

OPERATING PROCEDURE FIXED TREATMENT UNIT: MONTHLY MAINTENANCE AND CALIBRATION

APPLICATION

Monthly maintenance that must be performed on the Bldg 70A fixed treatment unit, which neutralizes acid wastes from labs in Bldg 70A. Its operation is vital to proper disposal of these wastes.

SPECIAL INSTRUCTIONS

- Before starting the procedure notify the Maintenance Supervisor at x 6993 or PMT Leads at x7941 and Building Manager in 70A.
- Equipment required: rubber gloves, face shield, apron.
- The pH meters must be calibrated monthly, there must be an adequate supply of caustic solution, and all system components must be operating correctly for the system to function properly.
- Both the wastes and the caustic solution used to neutralize them are extremely hazardous; personnel performing maintenance must be familiar with and trained in the system's standard operation and emergency procedures.
- The aqueous acidic waste may contain hydrofluoric acid (HF) and personnel must be aware of the hazards of handling hydrofluoric acid; in case of skin or eye contact or ingestion of waste, inform medical staff of the presence of HF.

WORK STEPS

1. Enter date, time, and signature in maintenance log.
2. Wear rubber gloves, face shields, and aprons.
3. At the pumps, turn Transfer Pumps GP-27 and GP-28 switches to OFF.
 - Turn EMCS/LOCAL switch to LOCAL.
 - Close inlet and outlet valves to strainer.
4. Turn caustic pumps A and B switches to **OFF**.
5. Clean strainer basket. OPEN outlet valve. For about one second, turn ON switch for transfer pump GP- 27 or GP-28, then turn the switch OFF and CLOSE the outlet valve.
6. Open inlet and outlet valves to strainer.
7. Calibrate according to OPER-066. Record all results in log (sample sheet attached). Procedure and relevant diagrams are in the OSP manual at the site.
8. Pour approximately 100 cc of 4.00 and 10.00 buffer solution into labeled beakers.
9. Remove the pH electrode.
 - Clean and rinse electrode with distilled water into 5 gallon container, shake off excess water, then place in the pH buffer 10.00 solution.

NOTE: Each pH unit is equal to 59 mv. At a 7.0 pH, mv value is equal to 0. Below 7 pH, the mv value will be positive (+). Above 7 pH, the mv value will be negative (.). When the measured pH is defined as pH_m, the mv value will be as follows:

$$mv = (7.00 - pH_m) 59$$

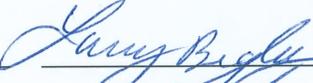
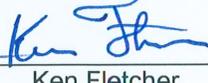
$$\begin{aligned} \text{for 10.00 pH: } mv &= (7.00 - 10.00) 59 \\ &= -3.00 \cdot 59 \text{ mv} = -177.00 \text{ mv} \end{aligned}$$

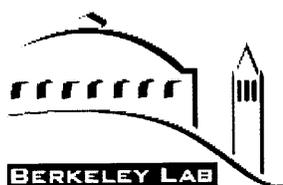
$$\begin{aligned} \text{for 4.00 pH: } mv &= (7.00 - 4.00) 59 \\ &= 3.00 \cdot 59 \text{ mv} = +177.00 \text{ mv} \end{aligned}$$

- Using the above formula, with the mv equal to the set point ± 0.35 , the probe/meter/preamp are all good.
10. Press the MOD button. Press the CAL button. Wait approximately 4 minutes for reading to stabilize. Meter should indicate SET STD mode. Meter should read 10.00. Press the MOD button again.
 11. IF meter is correct, press ENTER button.
 12. IF meter is does not read 10.00, change meter to read 10:00 using the UP and DOWN arrow keys.
 - Press ENTER button.
 - Numbers will flash when digit is selected.
 13. Press pH button. The pH meter should read within the range 10.00 ± 0.25 (9.75 to 10.25). Check Bldg 70 and Bldg 76. EMCS should read 10.00 ± 0.25 (9.75 to 10.25).
 14. Press mv button. The meter should reads within the range $.177 \pm 35$ mv (.142 to .212 mv). Closer to - 177 is better. IF meter will not read as required, and/or pH or mv fluctuate over the set points. Replace electrode and return to step 9.
 15. Press the pH button to return to the pH mode of operation. Thoroughly rinse electrode with distilled water into 5 gallon container, shake off excess water, then place in the pH buffer 4.00 solution.
 16. Press the MOD button. Press the CAL button twice. Meter should indicate SET SLP mode. Meter should read 4.00. Press the MOD button again.
 17. Using the arrow keys, change meter to read 4.00. Press ENTER button. Numbers will flash when digit is selected. Use up and down arrows to change value.
 18. Press pH button. The pH meter should reads within the range 4.00 ± 0.25 (3.75 to 4.25). Check Bldg 70 and Bldg 76. EMCS should reads 4.00 ± 0.25 (3.75 to 4.25).
 19. Press mv button. The meter should reads within the range +177 mv (+142 to +212 mv). Closer to +177 is better. IF meter will not read as required, and/or pH or mv fluctuate over the set points. Replace electrode and return to step 9. Press pH button and return to pH mode operation.
 20. Record the reading and any other corrective maintenance in the Maintenance Log.
 21. For both the influent and effluent pH electrodes, check that all recorder readings agree with the instruments pH meter readings. Adjust the Rustrak if necessary by turning the trim pot located under the Rustrak nameplate.
 22. Re-install the electrodes.
 23. Turn caustic pumps ON.
 24. Manually turn on sump pump to verify proper operation. CB#5 on elect panel.
 25. Log caustic pump settings (stroke and rate) for TK-8-70A and TK-9-70A.
 26. Check level in caustic tank TK-11 using light. Observe level through side of tank. Record level in log.
 27. Ensure GP-27-70A and GP-28-70A control switches are on AUTO.
 28. Start filling surge tank (TK-12-70A) with water from 3/4" hose. Connect sump pump return line to TK-12-70A.
 29. Observe marked levels on tank as level rises. As each pump starts, shut OFF at local disconnect. When high level alarm sounds, silence alarms, turn OFF water, and place both pump local disconnects to the ON position. Both transfer pumps should now be running until fluid level reaches marked level one on surge tank.
 - Level two: first pump should start. After pump starts tur off at disconnect.
 - Level three: second pump should start. After pump starts tur off at disconnect.
 - Level four: high level alarm should sound (light goes on). Secure fill hose.

- Level one: both pumps should stop.
 - Verify EMCS alarm.
30. Record that all of the above was done, and any additional comments, in the log. Note all maintenance on system, etc.
 31. Remove cover from GP-42/43 sump lift pumps effluent pit and observe water level. As each pump starts, turn switch to OFF. When alarm sounds, turn any pump switch to HAND and hold until alarm light goes off. Shift both pumps to AUTO. Both pumps should restart and then stop at the first bottom)
 - float switch automatically.
 - Second float switch: first pump should start.
 - Third float switch: second pump should start.
 - Fourth (top) float switch: alarm should sound, and GP-27/28-70A should stop.
 - First (bottom) float switch: both pumps should stop.
 - Verify EMCS alarm.
 32. Turn EMCS/LOCAL switch to EMCS.
 33. Record that all of the above was done, and any additional comments, in the log. Note all maintenance on system, etc.
 34. Replace tape in Rustrak paper recorder and adjust recorder if necessary.
 35. Check containment alarms at FTU and 3rd floor machine room.
 36. Check eyewash and emergency shower at system control panel and system caustic fill port. Verify EMCS alarm from eye wash activation. Enter in log.
 37. Be sure site is clean.

RESPONSIBILITIES AND CONTROLS

Rev. No.	SME/Title	REV/Title	Approved/Title	Date	Effective Date
2	 Michael Botello Plant Maint Tech Lead	 Larry Begley Maintenance Supervisor	 Ken Fletcher Operations Department Head	6/11/09	6/11/09



Building 70A Fixed Treatment Unit

Monthly Maintenance Checklist

Date: _____ Time: _____ Signature: _____

Procedure: Notify Bldg. 76 and 70A

1. Clean Strainer Basket
2. Calibrate pH probes:

	Mv @ pH10 -177 ±35	Mv @ pH4 -177 ±35	pH10	pH4	High/Low	High/Low
					Set Points	Alarm Points
Influent					/	/
TK-8-70A					/	/
TK-9-70A					/	/
Effluent					/	/

3. TK-11-70A Caustic Level: _____ inches. **Note:** Order 150 Gals caustic when tank is at order point.

4. Caustic Pump Settings

Pump 8 Stroke _____ Rate _____
 Pump 9 Stroke _____ Rate _____

5.

	1 st Pump	2 nd Pump	Alarm On	Pumps Off	
TK-12-70A					Xfer pmps GP-27/28
Effluent Pit					Lift Pmps GP=42/43

6. Check Eyewash and Emergency Shower at:

- FTU _____
- System Caustic Fill Ports _____

7. Activate double containment alarms at:

- FTU and 3rd Floor Machine Room _____

8. Verify flow meter operation and EFF RUSTRAK in standby.

9. Verify ECMS alarm (print out status from bldg. 76)

10. Comments: