Within the one minute aeration system dwell time, press the emergency stop on the north side of the building.

3.29.2 _____ LO/SO: Note in the table below if the emergency stop worked as stated above.

Alarm	Alarm Function (Y/N)	Comment
North Emergency Stop		

3.29.3 _____ LO/SO: Instruct the shift operator to start the system. Within the one minute aeration system dwell time, press the emergency stop on the east side of the building.

3.29.4 _____ LO/SO: Note in the table below if the emergency stop worked as stated above.

Alarm	Alarm Function (Y/N)	Comment
East Emergency Stop		

4. COMPLETION

4.1 LO/SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- Purifics Photo-Cat operating manual
- SOP-001 “System Checks Prior to Routine Treatment System Start Up”
- SOP-002 “System Start Up”
- SOP-003 “Short Term Treatment System Shut Down”
- SOP-029 “Hurricane Preparation”
- SOP-030 “Flood Preparation”
- Contingency Plan

Figure 1. Photo-Cat Unit A

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	12/03/08	All	Formatting
2	11/18/10	All	Improved procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager
SSO:	Site Security Officer

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) contains instructions for properly maintaining communication between security personnel and the Treatment System Shift Operator during night shift operations. If at any time there is an emergency, do not hesitate to call 911 and the Site Security Officer.

1.2 Scope and Applicability

This DOP applies to maintaining communication between security personnel and the Treatment System Shift Operator (SO) during night shift operations at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. STEP-BY-STEP INSTRUCTIONS

2.1 _____ SO: During night shift operations, the ARCADIS Shift Operator (SO) on duty is required to check in with the Site Security Officer (SSO) at least once hourly. Therefore, if a one hour window passes during which the SO has not seen or heard from the SSO, the SO must call the SSO's phone 941.360.1843

2.2 _____ SO: This contact must be verified with the table below. After the table below is completed, please file in the Lead Operator's office.

2.3 _____ SO: If the SSO on duty does not answer, the SO must take the first available opportunity to look for the SSO.

2.4 _____ SO: If the SO is unable to locate the SSO, or if the SSO needs assistance, the SO must seek help from one of the following people:

Darrin Johnson, ARCADIS	813.748.4874
Doug Foster, CDM	941-730-3772
Rick Shelton, CDM	941.544.0554
Paul Calligan, LMC	240.676.5392

As always, in case of emergency call 911. See the Site Crisis Management Plan in the OMM Manual or the IRA Treatment building.

Time **Date:**	**Initial here to verify contact with security guard**
8:00 pm	
9:00 pm	
10:00 pm	
11:00 pm	
12:00 am	
1:00 am	
2:00 am	
3:00 am	
4:00 am	
5:00 am	
6:00 am	

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev..	Date	Affected Pages	Revision Description
0	12/04/08	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for cleaning inside the treatment system facility.

1.2 Scope and Applicability

This procedure applies to cleaning and housekeeping inside of the Lockheed Martin Treatment Facility, located in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

See DOP-012 "Material Safety Data Sheets" if you are bringing new cleaning supplies to the site.

3. PR PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cat A and B.

3.1.2 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.2 Planning and Coordination

3.2.1 SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation." in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

3.3 Equipment Required

The following equipment can be found in the Conex box located just outside the facility: broom, dust pan, Simple Green® cleaning solution, 5-gallon bucket with potable water and Simple Green (labeled "Cleaning"), rags, paper towels, ladder, garbage bags, nitrile gloves. Cleaning equipment must not be stored inside the treatment system building due to MSDS guidelines.

4. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

4.1 _____ Gather the needed supplies listed in section 3.3, Equipment Required.

4.2 _____ Start by clearing the area of the items that do not belong in the treatment center (e.g., garbage, extension cords). Return all tools to their proper place inside the tool cabinet. All walkways must be clear of debris and tripping hazards.

4.3 _____ Set up the ladder in front of EW-110 at the extraction well manifold on the south side of the building. Start at the top of the EW-110 piping and work your way down, cleaning the pipes, valves and flow meters with a damp cloth. Rinse your rag frequently in the 5-gallon bucket of potable water and Simple Green. If cobwebs are present, remove them with the broom. Continue the process by moving west and repeating this step where each extraction well comes into the building.

4.4 _____ Continue to move west and clean the rest of the piping on the southwest side of the building, starting with the piping mounted from the ceiling and working your way down.

4.5 _____ Clean the aeration system piping, aerators and the aeration system pump on the west side of the building. Clean the PVC piping on the west side of the building. Clean the metal step on the west side of the building.

4.6 _____ Don nitrile gloves.

4.7 _____ Clean the yellow “Saf-Tainer” and the top of the acid tank. Clean the transfer point piping.

4.8 _____ Clean the outside of the Variable Frequency Drive (VFD) cabinet on the northwest side of the building with a slightly damp cloth. Clean P-201 and surrounding piping.

4.9 _____ Clean the sediment filter canisters and corresponding piping on the north side of the building.

4.10 _____ Clean the outside of the compressor and the air dryer on the north side of the building.

4.11 _____ Set up the ladder in front of the carbon canisters and clean the carbon canisters from top to bottom with a damp rag.

4.12 _____ Don nitrile gloves and clean the yellow “Saf Tainer” and the top of the caustic tank in the northeast corner of the building.

4.13 _____ Set up the ladder in front of the effluent piping on the east side of the building and clean the effluent piping and valves from top to bottom.

4.14 _____ Clean the cabinet containing personal protective equipment (PPE).

4.15 _____ Clean the outside of the air compressor and the air dryer in the southeast corner of the building.

4.16 _____ At this point, all of the piping and equipment on the perimeter of the building should be clean. Dump the 5-gallon bucket in the sump and refill with fresh water and Simple Green.

4.17 _____ Clean the outside of the Photo-Cat A cabinets with a damp rag. Dry the cleaned areas with a clean, dry cloth. Follow this step for Photo-Cat B.

4.18 _____ Sweep the floor and collect debris in a dust pan.

4.19 _____ Dispose of all garbage and collected debris in the dumpster.

4.20 _____ Return all cleaning supplies and equipment to their proper storage location.

5. COMPLETION

5.1 _____ SO: Verification of completion.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01					
DISCIPLINE	REVISION	CHANGE	DISCIPLINE	REVISION	CHANGE
OPERATIONS	X	X	SAFETY	X	X
ENGINEERING	X	X	QUALITY	N/A	X
TRAINING	N/A	X	EMERGENCY PREPAREDNESS	N/A	X
ENVIRONMENTAL	N/A	X			

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	3/15/09	All	Revision

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for taking inventory and ordering equipment and supplies to be used for the completion of DOPs/ SOPs related to the Tallevast Treatment System. Spare parts inventory will be performed as a maintenance task generated monthly by JOB Plus.

1.2 Scope and Applicability

This DOP applies to the use of the Handheld PDA to help inventory equipment and supplies to be used with the Tallevast Treatment System at the Lockheed Martin Treatment Facility in Tallevast, Florida. If the PDA is nonoperational, use attached paper copy (also located in SOP-005A Hardcopy) to inventory supplies. If the paper copy is used, deliver it to the lead operator's desk at the end of your shift.

2. PREREQUISITES

2.1 Planning and Coordination

2.1.1 _____ SO: Using the PDA located in the Operator's office, take inventory of equipment and supplies associated with the Tallevast Treatment System. If the PDA is not available, use the attached inventory table to take inventory of the listed supplies/equipment. The Lead Operator will generate a report listing the needed supplies. The Lead Operator will then order the needed supplies. Use the attached vendor contact information table to order needed supplies.

2.1.2 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

3. STEP-BY-STEP INSTRUCTIONS

3.1 Retrieve the PDA from its dock on the Operator's desk.

3.1.1 _____ SO: If PDA is not available, refer to the hard copy of the inventory list in this DOP.

3.1.2 _____ SO: If using the PDA, use the stylus to select the "inventory" section on the main menu. Select the supply cabinet, and input the available supply into the PDA as a number value. Do the same at the Conex box and the PPE cabinet.

3.1.3 _____ SO: If using the hard copy at the end of this DOP, start at the supply cabinet and list the amount of available supply for each item listed. Do the same at the Conex box, and the PPE cabinet.

After completing inventory, return the PDA to its dock. The PDA will automatically sync. The lead operator will order the needed supplies.

4. COMPLETION

4.1.1 _____ SO: Verification of Completion.

Signature _____ Date _____

Operating Supply Inventory List

Product in Supply Cabinet	Required Stock	# currently in stock
Paper towels	4 rolls	
3% Hydrogen Peroxide	2 bottles	
8 oz Fend All water additive	2 bottles	
Zip ties	1 package	
10, 20, 30 amp fuses	1 box each	
Brightly colored electrical tape	2 rolls	
D batteries	Pack of 4	
Garbage bags	2 boxes	
Silver paint pens	2	
Spill pads	1 pack	
Baking soda	5 boxes	
Vinegar	2 gallons	
pH buffer solution (4.01 and 7.01)	1 box of each	

Product in Conex Box	Required Supply	# currently in stock
Box of rags	1	
8 micron absolute bag filters	5 boxes	
10 micron nominal bag filters	3 boxes	
1 micron nominal cartridge filters	3 boxes	
55 gallon drums	4	
Plastic sheeting	2 boxes	

Spare Grundfos wet end	1	
Spare Grundfos Impellars	20	
93% Sulfuric Acid	2 gallons	
UV Lamps	40 lamps	
Photo-Cat Ballasts	10	
Sodium hydroxide pellets	(1) 2 gallon bucket	
Titanium dioxide	5 gal bucket	
pH probe (acid side) 91D	4	
pH probe (caustic side) 11D	4	
Simple green cleaner	1	
Alconox soap	3	
Isopropyl alcohol	2	
Atlas Copco Filters PD9, DD9	2 each	

PPE Cabinet	Required Supply	# currently in stock
Nitrile Gloves (L and XL)	4 each	
Leather Work Gloves	3 pair	
Safety Goggles	3 pair	
Face Shield	3	
Neoprene Apron	3	
Neoprene Sleeves	3	
Dust Mask	4	
Neoprene Gloves	3 pair	

Vendor Contact Table

Product/Service	Item/Part/Catalog Number	Phone Number	Vendor
19-micron A bag filters	GDPO 529-2A	727.443.6211	Water Solutions
10-micron bag filters	POG-1-P2-PP	727.443.6211	Water Solutions
Cartridge filters	DWO 5-03-40-1-C	727.443.6211	Water Solutions
8 micron A bag filters	GDPO-527-2A	727-443-6211	Water Solutions
pH probe (acid side)	CPS91D-7B021	800.881.1487 ext.0250	AMJ Equipment
pH probe (caustic side)	CPS11D-7BA21	800.881.1487 ext.262	AMJ Equipment
93% sulfuric acid 1-gallon bottle	None	813-870-2436	Chem-Stat
Sodium hydroxide pellets	None	813-870-2436	Chem-Stat
Nitrile gloves (large and XL)	7BF-35529	800.356.0783	Lab Safety Supply
UV lamps	None	519.473.5788	Purifics
UV Lamps (alternate)	G64T5-4P	800-229-6509	Science Lighting
Lamp ballasts	None	519.473.5788	Purifics
Grundfos pump wet end	Redi-Flo 4 (10E 05-5)	813.238.7872	United Electric
Extraction well manifold GEMU		952.941.0051	Philex Industrial
EW pump motor	Franklin Electric ½ HP 07E18-02-0256	941-377-4373	AAP Industrial
Compressor air and element filters	PD9, DD9	1-813-247-7231	Gulf Atlantic Equipment
Burkert pressure transducers	Omega PX-439 (0-15 psi)	727.323.1300	Southern Industrial
10-,20- and 30-amp Photo-Cat fuses		941.955.0905	Graybar Electric
Carbon change out	None	407.313.9113	Carbon Services
Waste removal, 55-gallon drums	None	727.546.6193	Southern Waste
Photo-Cat tech support	None	519.473.5788 ext. 223	Purifics
Chemical delivery	50% sodium hydroxide, 38%/93% sulfuric acid	813-870-2436	Chem-Stat
Pump Repair	Contact: Jary	Aap Industrial	941-371-4373

Lockheed Martin Tallevast Treatment Facility	Non-Technical Procedure	**USE TYPE 1**	CR Number:

Manual: Operating and Maintenance Manual

Document Owner: Treatment Systems Operations

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A		
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	03/15/09	All	Revision

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) outlines the steps to be followed for the use of eyewash stations as well as activities and responsibilities for the care and maintenance of the eyewash stations.

1.2 Scope and Applicability

This procedure applies to the use, periodic testing and maintenance of the safety eyewash stations inside the Lockheed Martin Treatment Facility in Tallevast, Florida.

1.3 Equipment

- Bradley Corporation Combination Drench Shower and Eyewash Model S19-3210JJ
- Fend•all Gravity-Feed™ Porta Stream Eyesaline™ Eye Wash Station
- five 16-ounce bottles of 3 % H_2O_2 (hydrogen peroxide) solution
- one 180-ounce bottle of Fend-all eyesaline concentrate
- dilute bleach solution
- 2 gallons of distilled or de-ionized water (optional)

2. PRECAUTIONS AND LIMITATIONS

It is always acceptable to call 911 in the event of a medical emergency. Eyewashes may be used to correct small issues, such as a dirt particle in a person's eye, in which there is no apparent risk to the person's eye or to the person's overall health. In case of an emergency in which a person's eye could be in danger, use of an eyewash may only be a measure that is taken in addition to calling 911. A telephone is located on the southeast side of Treatment System building.

The product used to make the eye saline solution arrives as a concentrate. In concentrate form, this product is not suitable for use in eyes.

The Porta Stream portable eyewash station weighs over 150 lbs when filled with solution. Care must be taken if the eyewash is to be moved when full. This is a two person operation.

3. PREREQUISITES

3.1 **Planning and Coordination**

3.1.1 _____ SO: Maintenance: This will be managed as part of the Treatment System Maintenance Schedule on Jobs Plus. Records will be maintained in the Operator's office by operations staff.

3.1.1.1 ____ For use of emergency eyewash stations or shower, there are no circumstances under which this procedure must be exited prematurely.

3.1.1.2 ____ SO: Maintenance of the eyewashes and shower may not be conducted when a hurricane or flooding event is occurring or pending.

IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown, refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to "Flood Preparation" in the Contingency Plan.

4. MAINTENANCE OF THE EYEWASH/SHOWER COMBO

4.1 The operator will inspect and maintain facility eyewash stations as follows:

4.1.1 _____ SO: Inspect and test each eyewash station weekly and prior to chemical delivery/ transfer operation.

4.1.2 _____ SO: Ensure that access to each station is unobstructed. Examine each eyewash station for leaks and broken parts. Activation of the eyewash station will clear sedimentation that can clog the supply line and will flush stagnant water, thus reducing the chance of microbial contamination hazards. If leaks or broken parts are identified, post an "out of service" sign and take actions to make repairs. Do not conduct any further activities that might require the use of the eyewash station until repairs are complete.

4.1.3 _____ SO: Activate the eyewash station by pressing the handle immediately to the right of the eyewash basin. Observe for full flow of water. Without holding the handle down, continue operation until water has been flushed for 3 minutes through the eyewash station.

4.1.4 _____ SO: Inspect and test each shower station weekly and prior to chemical delivery/transfer operation.

4.1.5 _____ SO: Ensure that access to the shower is unobstructed and examine shower for leaks and broken parts. Activating the shower station will clear sedimentation that can clog the supply line and will flush stagnant water, thus reducing the chance of microbial contamination hazards. If leaks or broken parts are identified, post an "out of service" sign and take actions to make repairs. Do not conduct any further activities that might require the use of the shower station until repairs are complete.

4.1.6 _____ SO: Disconnect the shower head and set it aside. Screw the 1" male cam lock fitting onto the pipe where the shower head was removed. Retrieve the hose with the 1" female cam lock fitting from the storage area and attach it to the 1" male cam lock fitting. Set the other end of the hose into the sink next to the shower. Activate the shower station by pulling down the handle immediately to the right of the shower head. Observe for full flow of water. Without holding the handle down, continue operation until water has been flushed for 30 seconds through the shower station.

4.1.7 _____ SO: Document the activation and inspection activity by filling out the eyewash station inspection tag.

5. MAINTENANCE OF THE RESERVOIR-TYPE EYEWASH

5.1 Solution in the reservoir must be discarded and replaced every 6 months following these steps:

5.1.1 _____ LO/SO: Utilizing a partner, carry the portable eyewash to the sink or the sump. Empty the contents of the eyewash into the sink/sump.

5.1.2 _____ SO: Don a new, clean pair of disposable, powder-free nitrile gloves.

5.1.3 _____ SO: Get a clean, new paper towel and soak it with 3% hydrogen peroxide solution. These items can be found in the supply cabinet between Photo-Cats A and B (3% H_2O_2 is available at grocery stores, pharmacies, etc.).

5.1.4 _____ SO: Wipe the entire inside surface of the reservoir with the hydrogen peroxide solution. Add four 16-ounce bottles of hydrogen peroxide solution and swirl in a clockwise motion, tilting to the side to reach all surfaces on the inside of the reservoir.

5.1.5 _____ SO: Empty the peroxide solution into the sink/sump.

5.1.6 _____ SO: Rinse the inside surface of the eyewash reservoir three times, each time using a half of a gallon of potable or deionized or distilled water. Dispose of this rinse water in the building sump.

5.1.7 _____ SO: When the reservoir has been cleaned and rinsed thoroughly, fill it with new solution following the steps below. The two liquids used to fill eyewash reservoir are potable water and fend-all eyesaline **concentrate**. This solution is only suitable for eyes *after* it has been mixed property.

Inspect the bottle of eyesaline concentrate to ensure that the seal, the expiration date, and the general appearance of the bottle are acceptable. If anything appears to be unacceptable, exit this procedure and contact the lead operator. If the bottle's contents appear to be satisfactory, proceed.

Add five gallons of water to the eye wash reservoir.

Add about a third of the liquid in the 180 oz bottle of fend-all eyesaline concentrate (located in the supply cabinet) to the reservoir.

Add another 5 gallons of water to the reservoir.

Add about a third of the liquid in the 180 oz bottle of fend-all eyesaline concentrate to the reservoir.

Add four gallons of water to the reservoir.

Add the last of the contents of the 180 oz bottle of fend-all eyesaline concentrate to the reservoir.

In the total, you will have added 14 gallons of water and the entire contents of the 180 oz. bottle of fend-all eyesaline concentrate

5.1.8 _____ SO: Inspect nozzles and the pull strap. Ensure that they are clean and correctly positioned.

5.1.9 _____ SO: Close the fill cap.

5.1.10 _____ SO: Document the maintenance and inspection activity by filling out the eyewash station inspection tag.

5.1.11 _____ SO: Properly dispose of the bottle that contained eyesaline concentrate.

6. STEP-BY-STEP PROCEDURE FOR USE OF AN EMERGENCY EYEWASH STATION

When foreign material enters the eye(s) (e.g., caustics, acid solutions, particles) perform the following:

6.1 _____ STOP WORK IMMEDIATELY

6.2 _____ Get assistance from a nearby co-worker, if available.

6.3 _____ Walk as quickly as possible to the nearest eyewash station.

6.4 _____ KEEP EYES OPEN and activate the water flow mechanism.

In the case of the permanent eyewash, operate by pressing the handle back. The handle is located immediately to the right of the basin.

In the case of the reservoir-type eyewash, first remove the dust cover from the unit. Then, activate the eyewash by pulling the strap loose.

6.5 _____ Position eyes in the water flow while holding eyelids open.

6.6 _____ Keep eyes in the water flow for at least 15 to 20 minutes (for permanent eyewash stations) or until the water supply is depleted. If the water depletes (for portable eyewash stations), move to a permanent eyewash station.

6.7 _____ If additional medical care is required, call 911 for emergency assistance.

7. REFERENCES

- Occupation Safety and Health Administration, 1910.151
- American National Standard for Emergency Eyewash and Shower Equipment, ANSI Z358.11998

Drain and fill here.

Clean eyewash with the bleach solution.

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	1/01/09	All	New Procedure
1	03/15/09	All	Revision

Responsible Personnel	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for performing scheduled maintenance at the Lockheed Martin Tallevast Treatment System. The maintenance work orders will be printed out by the Lead Operator at the start of each week. They will be distributed among the Shift Operators daily. The Lead Operator will be responsible for updating the maintenance system after work orders are completed.

1.2 Scope and Applicability

This DOP applies to the performance of scheduled maintenance at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PLANNING AND COORDINATION

_____ OM: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown: refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown: refer to "Hurricane Preparation" in the Contingency Plan.

3. SCHEDULED MAINTENANCE STEP BY STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ Lead Operator _____

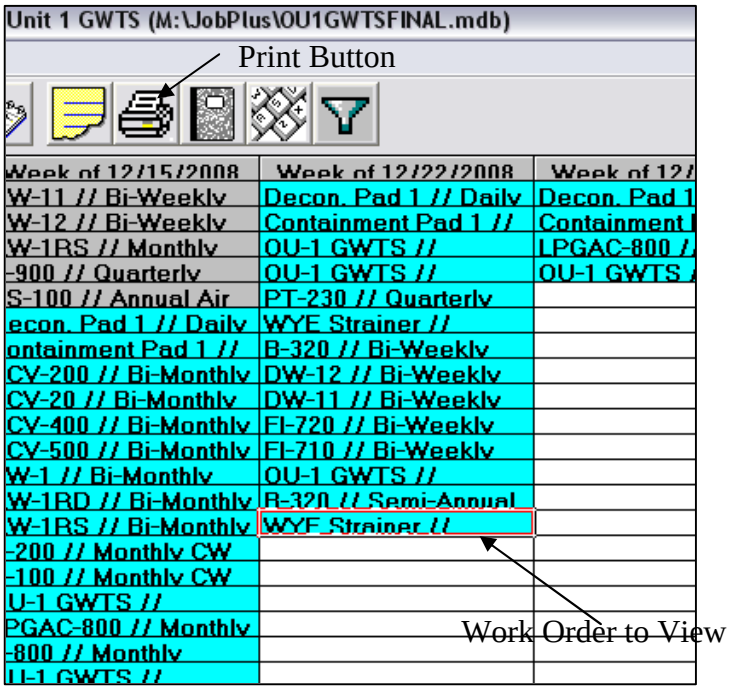
Shift Operator _____

3.1 _____ LO: Go to the Operators computer and open the program JOB Plus.

3.1.1 _____ To view or print an individual work order from the software:

Highlight the work order that you want to view.

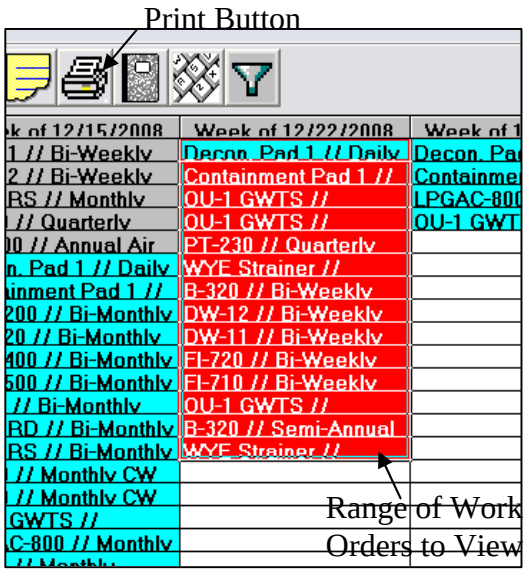
Click the "Print" button in the toolbar. A printable form of the work order will appear on the screen. Click "Print."



3.1.2 _____ To view or print a range of work orders:

Highlight the range of work orders that you want to view.

Click the “Print” button in the toolbar. Printable forms of the work orders will appear on the screen. Click “Print.”

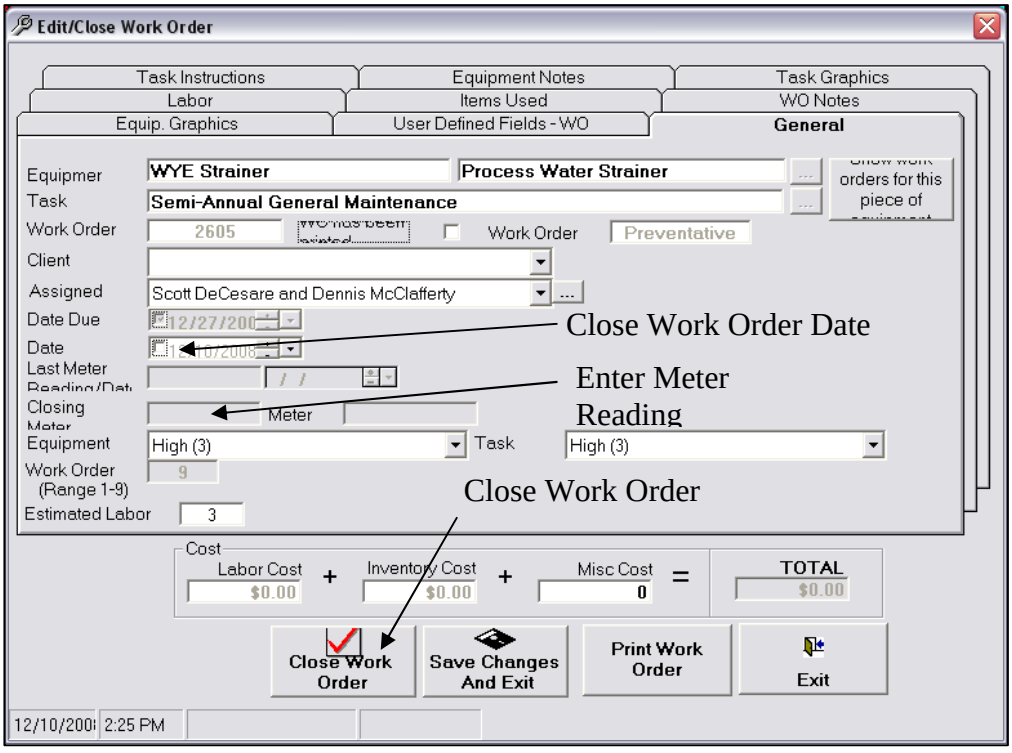


3.2 _____ SO: Following the instructions presented in the work order, perform the listed maintenance tasks.

3.3 _____ LO: After the work order is completed, the JOB Plus system must be updated. Go to the treatment system Operators office and update the status of the maintenance task in the JOB Plus system.

3.3.1 To close a work order using the JOB Plus software:

3.3.1.1 _____ Double click on the work order in the calendar view. The following window will appear:



3.3.1.2 _____ Click the box in the "Date" section of the window and choose the appropriate date that the work order was completed. If the task requires a meter reading, the meter reading can be entered into this screen as well. Any notes associated with the work order can be input on the "WO Notes" tab. Once all of the appropriate information has been input, click the "Close Work Order" button. The work order will then turn gray on the calendar view.

4. Completion

4.1 _____ LO/SO: Verification of Completion.

Signature _____ Date _____

Maintenance Tasks scheduled with JOB Plus Software

Photo-Cat Purifics ES, Inc. Photo-Cat Oxidizer (PC-300)	
Period	*Maintenance Task*
Weekly	Conduct visual inspection for blown lamps and non-functioning ballasts as per DOP-019.
Quarterly	Auto-tune discharge pressure control valve (DPCV), slurry loop control valve (SLCV) and slurry feed control valve (SFCV).
Annually	Check foundation for evidence of settling. Check anchoring system.

Slurry Loop Pump Goulds/G&L 4SH1K5B0 **Influent Pump (P-201)** Goulds SSV	
Period	*Maintenance Task*
Monthly	Lubricate bearings.
Quarterly	Replace #2 Sodium or Lithium grease until grease comes out of the relief fitting.
Quarterly	Inspect bearing and shaft seal

Aeration System Pump (P-401)	
Period	*Maintenance Task*
Quarterly	Clean pump. Inspect for potential parts wear: diaphragm, valve seat and valve balls.

Aerators (A-401 and A-402) Purifics ES, Inc.	
Period	*Maintenance Task*
Annually	Remove, inspect and clean as per DOP-028

Mass Flow Controller Burkert	
Period	*Maintenance Task*
Annually	Clean steel filter

Extraction Well Maintenance	
Period	*Maintenance Task*
Annually	Inspect electrical enclosures and conduits in extraction well vaults for moisture and corrosion. Replace gaskets in junction box as necessary.

Extraction Well Pumps Grundfos Redi-Flow 4 Stainless Steel Submersible Pump Model 4-inch 5S05-12	
Period	*Maintenance Task*
Quarterly	Conduct visual inspection
Annually	Measure and record individual phase voltage and current of extraction well pump
Annually	Measure static depth to water as per DOP-FT-002. Evaluate drawdown to ensure that the water level is not less than 3 feet above the pump intake screen.

Extraction Well Level Pressure Transducers Omega PX-437, PX-438, PX-439	
Period	*Maintenance Task*
Quarterly	Conduct visual inspection. Clean transducer sensor to remove buildup.
Annually	Check level transducer accuracy by taking a manual water level reading as per DOP-FT-002. Compare manual reading to the level displayed on the HMI screen.
Annually	Check for water in the vent tube. If water is present, dry transducer.

Level Switch K-Tek Resonator RS80/RS85, Anchor Scientific Eco-Float G	
Period	*Maintenance Task*
Quarterly	Manually cycle switch
Quarterly	Check fork for crusting. Clean if necessary. Replace if corrosion is evident.

.

Pressure Switches Automatic Switch Co. Asco Tripoint, United Electric Controls 100 Series	
Period	*Maintenance Task*
Quarterly	Cycle between two pressures or set points.

Flow Meters Rosemount, Badger	
Period	*Maintenance Task*
Quarterly	Perform zero-flow test to ensure reading at zero is correct.
Annually	Schedule Curry Controls to perform in-place proving and calibration.

pH Sensors and Transmitters Endress & Hauser Model: CPS11D-7BA21 (probe), Liquisys CPM253-MR3010 (transmitter)	
Period	*Maintenance Task*
Monthly	Calibrate pH sensors as per DOP-024.
Annually	Clean contamination from glass portion of the pH sensor.
Annually	Dissolve lime and metal hydroxide with 3% hydrochloric acid solution.

Pressure Relief Valves	
Period	*Maintenance Task*
Annually	Clean valve. Replace diaphragm and o-rings if necessary.

Air Release Valves	
Period	*Maintenance Task*
Weekly	Inspect valve to ensure proper opening and sealing.
Quarterly	Remove and clean internal parts.

Drain Valves	
Period	*Maintenance Task*
Quarterly	Open and close valve to evacuate collected liquid.

Ball, Check, and Gate Valves	
Period	*Maintenance Task*
Quarterly	Open and close valve to evacuate collected liquid.

Air Compressor (AC-601, AD-601) Atlas Copco SF2 Oil Free with integrated dryer SF2FF-100Mono 460/3 ph	
Period	*Maintenance Task*
Monthly	Inspect inlet air filter and dust filter. Check for damage. Replace a dirty or damaged filter with a new one.
Quarterly	Check the pressure drop between the D and PD Atlas Copco external air filters. If the pressure indicator is red (at 7.3 psi), replace filter element.
Bi-Annually	Operate the safety valve
Bi-Annually	Check the air cooler pipe for dirt. Remove with blast of compressed air.
Bi-Annually	Brush off the finned surface of the compressor.
Bi-Annually	Clean condensate trap.
Annually	Test the safety valve
Annually	Have electrical components and the shut down switch tested.
Annually	Replace the inlet air filter.
Annually	Replace dust filters.
Annually	Check tension and condition of the V-belts
Annually	Inspect ball valve mechanism of condensate trap.
Every 2 years	Replace the V-belt
Every 2 Years	Replace the check valve.
Every 4 Years	Replace element outlet pipe and the plastic insert.

Every 4 Years	Clean the fan, fan duct and element cooling fins.
Every 4 Years	Grease orbiting scroll bearing and pin crank bearings.
Every 4 years	Replace tip seals and dust seal.

Air Compressor (AC-600)	
Period	*Maintenance Task*
Weekly	Drain water from tank.
Quarterly	Check the pressure drop between the D and PD Atlas Copco external air filters. If the pressure indicator is red (at 7.3 psi), replace filter element.
Annually	Change filter elements if needed.

GAC Vessels (GAC-301,302,303)	
Period	*Maintenance Task*
Annually	Blow out sample ports with compressed air.

Surge Protector Advanced Protection Technologies, Inc**.**	
Period	*Maintenance Task*
Monthly	Inspect for failed modules using built in diagnostics per the OMM Manual.

Y Strainer	
Period	*Maintenance Task*
Monthly	Remove and clean Y strainer

.

Eyewash Shower Combo Guardian	
Period	*Maintenance Task*
Weekly	Perform DOP-008 to confirm eyewash is working properly. Record on yellow tag.

General Maintenance	
Period	*Maintenance Task*
Weekly	Check the auto-dialer to ensure that it is online and operational.
Weekly	Inspect fire extinguishers. Note low pressure and record on tag.
Weekly	Check first aid kit. Note if any items need to be replaced.
Weekly	Compare PPE inventory list to available supply. Order as necessary.
Weekly	Check flange bolts for tightness.
Monthly	Spare parts inventory
Quarterly	Rotate shaft on any spare piece of equipment with bearings 180 degrees.
Quarterly	Inspect storage area. Discard expired/broken parts.
Quarterly	Critical Alarms Testing
Annually	Schedule Curry Controls to disconnect, calibrate, and replace all pressure gauges and pressure inducing transmitters as necessary to ensure they are accurately zeroed.
Annually	Backflow preventer certification
Annually	Fire extinguisher certification
Annually	Replace auto-dialer backup battery
Weekly	Inspect sump for leaks
Annually	Electrician to tighten treatment system electrical connections
Annually	Vapor phase GAC change-out
Weekly	Exercise diaphragm valves

Operator Compliance	
Annually	Respirator medical clearance
Annually	Qualitative respirator fit testing for operators
Annually	Respirator training
Annually	Respirator cartridge replacement
Monthly	Complete Respirator Inspection Checklist

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	4/10/09		Corrections

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) presents procedures for checking the catalyst color. The catalyst material used in the Photo-Cat system is titanium dioxide. In order for the Photo-Cat Treatment System to operate at full capacity, the catalyst should be white or close to white and the catalyst consistency should compare closely with the catalyst standard (located in the treatment system building). Due to the considerable amount of iron in the groundwater brought into the system via the extraction wells, the catalyst will, after a period of time, start to change color. The catalyst will then need to be cleaned (see DOP-025, "Catalyst Cleaning"). The catalyst consistency may occasionally become thin. Catalyst may then need to be added to the system.

1.2 Scope and Applicability

This DOP applies to checking the catalyst at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain the current working edition of the "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

2.1.2 _____ SO: Refer to the "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent the operation of the Photo-Cat. If issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that the treatment system is operating. The treatment system must be operating to complete this procedure. If the treatment system is not operating, exit this procedure.

2.1.4 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ OM: IF any of the following events occur**,**
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 **Equipment Required**

Nitrile gloves (located in the cabinet containing personal protective equipment [PPE]), empty 40-milliliter (mL) glass vial, catalyst standard, catalyst color guide (located in the supply cabinet).

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO: _____

3.1 _____ SO: Don nitrile gloves.

3.2 _____ SO: Retrieve catalyst color chart, catalyst standard, and 40mL empty glass vial from the supply cabinet.

3.3 _____ SO: Go to SP-301 located on the northeast side of Photo-Cat A. Remove the cap from the empty 40mL vial. Purge the stainless steel line into the vial. Slowly open the valve 25% and fill the empty 40 mL vial. Close SP-301. Remove the cap on the top of the accumulator. Empty the 40mL vial into the accumulator and repeat the purging process three times. The purging process will ensure that your final sample is representative of the actual catalyst color. Open SP-301 25% and fill the 40mL vial. Close SP-301 and replace the cap on the vial.

3.4 _____ SO: Compare the color of your sample to the catalyst color guide. Find the color in the guide that most closely resembles your sample. The catalyst color guide will tell you whether or not the sample is within range. If the sample resembles a 1, 2 or 3, it is within range. If the sample resembles 4 or 5 on the catalyst color chart, it is out of range and needs to be cleaned. Note the consistency of the catalyst sample. Compare the catalyst sample to the catalyst standard. If the sample appears more translucent than the standard, use the digital scale and measure 25 grams of titanium dioxide. Carefully pour this into the top of the accumulator. After comparing the sample to the chart and standard, pour the contents of the sample vial into the accumulator and replace the accumulator cap.

3.5 _____ SO: Record finding.

3.6 _____ SO: If the sample resembles a 4 or 5 on the catalyst color guide, complete SOP-003, "Short-Term Treatment System Shut Down" to shut down the system and

proceed to Step 3.6.1 of this procedure. If the sample does not resemble a 4 or 5 on the catalyst color guide, proceed to Step 3.7.

3.6.1 _____ SO: Complete DOP-025, "Catalyst Cleaning."

3.7 _____ SO: This procedure will be documented every shift in the operator's daily logs as a numerical value (1, 2, 3, 4, 5). If the catalyst color changes dramatically from the day shift to the night shift or from the night shift to the day shift, this could indicate one or more of the following:

Soiled, defective or improperly installed 8-micron iron filters

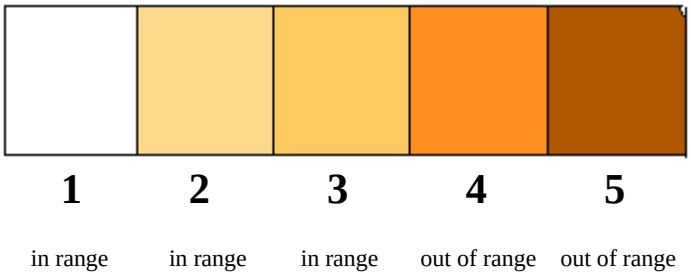
Iron filter baskets not seated properly

Iron filter o-rings (o-rings underneath the basket) are bad or not seated properly

Aeration system not operating properly

3.8 _____ SO: Return the catalyst color guide and the empty 40 mL vial to the supply cabinet.

Photo-Cat
Catalyst Color Chart



1	2	3	4	5
in range	in range	in range	out of range	out of range


WORLDWIDE SUPPORT
Accumulator cap.
Accumulator.


Purifics
NOTICE
Photo-Cat A.
SP-301.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) identifies the activities to be followed when sampling extraction wells by way of sample ports (SP-X) located within the treatment system building. This DOP presents the procedures to be followed when sampling inside the treatment system building.

1.2 Scope and Applicability

This DOP applies to sampling various sample ports located inside the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

The extraction wells remove contaminated groundwater from the subsurface. Therefore, it is **extremely important** that the operator use care to avoid contact with groundwater.

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.1.2 _____ SO: Verify that there is either a working sample refrigerator (located in the ARCADIS office) or a cooler with ice available to store samples.

3.1.3 _____ SO: Gather all of the necessary equipment (listed below) and locate near the manifold in the southeast corner of the treatment building.

3.2 Equipment

The following equipment can be found in the Conex box: 5-gallon container labeled “Purge Water” that has no holes or fractures (except for the main opening), proper lid to seal the 5-gallon container, proper personal protective equipment (PPE; steel-toed boots, nitrile gloves, safety glasses or goggles, traffic vest), spill containment kit, designated bucket or trash bag for temporary storage of used PPE and anything else that has contacted groundwater, sample bottles, laboratory bottleware, cooler, ice and labeling supplies.

3.3 Planning and Coordination

3.3.1 _____ SO: IF any of the following events occur,
THEN exit this procedure,
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" Contingency Plan.

3.4 Approvals and Notifications

3.4.1 _____ Approval to perform this procedure has been obtained from the Lead Operator.

Lead Operator Signature _____ Date _____

4. SAMPLING EXTRACTION WELLS VIA RESPECTIVE SAMPLE PORTS

Procedure Started: Time _____ Date: _____ LO _____

SO _____

4.1 _____ SO: Label sample bottles.

4.2 _____ SO: Fill cooler ½ full of ice.

4.3 _____ SO: Don nitrile gloves.

4.4 _____ SO: Place the 5-gallon container directly under the sample port to be sampled. If the 5 gallon container cannot be positioned so that the water will flow directly into it, add a section of polyethylene tubing located in the Conex box.

4.5 _____ SO: Slowly open the sample port to allow water to flow through the valve and into the 5-gallon contaner.

4.6 _____ SO: Purge approximately ¼ gallon of water into the 5-gallon container. (Combined Influent, Primary GAC Effluent, Mid-Process, and Effluent

samples require that you purge approximately four gallons before sampling.)

4.7 _____ SO: Fill appropriate laboratory bottleware with groundwater from the appropriate sample port. Note: Some bottles from the laboratory are pre-preserved. Avoid contacting or breathing vapors from preservative. Preseved and unpreserved bottles will be labeled as such on the bottle. Sample bottles will be labeled preserved or unpreserved**.**

4.8 _____ SO: After all samples have been collected from the first sample port, close the sample port.

4.9 _____ SO: Place sample bottles upright in the cooler on ice.

4.10 _____ SO: Verify that the sample port is completely closed.

4.11 _____ SO: Seal the 5-gallon container of purge water prior to relocation. Move the container to the location directly under the next sample port to be sampled.

4.12 _____ SO: Gloves must be changed in between each sample. Remove your gloves in the following manner:

- Using one gloved hand (hand "A"), grip the outer surface of the other glove (the glove on hand "B") near the wrist cuff (avoid contacting skin).
- Remove the glove from hand "B" by pulling toward the fingertips. Peel it down and let it become inside-out. Now hand B has no glove. Hand A is wearing a glove and is holding the other used glove.
- With hand B, grip the inside surface of the glove that is on hand A near the wrist cuff. Pull toward the fingertips; peel it down and let it become inside-out.
- Dispose of used gloves in "Used PPE" bucket or bag. This used PPE will be disposed of in a drum labeled "Used PPE" located inside the Conex box.

4.13 _____ SO: Don a new, clean pair of disposable nitrile gloves.

4.14 _____ SO: Repeat Steps 4.4 through 4.13 for each sample port.

4.15 _____ SO: Seal the container of purge water before transporting.

4.16 _____ SO: Carefully pour the 5-gallon bucket of purge water into the treatment system sump located on the south wall of the building.

4.17 _____ SO: Dispose of tubing and used PPE in the drum labeled “Used PPE” located in the Conex box.

4.18 _____ SO: Samples should be picked up be a courier or sent UPS overnight to the laboratory.

4.19 _____ SO: Equipment should be returned to its proper storage location.

5. COMPLETION

5.1 _____ SO: Verification of completion.

Signature _____ Date _____

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) explains the responsibilities and procedures for maintaining a complete and active Material Safety Data Sheet (MSDS) database.

1.2 Scope and Applicability

The MSDS database will be kept by ARCADIS at the Lockheed Martin Treatment Facility in Tallevast, Florida and will include MSDSs for each chemical that ARCADIS has on site.

Each MSDS three-ring binder (book) will have a current index, listing all sheets in the book alphabetically by chemical name**.** The MSDSs will be alphabetized in the way that seems most intuitive (e.g., 2-Cycle Engine Oil will be alphabetized under "O" for "oil"). The index will be alphabetized by chemical name and will indicate the "alphabetized by" title (by which to find the MSDS in the book).

The treatment building will house an MSDS book that contains sheets for only for chemicals that are located within that building. MSDS books will also be located in the operator's office and in the storage area in the Conex box. These will represent all ARCADIS chemicals located anywhere on site.

2. STEP-BY-STEP PROCEDURE

2.1 _____ SO: Before purchasing a chemical, investigate whether that chemical is already included in the current MSDS book.

2.2 _____ SO: If the chemical to be purchased is already listed in the book, no further steps are necessary.

2.3 _____ SO: If the chemical to be purchased is not yet included in the MSDS book, complete Steps 2.4 through 2.7:

2.4 _____ SO: While purchasing the chemical, request an MSDS from the seller (e.g., hardware store). Have the MSDS with the chemical when the chemical arrives on site.

2.5 _____ SO: After the chemical arrives on site, make a copy of the MSDS.

2.6 _____ SO: Add one copy of the MSDS to the MSDS book in the operator's office. Hand write the chemical name, manufacturer name and "alphabetized by" name on the index. This is a temporary measure to save paper and to increase efficiency. The index will be updated and reprinted (incorporating any hand-written additions) periodically.

2.7 _____ SO: Remove MSDSs for materials no longer used or stored on site from the MSDS books and store in an inactive MSDS file in case of future need. The index will be updated to reflect that the material is no longer on site.

Note: It is recommended that, whenever possible, materials be replaced with the same brand name to minimize the number of MSDSs required for the site.

MSDS are located on the east door of the treatment system building.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	02/25/09		Updates and Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for the replacement of bag filters in the iron filter units and bag and/or cartridge filters in the sediment filter units.

1.2 Scope and Applicability

This procedure applies to filter replacements in the filter units of the Lockheed Martin Treatment System in Tallevast, Florida.

2. PRECAUTIONS AND LIMITATIONS

2.1 Bag and/or cartridge filter change should not proceed without verifying that the system is off. If the system is on, refer to SOP-003 "Short Term Treatment System Shutdown."

3. PREREQUISITES

3.1 Field Preparations

3.1.1 _____ SO: Obtain current working edition of "Operations Log."

3.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/recorded that would prevent a filter change. If such issues are noted, then exit this procedure until resolution is obtained.

3.1.3 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

3.1.4 _____ SO: Verify that new filters are available for change out. Gather new bags and cartridge filters needed and stage at the work location. Replacement filters are located in the Conex box.

3.2 Planning and Coordination

3.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure,
AND go to identified procedure.

A. A hurricane event requiring a treatment system shutdown, refer to the "Hurricane Procedures" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to the "Flood Procedures" in the Contingency Plan.

4. FILTER CHANGE STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO: _____

4.1 Filter Canister Isolation and Gravity Draining

4.1.1 _____ SO: Isolate the applicable filter unit(s) following the isolation table provided below.

Filter Skid	Filter Type	Filter #(s)	Device(s)	Device #(s)	Configuration
Sediment	Bag	BF-201	Ball Valve	BV-201/203	CLOSED
	Bag	BF-202	Ball Valve	BV-202/204	CLOSED
	Cartridge	CF-201	Ball Valve	BV-205/207	CLOSED
	Cartridge	CF-202	Ball Valve	BV-206/208	CLOSED
Iron	Bag	BF-210/211	Ball Valve	BV-221/224/225	CLOSED
	Iron	BF-212/213	Ball Valve	BV-224/226/229	CLOSED

4.1.2 _____ SO: Obtain the black polyvinyl chloride (PVC) drain hose stored in Conex box #1 (storage box closest to treatment system building). Return to the treatment system building and place the discharge side of the PVC drain hose (end without PVC union) into the treatment building sump and secure hose to the sump grating using a zip tie. Unroll and straighten out the PVC drain hose toward the filter skid to be drained. Undo the union on the applicable filter skid drain manifold and set aside the removed part of the union. Connect the unionized end of the PVC drain hose to the union on the drain manifold of the applicable filter skid.

4.1.3 _____ SO: With PVC hose routed from the applicable filter skid drain to the treatment building sump, canister draining may begin. To drain the filter canisters, first open the appropriate filter drain valve located at the bottom of the filter canister. Then open the appropriate valve at the top of the canister. The table below lists valve numbers for drain valve of each filter. Water will begin to drain through the PVC hose to the treatment building sump. Allow filter canister to drain for at least one minute before proceeding to Step 4.1.4.

Filter Skid	Filter Type	Filter #(s)	Device(s)	Device #(s)	Configuration
Sediment	Bag	BF-201	Drain Valve	DV-201	OPEN
	Bag	BF-202	Drain Valve	DV-202	OPEN
	Cartridge	CF-201	Drain Valve	DV-203	OPEN
	Cartridge	CF-202	Drain Valve	DV-204	OPEN
Iron	Bag	BF-210	Drain Valve	DV-220	OPEN
	Bag	BF-211	Drain Valve	DV-221	OPEN
	Bag	BF-212	Drain Valve	DV-222	OPEN
	Bag	BF-213	Drain Valve	DV-223	OPEN

4.1.4 _____ SO: After allowing the filter canister to drain for at least one minute, open the ball valve at the top of the corresponding filter canister (see table below). This action should allow air to enter the canister, enhancing the gravity draining of the vessel. Gravity drain the canister for 5 to 10 minutes or until fully drained. **If not fully drained after 10 minutes, proceed to Step 4.2. Otherwise proceed to Step 4.3.**

Filter Skid	Filter Type	Filter #(s)	Device(s)	Device #(s)	Configuration
Sediment	Bag	BF-201	Ball Valve	BV-209	OPEN
	Bag	BF-202	Ball Valve	BV-210	OPEN
	Cartridge	CF-201	Ball Valve	BV-211	OPEN
	Cartridge	CF-202	Ball Valve	BV-212	OPEN
Iron	Bag	BF-210	Ball Valve	BV-222	OPEN
	Bag	BF-211	Ball Valve	BV-223	OPEN
	Bag	BF-212	Ball Valve	BV-227	OPEN
	Bag	BF-213	Ball Valve	BV-228	OPEN

4.2 Pressurized Draining of Canister

4.2.1 _____ SO: Obtain the ¼" ID polyurethane air hose (air hose) from the supply cabinet located between Photo-Cat A and Photo-Cat B and proceed toward air compressor AC-600. Verify that ball valve BV-605 is fully closed. Attach the air hose to air hose connection on the effluent side of ball valve BV-605. This hose will be used to convey the pressurized air to the filter canister to be pressure drained.

4.2.2 _____ SO: Connect the air hose to the air hose connection on the ball valve located on top of the filter canister to be drained and confirm the applicable valve configurations presented below.

Filter Skid	Filter Type	Filter #(s)	Closed Valves	Open Valves
Sediment	Bag	BF-201	BV-201, BV-203, BV-209, SP-201, DV-202, DV-203, DV-204	DV-201
	Bag	BF-202	BV-202, BV-204, BV-210, DV-201, DV-203, DV-204	DV-202
	Cartridge	CF-201	BV-205, BV-207, DV-201, DV-202, DV-204	DV-203
	Cartridge	CF-202	BV-206, BV-208, DV-201, DV-202, DV-203	DV-204
Iron	Bag	BF-210	BV-221, BV-222, BV-223, BV-224, BV-225, SP-220, DV-221	DV-220
	Bag	BF-211	BV-221, BV-222, BV-223, BV-224, BV-225, SP-220, DV-220	DV-221
	Bag	BF-212	BV-224, BV-226, BV-227, BV-228, BV-229, SP-221, SP-223, DV-223	DV-222
	Bag	BF-213	BV-224, BV-226, BV-227, BV-228, BV-229, SP-221, SP-223, DV-222	DV-223

4.2.3 _____ SO: With the air hose connected and after confirming the applicable valve configurations presented in the table above, open ball valve BV-605 to pressurize the air hose.

4.2.4 _____ SO: With the air hose connected and pressurized, slowly open the ball valve on top of the applicable canister to 25% open, gradually increasing to 50% open. Observe the water draining into the treatment building sump. When water has significantly stopped draining, the filter canister is sufficiently dry. (This step should take less than one minute per canister.) Close ball valve BV-605 to depressurize the air hose. Then close the ball valve on top of the respective filter canister and disconnect the air hose.

4.2.5 _____ SO: Repeat Steps 4.2.2 through 4.2.4 until all filter canisters that require filter change out have been sufficiently drained.

4.3 **Filter Exchange**

4.3.1 _____ SO: Remove lid on the applicable filter canisters for each filter to be exchanged.

4.3.2 _____ SO: If changing filters on the sediment filters skid, hand loosen the tee-handle on the band clamp until the tee-handle can be removed from the threaded rod attached to the band clamp. The hole on the handle end of an adjustable wrench can be used to assist with opening the tee-handle. Remove the tee-handle, band clamp and filter lid, and set aside in a bucket or on the ground in a place not in a walking path. If removing the cartridge filter, the set spring on top of the cartridge must also be removed and stored with the tee-handle, band clamp, springs and filter lid.

4.3.3 _____ SO: If changing filters on the iron filters skid, loosen the two applicable loop nuts on top of the filter canister until the nuts can be swung clear of the lid. Loosen the remaining loop nut enough to allow the lid to be swung free of the filter canister. A thick-shafted screwdriver or pry bar can be inserted into the loop of the loop nut to help loosen the loop nuts.

4.3.4 _____ SO: Don nitrile gloves.

4.3.5 _____ SO: Remove bag and/or cartridge filters from canisters and place used filters into a trash barrel lined with a garbage bag.

4.3.6 _____ SO: Replace the bag and/or cartridge filters with new filters. Replace bag filters gently to avoid tears. The 8-micron (absolute) bag filters are used in the iron removal skid bag filter canisters (BF-210/211/212/213). The 1-micron (nominal) bag filters are used in the bag filter canisters (BF-201/202) and the 10-micron (absolute) cartridge filters are used in the cartridge filter canisters (CF-201/202) of the sediment removal skid.

4.4 Returning Filters to Service

4.4.1 _____ SO: With the filter in place, close all canister drain valves (DV-201/202/203/204/220/221/222/223) and use the potable water hose to fill the applicable filter canister to the top of the canister. Do not leave filter unattended while filling with potable water.

4.4.2 _____ SO: Reinstall the set springs on cartridge filters, hold down springs on bag filters and confirm that the o-rings are correctly seated and free of debris. Reset and secure the filter canister lid using either the band clamp (sediment removal filters) or loop nuts (iron removal filters).

4.4.3 _____ SO: Remove nitrile gloves and place in the garbage-lined trash barrel used to store used filters. See DOP-FT-003 “Trash Procedures” for waste management procedures.

4.4.4 _____ SO: Return all associated valves to the correct start-up position using the table below. Perform system startup according to SOP-002 "Routine System Start-Up."

Filter Skid	Filter Type	Filter #(s)	Device(s)	Device #(s)	Configuration
Sediment	Bag	BF-201	Ball Valve	BV-201/203	Open
	Bag	BF-202	Ball Valve	BV-202/204	Open
	Cartridge	CF-201	Ball Valve	BV-205/207	Open
	Cartridge	CF-202	Ball Valve	BV-206/208	Open
Iron	Bag	BF-210/211	Ball Valve	BV-221/224/225	Open
	Iron	BF-212/213	Ball Valve	BV-224/226/229	Open

4.4.5 _____ SO: With the system operating, begin bleeding off potential air in the canister (from upstream canister to downstream canister) using the applicable ball valve on top of the canister. Hold a 5-gallon bucket in front of the bleed-off discharge to contain any water that may be discharged during the process. See table below for canister bleed-off sequence and identification of applicable ball valve to be used for air bleed off. Bleed air off one canister at a time.

Filter Skid	Sequence	Filter #(s)	Device(s)	Device #(s)	Configuration
Iron	1	BF-210	Ball Valve	BV-222	25% OPEN
	2	BF-211	Ball Valve	BV-223	25% OPEN
	3	BF-212	Ball Valve	BV-227	25% OPEN
	4	BF-213	Ball Valve	BV-228	25% OPEN
Sediment	5	BF-201	Ball Valve	BV-209	25% OPEN
	6	BF-202	Ball Valve	BV-210	25% OPEN
	7	CF-201	Ball Valve	BV-211	25% OPEN
	8	CF-202	Ball Valve	BV-212	25% OPEN

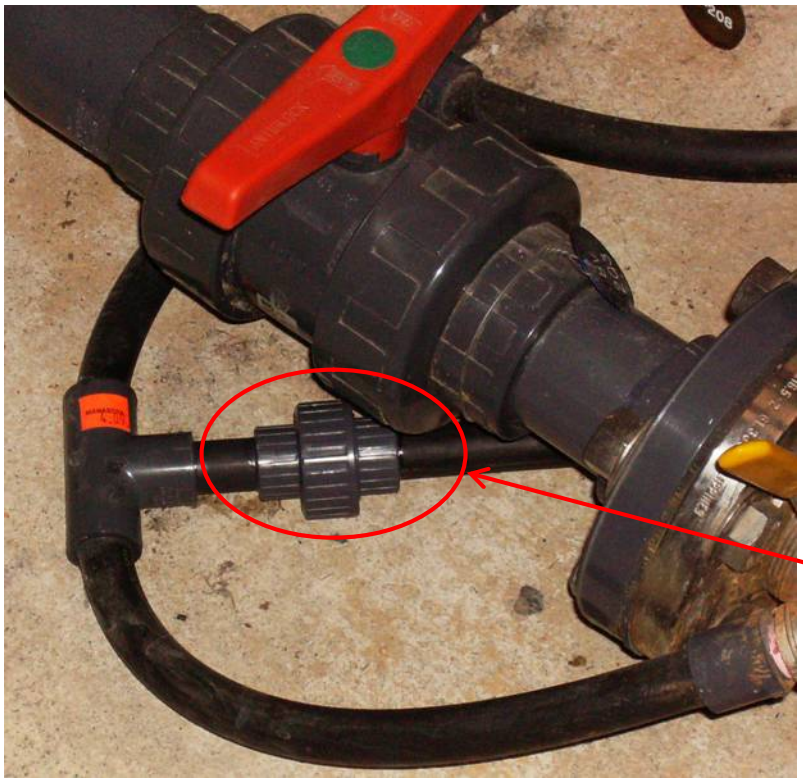
5. COMPLETION

5.1 _____ SO: Verification of completion.

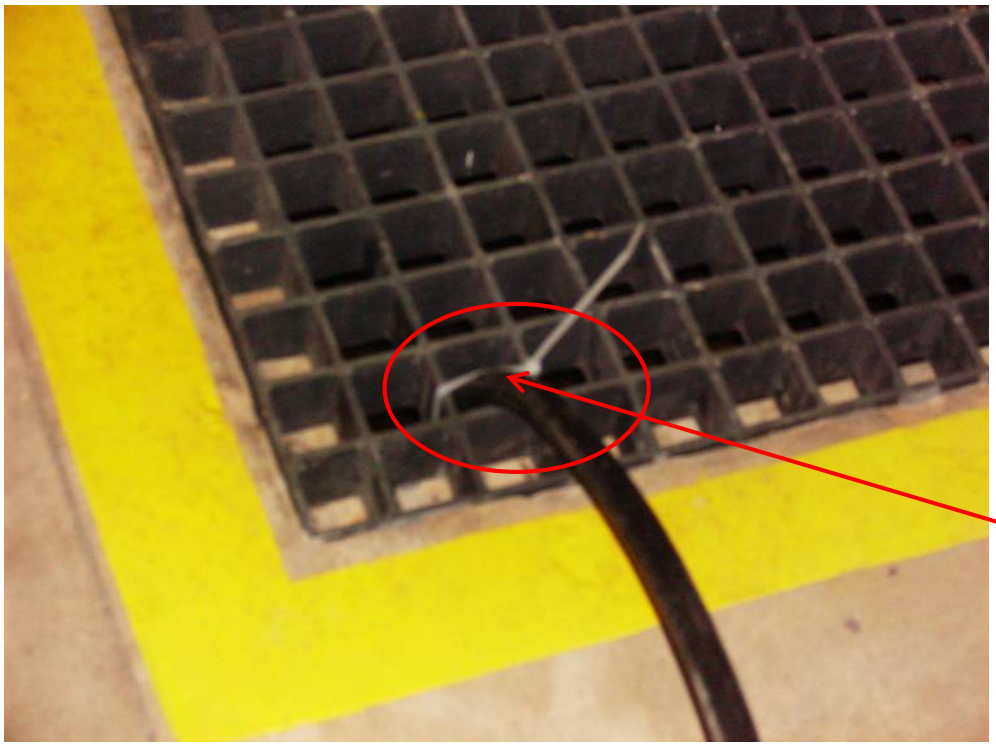
Signature _____ Date _____

6. REFERENCES

- Health and Safety Plan
- DOP-FT-003 “Trash Procedures”
- SOP-002 “Routine System Start Up”
- SOP-003 “Short-Term Treatment System Shutdown”

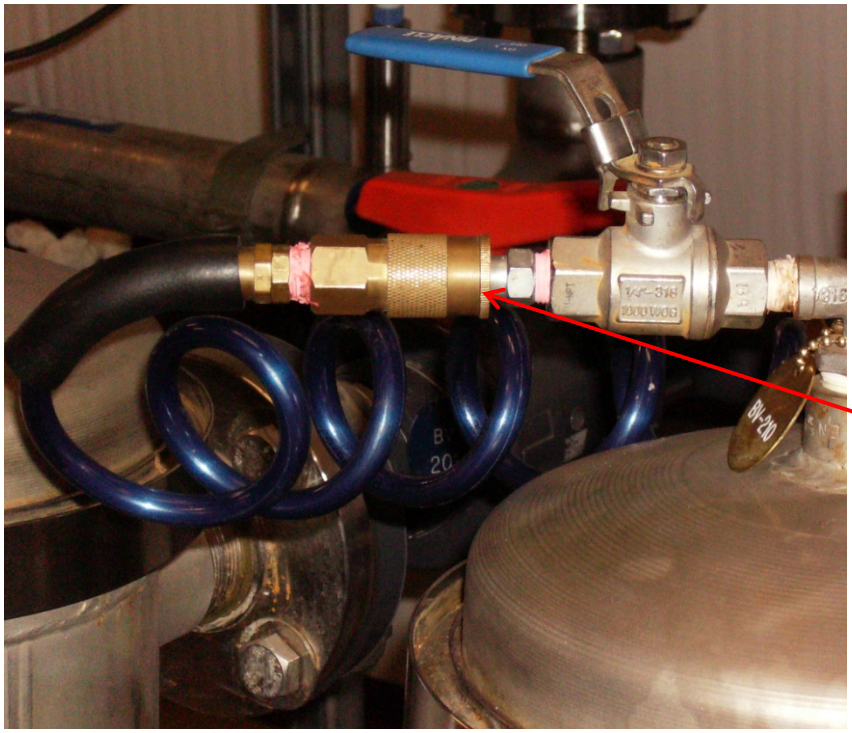


4.1.2
Unionized end of the PVC hose.



4.1.2
PVC hose secured to sump pump drain.

4.2.1
Air hose attached to BV-605.



4.2.2
Air hose connected to canister.

4.3.1 Sediment filters.
Loosen and remove
tee-handle.

4.3.1 Iron filters
Loosen loop nuts.

4.3.5
Remove bag/cartridge filter.
Place in lined garbage can.

4.3.6
Replace bag/cartridge filter.

4.4.1
Fill with potable water.

4.4.2
Re-install set springs on cartridge filters,
hold down springs on bag filters,
and tighten wing-nuts.

CHANGE CONTROL PROCEDURE

PROCEDURE REVIEW REQUIREMENTS PER EROP-01			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	1/7/09	All	New Procedure

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) is to be used when performing initial and typical extraction well manifold balancing. Initial balancing is performed during the initial start up of the extraction system, after an extended system shut down (greater than 1 month) and after a modification to the manifold valves. Typical balancing of the extraction well manifold will be performed daily, and when an extraction well is removed from service for cleaning.

1.2 Scope and Applicability

This DOP applies to balancing the extraction well manifold installed on the IRAP system at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ LO/SO: Obtain current working edition of "Operations Log."

2.1.2 _____ LO/SO: Refer to "Operations Log" to insure that there are no operational issues reported/recorded that would prevent a normal extraction well balancing. If such are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ LO/SO: Verify that no emergency stops are in effect (e.g. hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure,
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown, refer to the "Hurricane Preparation" plan in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown, refer to the "Flood Preparation" Contingency Plan.

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ LO Operator _____

SO Operator _____

3.1 Introduction

The purpose of extraction well manifold balancing is to optimize the radius of influence of the extraction system and the recovery of constituents extracted by the extraction system. Extraction well manifold balancing will be performed with all operable wells in operation.

3.2 Individual Extraction Well Operation Set Points

Each extraction well will operate at a different flow rate and water level depth. In general, Upper Surficial Aquifer System (USAS) Extraction Wells (the odd numbered wells) will operate at a lower flow rate and higher water level than Lower Surficial Aquifer System (LSAS) Extraction Wells. Typical ranges for flow rates and water levels for each individual extraction well are presented in the Table 3.2.

Table 3.2 Typical Extraction Well Flow Rate and Water Level Ranges

Extraction Well	Typical Flow Rate Range (GPM)	Typical Operational Water Level (ft bgs)
EW-101	2 - 2.7	15 -18
EW-102	2.0 - 3.0	23 - 28
EW-103	0.6 - 0.8	15 – 18
EW-104	0.8 - 1.6	22 – 28
EW-105	1.3 - 2.2	16 – 20
EW-106	0.5 - 0.8	21 – 27
EW-107	2.0 - 3.0	18 - 21
EW-108	7.0 - 8.5	25 – 31
EW-109	0.6 – 1.0	14 – 18
EW-110	0.9 – 2.0	16 - 24

Note: Continuous operation of extraction well pumps below 0.5 gpm is not recommended and may cause shortened lifespan of pump wet end and/or motor. Wells that typically operate below 0.5 gpm will, in most cases, cycle on and off and not maintain a steady water level in the well.

3.3 Initial Extraction Well Manifold Balancing

Initial extraction well manifold balancing will only be performed during the initial start up of the extraction system, after an extended system shut down (greater than 1-month) and after a modification to the manifold valves.

3.3.1 _____ Open ball valves BV-101 through BV-111 and BV-121 through BV-140.

3.3.2 _____ Close ball valves BV-141 and BV-143

3.3.3 _____ Close sample ports SP-101 through SP-111

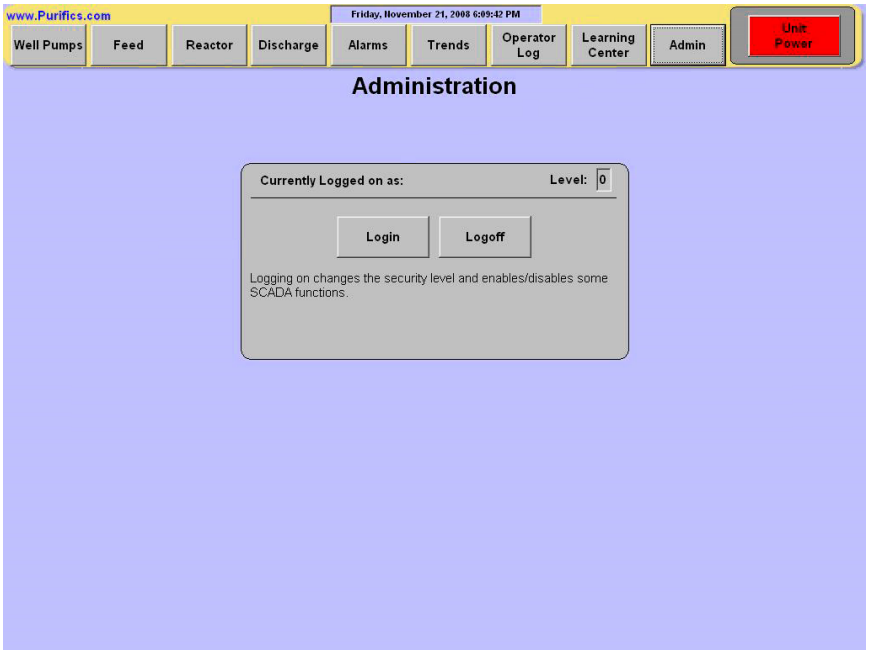
3.3.4 _____ Open all diaphragm valves on the extraction well manifold to the 50% open position (FCV-101 through FCV-110).

3.3.5 _____ Continue with typical extraction well manifold balancing as described below.

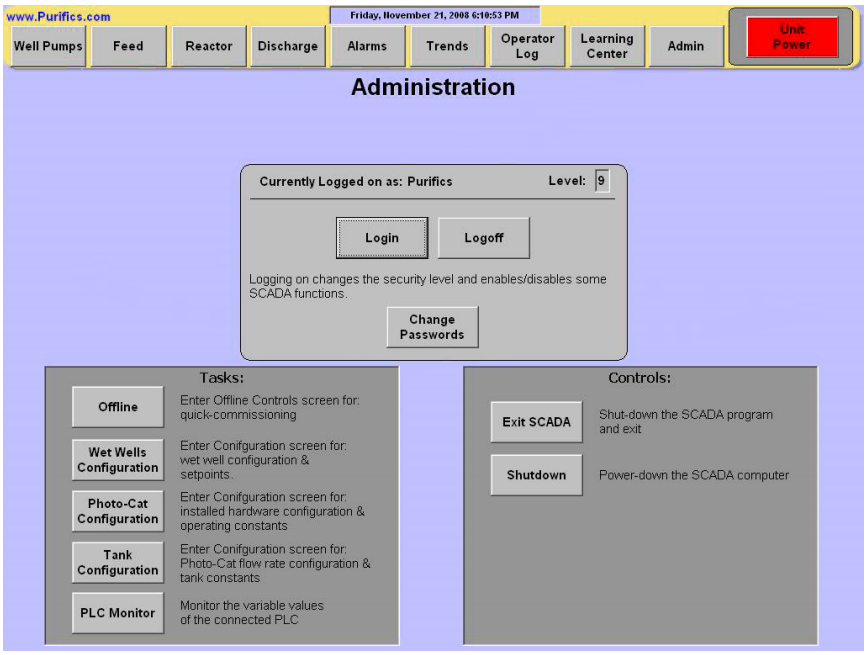
3.4 Typical Extraction Well Manifold Balancing

Typical extraction well manifold balancing will be performed once every day, if an extraction well is removed from service for more any length of time, and if an extraction well is brought back online after cleaning.

3.4.1 _____ Verify that all operable extraction wells are enabled. Press the Admin button at the top of the HMI screen and log on by entering your Username and Password, press OK on the username window and enter on the keyboard displayed on the screen.

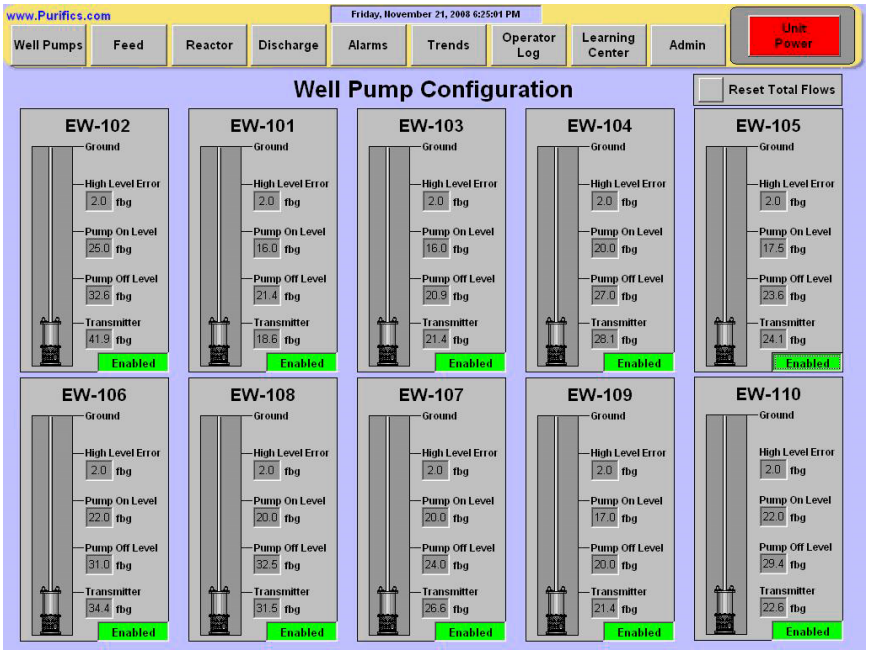


3.4.2 _____ The Admin screen will now display Task buttons on the bottom left of the screen.

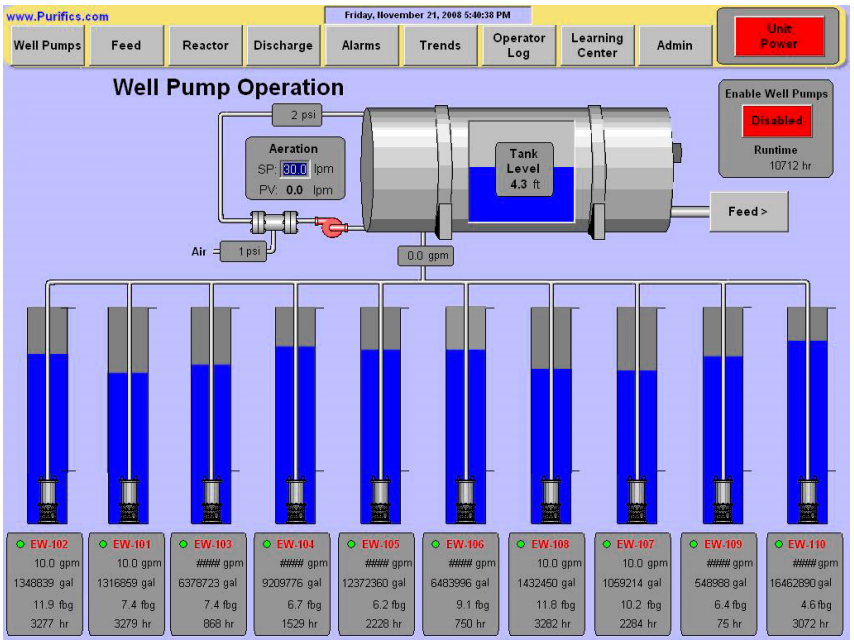


3.4.3 _____ Touch the Wet Well Configuration button and Well Pump Configuration screen will appear. When viewing the Well Pump Configuration screen, notice that each well shows has a High Level Error, a Pump On Level, a Pump OFF level and a Transmitter Level.

3.4.4 _____ Verify all operable pumps are enabled. Pumps that are operational and are disabled can be enabled by pressing the red disabled button at the bottom of the respective well, the button will turn green and read enabled, and the pump is now enabled.



3.4.5 _____ Press the Well Pumps button on the HMI and the Well Pump Operation screen will be displayed. If the Extraction Well Pumps button is red and reads disabled, touch the button to enable it. All extraction wells that are enabled will now start to operate. The HMI will display flow rate for each well and the water level in the respective wells. Allow the entire extraction system to operate for approximately 1 minute before adjusting any valves.



3.4.6 _____ Adjust the Extraction Well Manifold Diaphragm Valves (FCV-101 through FCV-110) such that the flow rates displayed on the local flow meter displays are within the ranges of flow rates described in the Table 3.2 in this DOP. A clockwise rotation of the valve will close the valve, reducing flow rate, while a counter-clockwise rotation of the valve will open the valve, increasing flow rate.

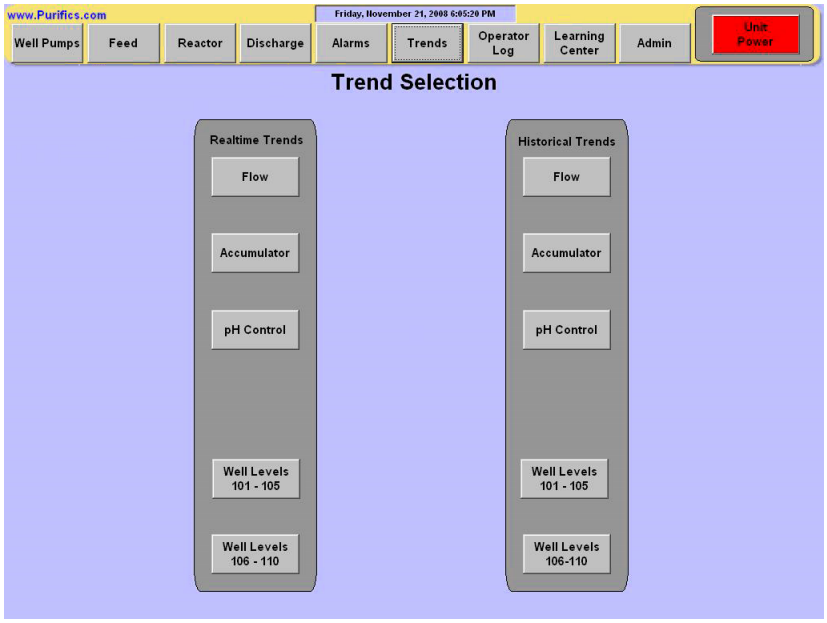
Please note that the operation of extraction wells below 0.5 gpm is not recommended, as it may result in a shortened lifespan of the pump wet end and/or motor. However, as shown in Table 3.2, Extraction Wells EW-103, EW-106 and EW-109 all have typical operational flow rates below 1 gpm. It is recommended that the flow rates for these wells be set to the high end of the range and operational cycling of the extraction well be accepted as typical operation.

It is prohibited to set the operational flow rate of any extraction well below 0.5 gpm as it will result in a shortened lifespan of the pump wet end and motor.

3.4.7 _____ Allow the extraction system to operate for approximately 10 minutes after the initial adjustment of the diaphragm valves, such that the water levels and flow rates can stabilize. Notice if the well pumps are decreasing the water level in any of the wells too quickly. If so, slowly rotate the diaphragm valve clockwise in very small increments to restrict the flow.

3.4.8 _____ Touch the Trends button on the HMI screen and the Trend Selection screen will appear. When in the Trend Selection screen, touch the

Historical Trends Well Levels 101-105 button. The plot of water levels for EW-101 through EW-105 will display.



3.4.9 _____ Note in the trends, extraction wells producing a steady or flattening plotted line as well as those that are cycling (i.e., the plotted line looks like a sharp wave).

3.4.10 _____ Touch the Trends button on the HMI screen and then Historical Trends Well Levels 106- 110 button. The plot of water levels for EW-106 through EW-110 will display. Again note those extraction wells producing a steady or flattening plot line and those producing a cycling plot line.

3.4.11 _____ Extraction wells producing a steady or flattening plot line will not be adjusted at this time. Extraction wells producing a cycling plot line will be adjusted to produce a lower flow rate. Reduce flow rate of extraction wells that are cycling between 10 and 20 percent. After the second valve adjustment is completed, allow the extraction system to operate for approximately 15 minutes to allow for stabilization.

3.4.12 _____ Follow Steps 3.4.7 through 3.4.10 of this DOP and again adjust the diaphragm valves of those extraction wells that are cycling. After the third valve adjustment is complete, allow the extraction system to operate for approximately 30 minutes to allow for stabilization.

3.4.13 _____ Again follow Steps 3.4.7 through 3.4.10 of this DOP and adjust the diaphragm valves of those extraction wells that are cycling. After the

fourth valve adjustment is complete, allow the extraction system to operate for 24 hours to allow for stabilization.

3.4.14 _____ Any additional valve adjustment should be minimal at this point; however, continue with the valve adjustment process until all operational extraction wells (excluding EW-103, EW-106 and EW-109) have continuous operation for 1 hour without a well shut down.

3.4.15 _____ Fill in the table below at the completion of the Extraction Well Manifold Balancing.

Extraction Well	Operational Flow Rate (GPM)	Operational Water Level	Is Extraction Well Cycling? Y/N
EW-101			
EW-102			
EW-103			
EW-104			
EW-105			
EW-106			
EW-107			
EW-108			
EW-109			
EW-110			

4. COMPLETION

4.1.1 _____ LO/SO: Verification of completion.

Signature _____ Date _____

5. REFERENCES

- Purifics Photocat operating manual
- SOP-001 “System Checks Prior to Routine Treatment System Start Up”
- SOP-002 “System Start Up”
- SOP-003 “Short-Term Treatment System Shut Down”
- SOP-029 “Hurricane Preparation”
- SOP-030 “Flood Preparation”

Figure 1. Photocat Unit A

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	02/26/09	All	Updates and Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

1. INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for accessing an extraction well vault.

1.2 Scope and Applicability

This DOP applies to extraction well vault access at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 _____ SO: Obtain current working edition of "Operations Log." This is located in the cabinet labeled "Supply" between Photo-Cats A and B.

2.1.2 _____ SO: Refer to "Operations Log" to ensure that there are no operational issues reported/ recorded that would prevent access to the extraction wells. If operational issues are noted, then exit this procedure until resolution is obtained.

2.1.3 _____ SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.2 Planning and Coordination

2.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Procedures" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Procedures" in the Contingency Plan.

2.3 Equipment Required

Leather work gloves (located in the cabinet containing personal protective equipment [PPE]), flathead screwdriver (located in the tool cabinet), vault key (located in the key box attached to the PPE cabinet), safety cones (located in the Conex box).

3. STEP-BY-STEP INSTRUCTIONS

Procedure Started: Time _____ Date: _____ SO _____

3.1 _____ SO: Gather supplies listed under the equipment section of this DOP and stage them by the well vault.

3.2 _____ SO: If there is any vehicle traffic, stage safety cones around the work area to make any drivers aware of the work area.

3.3 _____ SO: Don work gloves.

3.4 _____ SO: At the well vault, remove the small access panel with a screwdriver.

3.5 _____ SO: Using the vault key (labeled 1600 and located in the operations office inside the small Honeywell key box), unlock the lock and remove.

3.6 _____ SO: If the vault door is the pneumatic type, skip to Step 3.10.

3.7 _____ SO: Pull lever in small access to unlock the vault lid.

3.8 _____ SO: Lift the vault lid from the side with the small access up about 2 inches and pull toward you.

3.9 _____ SO: Lift the lid up until it is standing vertically and then lay it down carefully on its face.

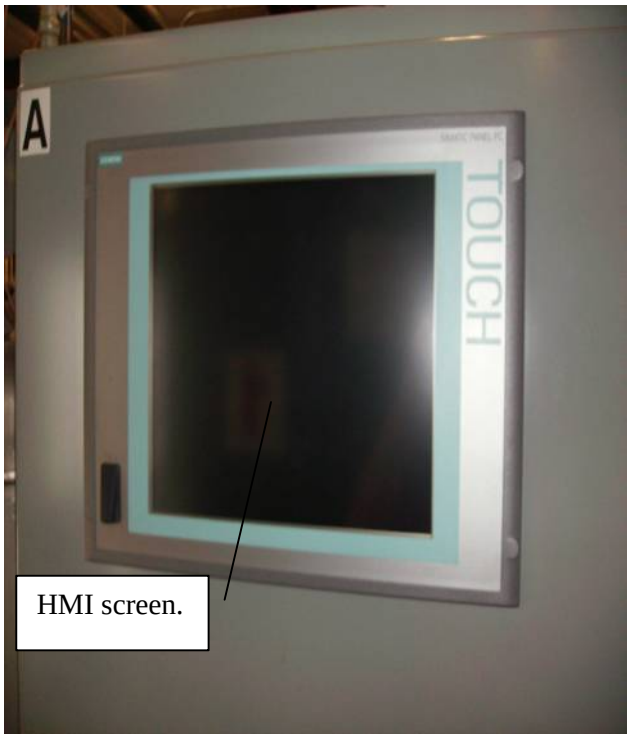
3.10 _____ SO: Perform the desired task as per DOP.

3.11 _____ SO: Replace the vault lid, re-lock and return supplies to the original location.

4. COMPLETION

4.1 _____ SO: Verification of completion.

Signature _____ Date _____



HMI screen.

Extraction well vault.

Access door and lock.

CHANGE CONTROL PROCEDURE

DISCIPLINE	REVISION	DISCIPLINE	REVISION
OPERATIONS	X	SAFETY	X
ENGINEERING	X	QUALITY	N/A
TRAINING	N/A	EMERGENCY PREPAREDNESS	N/A
ENVIRONMENTAL	N/A		

CHANGE REQUEST REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	12/01/08	All	New Procedure
1	10-08-09	3, 4, 5	Revisions

RESPONSIBLE PERSONNEL	
LO:	Lead Operator
SO:	Shift Operator
OM:	Operations Manager

INTRODUCTION

1.1 Purpose

This Detailed Operating Procedure (DOP) provides instructions for pulling an extraction well pump out of an extraction well. This is a two-person operation.

1.2 Scope and Applicability

This DOP applies to pulling an extraction well pump out of an extraction well at the Lockheed Martin Treatment Facility in Tallevast, Florida.

2. PREREQUISITES

2.1 Field Preparations

2.1.1 SO: Verify that no emergency stops are in effect (e.g., hurricane, flood). If in effect, exit this procedure.

2.1.2 SO: Verify that a condition indicating pump fouling, malfunction or failure has occurred to necessitate pulling the pump for servicing.

2.2 Planning and Coordination

3.2.1 _____ SO: IF any of the following events occur,
THEN exit this procedure
AND go to identified procedure:

A. A hurricane event requiring a treatment system shutdown; refer to "Hurricane Preparation" in the Contingency Plan.

B. A flooding event requiring a treatment system shutdown; refer to "Flood Preparation" in the Contingency Plan.

2.3 Equipment Required

Nitrile gloves, work gloves, safety glasses, large plastic container, plastic sheeting, screwdriver, safety cones (located inside the Conex box), vault lock key (located in the key box attached to the cabinet containing personal protective equipment [PPE]).

3. STEP-BY-STEP PROCEDURE

Procedure Started: Time _____ Date: _____ SO _____

3.1 _____ SO: Gather supplies listed under the equipment section of this DOP and stage them by the well vault.

3.2 _____ SO: If there is vehicle traffic, stage safety cones around the work area to block any potential traffic.

3.3 _____ SO: Shut down the extraction well for the pump being pulled at the Human Machine Interface (HMI). Do this by tapping the "admin" icon on the top right hand side of the touch screen. You will be asked to enter a password. Enter your password. Tap the "well configuration" icon. Tap the "enabled" icon underneath the well illustration whose pump will be pulled. The icon will change from green to red and it will now show a "disabled" icon.

3.4 _____ SO: See DOP-LOTO-003 to lock out and tag out (LOTO) the extraction well pump. To do this you will turn the lever to the off position on the desired disconnect and install a lock and tag. Record this on the LOTO log. (LOTO supplies will be located in the PPE cabinet in the treatment center building).

3.5 _____ LO/SO: Don nitrile gloves.

3.6 _____ SO: At the well vault, remove the small access panel with a screwdriver.

3.7 _____ SO: Using the vault key (labeled 1600 and located in the treatment center inside the small Honeywell key box), unlock the lock and remove.

3.8 _____ SO: Disregard next three steps if vault door is the pneumatic type.

3.9 _____ SO: Pull the lever in the small access panel to unlock the vault lid.

3.10 _____ SO: Lift vault lid from the side with the small access panel up about 2 inches and pull toward you.

3.11 _____ SO: Lift the lid up until it is standing vertically and then lay it down carefully on its face.

3.12 _____ SO: Set up plastic sheeting around the well vault and place a large plastic container on top of the sheeting.

3.13 _____ SO: Remove level transducer by gently pulling the cord until the transducer is out of the well. Set transducer aside in the vault. Note: transducer is very fragile.

3.14 _____ SO: Disconnect the cam lock fitting on the extraction pump hose within the well vault and plug the female cam lock with a male cam lock plug.

3.15 _____ LO: With the assistance of a second qualified SO, slowly raise the pump

by lifting the hose and feed the hose into the large plastic container.

3.16 _____ LO/SO: Place the pump into the large plastic container.

3.17 _____ LO/SO: Service the pump/motor in accordance with identified defect.

3.18 _____ LO/SO: Replace the repaired or replaced pump/motor by lowering the pump and pump hose into the well. This should be performed by two qualified operators using the safety cable for support. Lower the electrical cables slowly so they do not tangle within the well. The electrical wires cannot support the weight of the pump, motor and hose. When the safety cable is fully deployed, reattach the cam lock fitting and secure the cam lock wings with cable ties.

3.19 _____ SO: Lower transducer back into well. Using a water level meter, measure the static depth to water from the ground surface. Give this reading to the lead operator.

3.20 _____ SO: Remove the lock and tag in accordance with DOP-LOTO-003. Return the LOTO supplies in the LOTO station. Return power to the pump at the local disconnect.

3.21 _____ SO: Restart the extraction well at the HMI interface by tapping the "disabled" icon on the well configuration screen. The icon will change from red to green and show an "enabled" status. Perform DOP-014 "Balancing Extraction Well Manifold" to rebalance the extraction wells.

3.22 _____ SO: Return to the open vault and visually inspect for leaks.

3.23 _____ SO: If there are no leaks, reinstall and lock the vault lid. Return key to the key box in the treatment center building. If leaks are present, repair the leaks before returning the extraction well to service.

3.24 _____ SO: Follow DOP-FT-003, "Trash Procedures" and place used plastic sheeting in drum marked "Used PPE" and return supplies to storage room. Dump any water that has accumulated in the plastic container into the treatment system sump. Rinse the plastic container.

4. COMPLETION

4.1 _____ LO/SO: Verification of completion. .

Signature _____ Date _____

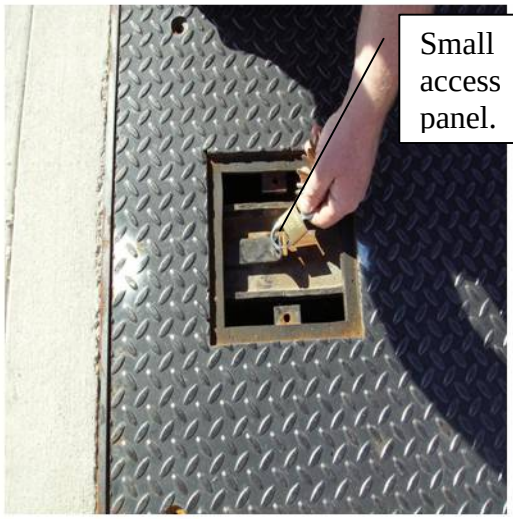
5. REFERENCES

- DOP-LOTO-003 “Well Pumps 101-110”
- DOP-FT-003 “Trash Procedures”

Extraction well disconnect.

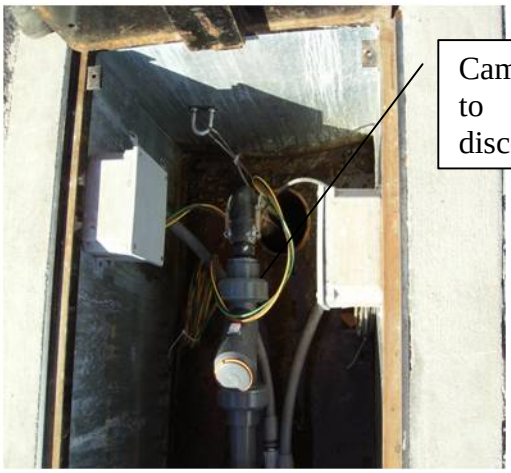
Extraction well vault.

Large plastic container.



Small access panel.

HMI screen.



Cam lock to disconnect.