USQ Not Required – ETF is a < Hazard Category 3 Radiological Facility

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-6</td>
<td>07/25/2018</td>
<td>Process Improvement</td>
<td>Added new Section 5.11 to drain UV-1/UV-2 rupture disk header, added catch container direction, and added flexibility statement to Section 5.0. Updated Rad Con Statement to procedural standard.</td>
</tr>
<tr>
<td>A-5</td>
<td>03/30/2018</td>
<td>Process Improvement</td>
<td>Add flexibility. Add directions to allow bypass of PDMs and/or PDM filters and/or UV/OX Inlet Cooler. Add language for approved deviations in TFC-ENG-STD-12, Tank Farm Equipment Identification Numbering and Labeling Standard.</td>
</tr>
<tr>
<td>A-4</td>
<td>01/29/2018</td>
<td>Operations Request</td>
<td>Added special instruction to allow for flexibility.</td>
</tr>
<tr>
<td>A-3</td>
<td>11/30/2017</td>
<td>Operations Request</td>
<td>WRPS-PER-2016-2182.2- Steps added to Rad Con statement</td>
</tr>
<tr>
<td>A-2</td>
<td>09/25/2017</td>
<td>Operations Request</td>
<td>Clarification to allow for charging during lock and tag. Minor improvements to ensure proper line-up of supporting systems. Corrected mis-spelled word.</td>
</tr>
</tbody>
</table>

Table of Contents

Page

1.0 PURPOSE AND SCOPE ............................................................................................................. 3
  1.1 Purpose .............................................................................................................................. 3
  1.2 Scope ................................................................................................................................. 3

2.0 INFORMATION .......................................................................................................................... 3
  2.1 Terms and Definitions ........................................................................................................ 3
  2.2 General Information ........................................................................................................... 3

3.0 PRECAUTIONS AND LIMITATIONS ...................................................................................... 4
  3.1 Personnel Safety ............................................................................................................... 4
  3.2 Equipment Safety .............................................................................................................. 4
  3.3 Radiation and Contamination Control ............................................................................. 4
  3.4 Environmental Compliance ............................................................................................... 4

4.0 PREREQUISITES ................................................................................................................... 5
  4.1 Special Tools, Equipment, and Supplies ......................................................................... 5
  4.2 Performance Documents ................................................................................................... 5

5.0 PROCEDURE .......................................................................................................................... 6
  5.1 Priming Peroxide Pumps .................................................................................................. 6
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2</td>
<td>Bypassing UV-1 or UV-2</td>
</tr>
<tr>
<td>5.3</td>
<td>Peroxide Pump Control</td>
</tr>
<tr>
<td>5.4</td>
<td>Priming Peroxide Pumps In Operate</td>
</tr>
<tr>
<td>5.5</td>
<td>Changing Filter Elements (60D-FL-1/2/3/4)</td>
</tr>
<tr>
<td>5.6</td>
<td>Charging Filters (60D-FL-1/2/3/4)</td>
</tr>
<tr>
<td>5.7</td>
<td>Flushing Peroxide Injection Lines with Demineralized Water in Ready or Shutdown Mode</td>
</tr>
<tr>
<td>5.8</td>
<td>Flushing Peroxide Inject Lines with Demineralized Water in Operation Mode</td>
</tr>
<tr>
<td>5.9</td>
<td>Draining UV-1 or UV-2</td>
</tr>
<tr>
<td>5.10</td>
<td>Charging UV1 or UV2</td>
</tr>
<tr>
<td>5.11</td>
<td>Drain UV-1/UV-2 Rupture Disk Header</td>
</tr>
<tr>
<td>5.12</td>
<td>Records</td>
</tr>
</tbody>
</table>

Page 2 of 32
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for infrequent operations of the UV/OX System.

1.2 Scope

Infrequent operations include pump priming, line flushing, and other miscellaneous operation activities of the UV/OX System.

2.0 INFORMATION

2.1 Terms and Definitions

- IH - Industrial Hygiene
- MTT – Main Treatment Train
- UV/OX – Ultraviolet Oxidation System.

2.2 General Information

Dash placement in equipment numbers is not consistent and may differ dependent on whether the user is looking at the valve in the field or on the MCS. See approved deviations in TFC-ENG-STD-12, Tank Farm Equipment Identification Numbering and Labeling Standard.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

**WARNING** - Hydrogen peroxide is an oxidizer that may intensify a fire. It can be harmful if swallowed and cause skin irritation. Serious eye damage and respiratory irritation may occur. It may also cause damage to organs through prolonged or repeated exposure.

3.2 Equipment Safety

**CAUTION** - Peroxide feed system check valves may deteriorate if peroxide pumps have been off-line for extended periods of time.

3.2.1 Pump discharge pressure near 60 psig will cause overpressure relief check valves to open and allow demin water to flow into peroxide tank.

3.3 Radiation and Contamination Control

3.3.1 When this procedure is worked in radiological areas, an RWP is required. If radiological conditions or work performed falls outside the scope of the RWP, all work activities must be discontinued until a new or revised RWP has been issued in accordance with TFC-ESHQ-RP_RWP-C-03.

3.3.2 When disconnecting, breaching or opening systems or system components that currently contain or previously contained radioactive material, the following actions apply:

- HPT coverage is required
- Pre-job and post-job HPT surveys are required
- Contamination controls shall be implemented in accordance with ETF-02-001, until radiological verifications have been performed.

3.4 Environmental Compliance

3.4.1 In the event of a spill/leak/release, notify the SOM/FWS and respond per ETF-ERP-85B-003, Emergency Spill or Release at ETF.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:
- Nitrile or butyl gloves
- Chemical goggles.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- ETF-60-002, Integrated MTT Operation
- ETF-60-006, Initial MTT Lineup in Configuration 1
- TFC-OPS-OPER-C-17, Operating Logbooks.
5.0 PROCEDURE

Special Instructions

Sections 5.1 through 5.11 may be performed in any logical order, individually, or concurrently.

At direction of SOM, any equipment identified in this procedure may be placed in MANUAL and Setpoints/Outputs adjusted to facilitate system operations. RECORD SOM directions in logbook.

SOM determines component lineup requirements and deviations.

If the MTT is shut down when peroxide lines are flushed, Section 5.1 must be performed to avoid over-pressurizing the UV units when the peroxide lines are flushed.

5.1 Priming Peroxide Pumps

5.1.1 BEFORE attempting UV/OX System startup, CONFIRM pumps are primed.

5.1.2 CONFIRM UV/OX System aligned per ETF-60-006.

WARNING

Hydrogen peroxide is an oxidizer that may intensify a fire. It can be harmful if swallowed and cause skin irritation. Serious eye damage and respiratory irritation may occur. It may also cause damage to organs through prolonged or repeated exposure.

5.1.3 DON the following PPE:

- Chemical gloves (nitrile or butyl)
- Chemical goggles.

5.1.4 ENSURE 60D-338, 60D-TK-1 discharge valve CLOSED.
5.1 Priming Peroxide Pumps (Cont.)

5.1.5 **CLOSE** the following peroxide pump inlet valve(s):

<table>
<thead>
<tr>
<th>Valve</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-305</td>
<td>60D-313</td>
</tr>
<tr>
<td>60D-321</td>
<td>60D-329</td>
</tr>
<tr>
<td>60D-350</td>
<td>60D-355</td>
</tr>
<tr>
<td>60D-360</td>
<td>60D-366</td>
</tr>
</tbody>
</table>

5.1.6 **OPEN** the following peroxide pump discharge valve(s):

<table>
<thead>
<tr>
<th>Valve</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-309</td>
<td>60D-318</td>
</tr>
<tr>
<td>60D-326</td>
<td>60D-334</td>
</tr>
<tr>
<td>60D-341</td>
<td>60D-342</td>
</tr>
<tr>
<td>60D-343</td>
<td>60D-344</td>
</tr>
</tbody>
</table>

**Special Instructions**

Valves, pumps, and pump switches may be omitted based on UV chamber being primed, based on Process Memo or SOM direction.

5.1.7 **OPEN** the following UV skid peroxide isolation valve(s):

<table>
<thead>
<tr>
<th>Valve</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-145</td>
<td>60D-144</td>
</tr>
<tr>
<td>60D-148</td>
<td>60D-147</td>
</tr>
<tr>
<td>60D-245</td>
<td>60D-244</td>
</tr>
<tr>
<td>60D-248</td>
<td>60D-247</td>
</tr>
</tbody>
</table>

5.1.8 **ENSURE** the following UV skid peroxide throttle valve(s) **OPEN**:

<table>
<thead>
<tr>
<th>Valve</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-151</td>
<td>60D-150</td>
</tr>
<tr>
<td>60D-153</td>
<td>60D-152</td>
</tr>
<tr>
<td>60D-251</td>
<td>60D-250</td>
</tr>
<tr>
<td>60D-253</td>
<td>60D-252</td>
</tr>
</tbody>
</table>

5.1.9 **ENSURE** the following UV skid peroxide bleed valve(s) **CLOSED**:

<table>
<thead>
<tr>
<th>Valve</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-155</td>
<td>60D-154</td>
</tr>
<tr>
<td>60D-157</td>
<td>60D-156</td>
</tr>
<tr>
<td>60D-255</td>
<td>60D-254</td>
</tr>
<tr>
<td>60D-257</td>
<td>60D-256</td>
</tr>
</tbody>
</table>

5.1.10 **ENSURE** the following local peroxide pump switch(es) **OFF**:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-60D331</td>
<td>HS-60D332</td>
</tr>
<tr>
<td>HS-60D333</td>
<td>HS-60D334</td>
</tr>
<tr>
<td>HS-60D345</td>
<td>HS-60D346</td>
</tr>
<tr>
<td>HS-60D347</td>
<td>HS-60D348</td>
</tr>
</tbody>
</table>
5.1 Priming Peroxide Pumps(Cont.)

5.1.11 On local peroxide feed panel, **POSITION** LOCKOUT/STOP switch HS-60D399 to HAND.

5.1.12 **OPEN** 95D-014, DI skid isolation valve.

5.1.13 **OPEN** 60D-374, DI water transfer valve.

5.1.14 **OPEN** 60D-302, peroxide skid isolation valve.

5.1.15 **CONFIRM** pump discharge pressure less than 55 psig.

**NOTE** - Varying peroxide pump discharge pressure (as much as ten psi or more) indicates a properly primed pump. Constant discharge pressure during pump operation usually signals a vapor locked pump.

5.1.16 **IF** pump discharge pressure is greater than 55 psig, **THROTTLE** 95D-014.

5.1.17 **INDIVIDUALLY PRIME** the listed pumps as follows:

<table>
<thead>
<tr>
<th>Pump</th>
<th>Inlet Valve</th>
<th>Pump Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-P-1A1</td>
<td>60D-305</td>
<td>HS-60D331</td>
</tr>
<tr>
<td>60D-P-1A2</td>
<td>60D-313</td>
<td>HS-60D332</td>
</tr>
<tr>
<td>60D-P-1B1</td>
<td>60D-321</td>
<td>HS-60D333</td>
</tr>
<tr>
<td>60D-P-1B2</td>
<td>60D-329</td>
<td>HS-60D334</td>
</tr>
<tr>
<td>60D-P-2A1</td>
<td>60D-350</td>
<td>HS-60D345</td>
</tr>
<tr>
<td>60D-P-2A2</td>
<td>60D-355</td>
<td>HS-60D346</td>
</tr>
<tr>
<td>60D-P-2B1</td>
<td>60D-360</td>
<td>HS-60D347</td>
</tr>
<tr>
<td>60D-P-2B2</td>
<td>60D-366</td>
<td>HS-60D348</td>
</tr>
</tbody>
</table>

5.1.17.1 **OPEN** listed inlet valve.

5.1.17.2 **POSITION** listed pump switch (local panel) to HAND.

5.1.17.3 **PLACE** local switches on pump face to MAN.

5.1.17.4 **RUN** the pumps until primed.
5.1 Priming Peroxide Pumps (Cont.)

**Special Instructions**

Approximately 1 hour and 40 minutes of pump operating time is required to ensure 50% peroxide is being delivered to UV-1, UV-2 units.

5.1.18 CLOSE 60D-302, peroxide skid isolation valve.

5.1.19 CLOSE 60D-374, DI water transfer valve.

5.1.20 CLOSE 95D-014, DI skid isolation valve.

5.1.21 OPEN 60D-338, 60D-TK-1 discharge valve.
5.2  **Bypassing UV-1 or UV-2**

5.2.1  **CLOSE** the following isolation valves for chamber(s) to be bypassed:

<table>
<thead>
<tr>
<th>Chamber</th>
<th>Manual Isolation Valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV-1A</td>
<td>60D-110 and 60D-128</td>
</tr>
<tr>
<td>UV-1B</td>
<td>60D-118 and 60D-129</td>
</tr>
<tr>
<td>UV-2A</td>
<td>60D-210 and 60D-228</td>
</tr>
<tr>
<td>UV-2B</td>
<td>60D-218 and 60D-229</td>
</tr>
</tbody>
</table>

5.2.2  **CLOSE** the following H₂O₂ isolation valves for chamber(s) to be bypassed:

<table>
<thead>
<tr>
<th>Chamber</th>
<th>Manual Isolation Valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV-1A</td>
<td>60D-144 and 60D-145</td>
</tr>
<tr>
<td>UV-1B</td>
<td>60D-147 and 60D-148</td>
</tr>
<tr>
<td>UV-2A</td>
<td>60D-244 and 60D-245</td>
</tr>
<tr>
<td>UV-2B</td>
<td>60D-247 and 60D-248</td>
</tr>
</tbody>
</table>

5.3  **Peroxide Pump Control**

NOTE - Engineering provides peroxide pump status via process memo.

- Peroxide pump stroke length settings are to be maintained at 100% unless directed otherwise by Engineering.

5.3.1  **ADJUST** pump stroke length/frequency adjustment per engineering instructions.
5.4 Priming Peroxide Pumps In Operate

5.4.1 **ENSURE** peroxide pump inlet valves OPEN.

**WARNING**
Hydrogen peroxide is an oxidizer that may intensify a fire. It can be harmful if swallowed and cause skin irritation. Serious eye damage and respiratory irritation may occur. It may also cause damage to organs through prolonged or repeated exposure.

5.4.2 **DON** the following PPE:
- Chemical gloves (nitrile or butyl)
- Chemical goggles.

5.4.3 **OPEN** the following valves:
- 95D-014
- 60D-374.

5.4.4 **IMMEDIATELY CLOSE** 60D-338 AND **OPEN** 60D-302.

5.4.5 **CONFIRM** pump discharge pressures less than 55 psig.

5.4.6 **IF** pump discharge pressure is greater than 55 psig, **THROTTLE** 95D-014.

**NOTE** - During MTT PURGE, the five-minute limitation of running in the demineralizer configuration can be exceeded per SOM direction.

5.4.7 **RUN** pump for three to five minutes maximum.

5.4.8 **WHEN** pump is primed, **IMMEDIATELY PERFORM** the following:

5.4.8.1 **CLOSE** 60D-302.

5.4.8.2 **OPEN** 60D-338.

5.4.8.3 **CLOSE** 60D-374.

5.4.8.4 **CLOSE** 95D-014.

5.4.9 **IF** pump does not prime, **PRIME** pump per Section 5.1.
5.5 Changing Filter Elements (60D-FL-1/2/3/4)

**Special Instructions**

Section 5.5 is applicable to either cartridge or bag filter elements.

5.5.1 **ADJUST** service air pressure at 1B-PCV-053 to 20 psig.

5.5.2 IF changing filter elements in 60D-FL-1/2, **PERFORM** the following:

5.5.2.1 **CLOSE** the following valves:
   - 60D-441
   - 60D-445.

5.5.2.2 **OPEN** the following drain valves:
   - 60D-461
   - 60D-462.

5.5.2.3 **SLOWLY OPEN** service air inlet valve 60D-449.

5.5.2.4 **ALLOW** filters 60D-FL-1/2 to blow down with service air for at least five minutes.

5.5.2.5 **CLOSE** service air inlet valve 60D-449.

5.5.2.6 **CLOSE** the following drain valves:
   - 60D-461
   - 60D-462.

5.5.2.7 **CHANGE** filter elements.

5.5.2.8 IF directed by SOM, **PERFORM** Section 5.6.
5.5 Changing Filter Elements (60D-FL-1/2/3/4) (Cont.)

5.5.3 IF changing filter elements in 60D-FL-3/4, PERFORM the following:

5.5.3.1 CLOSE the following valves:
- 60D-440
- 60D-444.

5.5.3.2 OPEN the following drain valves:
- 60D-463
- 60D-464.

5.5.3.3 SLOWLY OPEN service air inlet valve 60D-450.

5.5.3.4 ALLOW filters 60D-FL-3/4 to blow down with service air for at least five minutes.

5.5.3.5 CLOSE service air inlet valve 60D-450.

5.5.3.6 CLOSE the following drain valves:
- 60D-463
- 60D-464.

5.5.3.7 CHANGE filter elements.

5.5.3.8 IF directed by SOM, PERFORM Section 5.6.
5.6 Charging Filters (60D-FL-1/2/3/4)

**Special Instructions**

Section 5.6 should be performed after filter vessels (60D-FL-1/2) or [60D-FL-3/4] have been drained for any reason.

5.6.1 **IF** charging filters, **CONFIRM** pH adjustment system is operating.

5.6.2 **IF** charging filters 60D-FL-1/2, **PERFORM** the following:

5.6.2.1 **ENSURE** the following PDM Filter inlet and outlet valves are OPEN:

- 60D-456
- 60D-458.

5.6.2.2 **SLOWLY OPEN** 60D-441, filter inlet valve, to about 1/4 OPEN.

5.6.2.3 **ENSURE** 60D-457, PDM Filter bypass valve, is CLOSED.

5.6.2.4 **WHEN** sound of water entering filter vessels is no longer heard, **SLOWLY OPEN** 60D-445, filter outlet valve.

5.6.2.5 **WHEN** sound of air leaving filter vessels is no longer heard, **SLOWLY OPEN** inlet valve 60D-441 to full OPEN.

5.6.3 **IF** charging filters 60D-FL-3/4, **PERFORM** the following:

5.6.3.1 **ENSURE** the following PDM Filter inlet and outlet valves are OPEN:

- 60D-456
- 60D-458.

5.6.3.2 **SLOWLY OPEN** 60D-440, filter inlet valve, to about 1/4 OPEN.

5.6.3.3 **ENSURE** 60D-457, PDM Filter bypass valve, is CLOSED.

5.6.3.4 **WHEN** sound of water entering filter vessels is no longer heard, **SLOWLY OPEN** 60D-444, filter outlet valve.

5.6.3.5 **WHEN** sound of air leaving filter vessels is no longer heard, **SLOWLY OPEN** 60D-440, inlet valve, to full OPEN.
5.6 Charging Filters (60D-FL-1/2/3/4) (Cont.)

5.6.4 IF directed by SOM that all PDM filters are to be removed from service, PERFORM the following:

5.6.4.1 OPEN 60D-457.

5.6.4.2 CLOSE the following valves:
   - 60D-456
   - 60D-458.

5.6.5 IF directed by SOM that FL-1/2 are to be removed from service, CLOSE the following valves:
   - 60D-441
   - 60D-445.

5.6.6 IF directed by SOM that FL-3/4 are to be removed from service, CLOSE the following valves:
   - 60D-440
   - 60D-444.
5.7 Flushing Peroxide Injection Lines with Demineralized Water in Ready or Shutdown Mode

5.7.1 IF the MTT is shut down, **PERFORM** Section 5.1 to avoid over-pressurizing the UV units when the peroxide lines are flushed.

**CAUTION**

Peroxide feed system check valves may deteriorate if peroxide pumps have been off-line for extended periods of time.

5.7.2 IF peroxide pumps have been off-line, **FLUSH** peroxide injection lines with demin water.

5.7.3 **CONFIRM** UV/OX System aligned per ETF-60-006.

**WARNING**

Hydrogen peroxide is an oxidizer that may intensify a fire. It can be harmful if swallowed and cause skin irritation. Serious eye damage and respiratory irritation may occur. It may also cause damage to organs through prolonged or repeated exposure.

5.7.4 **DON** the following PPE:
- Chemical gloves (nitrile or butyl)
- Chemical goggles.

5.7.5 **ENSURE** 60D-338, 60D-TK-1, discharge valve, CLOSED.

5.7.6 **CLOSE** the following peroxide pump inlet valve(s):

<table>
<thead>
<tr>
<th>Valve 1</th>
<th>Valve 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-305</td>
<td>60D-313</td>
</tr>
<tr>
<td>60D-321</td>
<td>60D-329</td>
</tr>
<tr>
<td>60D-350</td>
<td>60D-355</td>
</tr>
<tr>
<td>60D-360</td>
<td>60D-366</td>
</tr>
</tbody>
</table>
5.7 Flushing Peroxide Injection Lines with Demineralized Water in Ready or Shutdown Mode (Cont.)

5.7.7 OPEN the following peroxide pump discharge valve(s):

<table>
<thead>
<tr>
<th>60D-309</th>
<th>60D-318</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-326</td>
<td>60D-334</td>
</tr>
<tr>
<td>60D-341</td>
<td>60D-342</td>
</tr>
<tr>
<td>60D-343</td>
<td>60D-344</td>
</tr>
</tbody>
</table>

5.7.8 OPEN the following UV skid isolation valve(s):

<table>
<thead>
<tr>
<th>60D-145</th>
<th>60D-144</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-148</td>
<td>60D-147</td>
</tr>
<tr>
<td>60D-245</td>
<td>60D-244</td>
</tr>
<tr>
<td>60D-248</td>
<td>60D-247</td>
</tr>
</tbody>
</table>

5.7.9 ENSURE the following local peroxide pump switch(es) OFF:

<table>
<thead>
<tr>
<th>HS-60D331</th>
<th>HS-60D332</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-60D333</td>
<td>HS-60D334</td>
</tr>
<tr>
<td>HS-60D345</td>
<td>HS-60D346</td>
</tr>
<tr>
<td>HS-60D347</td>
<td>HS-60D348</td>
</tr>
</tbody>
</table>

5.7.10 ON local peroxide feed panel, POSITION LOCKOUT/STOP switch HS-60D399 to HAND.

5.7.11 OPEN 95D-014, DI skid isolation valve.

5.7.12 OPEN 60D-374, DI water transfer valve.

5.7.13 OPEN 60D-302, peroxide skid isolation valve.

5.7.14 CONFIRM pump discharge pressure is less than 55 psig.

5.7.15 IF pump discharge pressure is greater than 55 psig, THROTTLE 95D-014.
5.7 Flushing Peroxide Injection Lines with Demineralized Water in Ready or Shutdown Mode (Cont.)

Special Instructions

UV units are hydraulically isolated when the MTT is shut down.

If the MTT is shut down when peroxide lines are flushed, the following steps must be performed to avoid over pressurizing the UV units.

5.7.16 IF the MTT is shut down when peroxide lines are to be flushed, PERFORM the following:

5.7.16.1 CONNECT flexible tubing (e.g., Tygon) to the following UV-1 and UV-2 influent sample valves:

<table>
<thead>
<tr>
<th>60D-116</th>
<th>60D-124</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-216</td>
<td>60D-224</td>
</tr>
</tbody>
</table>

5.7.16.2 ROUTE the free ends of flex tubing into five-gallon carboys or other appropriate containers.

5.7.16.3 OPEN the following sample valves:

<table>
<thead>
<tr>
<th>60D-116</th>
<th>60D-124</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-216</td>
<td>60D-224</td>
</tr>
</tbody>
</table>

5.7.16.4 WHEN peroxide pumps are running, PERIODICALLY MONITOR the water level in carboys throughout flushing period
5.7 Flushing Peroxide Injection Lines with Demineralized Water in Ready or Shutdown Mode (Cont.)

NOTE - Pumps may be run individually to flush individual peroxide feed lines.

5.7.17 OPERATE each listed pump as follows:

<table>
<thead>
<tr>
<th>Pump</th>
<th>Inlet Valve</th>
<th>Pump Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-P-1A1</td>
<td>60D-305</td>
<td>HS-60D331</td>
</tr>
<tr>
<td>60D-P-1A2</td>
<td>60D-313</td>
<td>HS-60D332</td>
</tr>
<tr>
<td>60D-P-1B1</td>
<td>60D-321</td>
<td>HS-60D333</td>
</tr>
<tr>
<td>60D-P-1B2</td>
<td>60D-329</td>
<td>HS-60D334</td>
</tr>
<tr>
<td>60D-P-2A1</td>
<td>60D-350</td>
<td>HS-60D345</td>
</tr>
<tr>
<td>60D-P-2A2</td>
<td>60D-355</td>
<td>HS-60D346</td>
</tr>
<tr>
<td>60D-P-2B1</td>
<td>60D-360</td>
<td>HS-60D347</td>
</tr>
<tr>
<td>60D-P-2B2</td>
<td>60D-366</td>
<td>HS-60D348</td>
</tr>
</tbody>
</table>

5.7.17.1 OPEN listed inlet valve.

5.7.17.2 POSITION listed pump switch (local panel) to HAND.

5.7.17.3 PLACE local switches on pump face to MAN.

NOTE – SOM will review trends on computer to determine actual run time.

5.7.17.4 RUN pump for two hours, or as directed by SOM.

a. IF SOM direction provided, RECORD in ETF Control Room Logbook.

5.7.18 CLOSE 60D-302, peroxide skid isolation valve.

5.7.19 CLOSE 60D-374, DI water transfer valve.

5.7.20 CLOSE 95D-014, DI skid isolation valve.

5.7.21 OPEN 60D-338, 60D-TK-1 discharge valve.
5.7 Flushing Peroxide Injection Lines with Demineralized Water in Ready or Shutdown Mode (Cont.)

5.7.22 IF the MTT was shut down during peroxide line flushing, PERFORM the following:

5.7.22.1 CLOSE UV-1 and UV-2 influent sample valves:
   - 60D-116
   - 60D-124
   - 60D-216
   - 60D-224.

5.7.22.2 DISCONNECT flexible tubing that was connected at the above sample valves.

5.7.22.3 WHEN directed by SOM, DRAIN containers used for collecting displaced flush water into Sump 1 or Sump 2.
5.8 Flushing Peroxide Inject Lines with Demineralized Water in Operation Mode

NOTE - The use of ( ), [ ], and { } to offset numbers represents the same valve, different pumps.

5.8.1 On graphic, CONFIRM (UV-1A) [UV-1B] {UV-2A}, UV-2B peroxide pumps deselected.

WARNING

Hydrogen peroxide is an oxidizer that may intensify a fire. It can be harmful if swallowed and cause skin irritation. Serious eye damage and respiratory irritation may occur. It may also cause damage to organs through prolonged or repeated exposure.

5.8.2 DON the following PPE:
- Chemical gloves (nitrile or butyl)
- Chemical goggles.

5.8.3 ENSURE the following peroxide pump inlet valve and pressure transmitter isolation valves OPEN:

<table>
<thead>
<tr>
<th>Pump</th>
<th>Inlet Valve</th>
<th>PT Isolation Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-P-1A1</td>
<td>60D-305</td>
<td>60D-307</td>
</tr>
<tr>
<td>60D-P-1A2</td>
<td>60D-313</td>
<td>60D-315</td>
</tr>
<tr>
<td>60D-P-1B1</td>
<td>60D-321</td>
<td>60D-323</td>
</tr>
<tr>
<td>60D-P-1B2</td>
<td>60D-329</td>
<td>60D-331</td>
</tr>
<tr>
<td>60D-P-2A1</td>
<td>60D-350</td>
<td>60D-354</td>
</tr>
<tr>
<td>60D-P-2A2</td>
<td>60D-355</td>
<td>60D-359</td>
</tr>
<tr>
<td>60D-P-2B1</td>
<td>60D-360</td>
<td>60D-364</td>
</tr>
<tr>
<td>60D-P-2B2</td>
<td>60D-366</td>
<td>60D-370</td>
</tr>
</tbody>
</table>

5.8.4 OPEN 95D-014.

5.8.5 OPEN 60D-374.

5.8.6 CLOSE 60D-338 AND IMMEDIATELY OPEN 60D-302.

5.8.7 CONFIRM pump discharge pressure less than 55 psig.

5.8.8 IF pump discharge pressure is greater than 55 psig, THROTTLE 95D-014.
5.8 **Flushing Peroxide Inject Lines with Demineralized Water in Operation Mode (Cont.)**

NOTE - During MTT RECYCLE, the five-minute limitation of running in the demineralizer configuration can be exceeded as directed by SOM based on reviews of trends on MCS.

- Fluctuating pump discharge pressures indicate the line is being flushed.
- Pumps may be run individually to flush individual peroxide feed lines.

5.8.9 **OPERATE** each listed pump as follows:

<table>
<thead>
<tr>
<th>Pump</th>
<th>Pump Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-P-1A1</td>
<td>HS-60D331</td>
</tr>
<tr>
<td>60D-P-1A2</td>
<td>HS-60D332</td>
</tr>
<tr>
<td>60D-P-1B1</td>
<td>HS-60D333</td>
</tr>
<tr>
<td>60D-P-1B2</td>
<td>HS-60D334</td>
</tr>
<tr>
<td>60D-P-2A1</td>
<td>HS-60D345</td>
</tr>
<tr>
<td>60D-P-2A2</td>
<td>HS-60D346</td>
</tr>
<tr>
<td>60D-P-2B1</td>
<td>HS-60D347</td>
</tr>
<tr>
<td>60D-P-2B2</td>
<td>HS-60D348</td>
</tr>
</tbody>
</table>

5.8.9.1 **ENSURE** listed pump switch (local panel) to AUTO.

5.8.9.2 **ENSURE** local switches on pump face to AUTO.

5.8.9.3 **ON** graphic UV, **MONITOR** pump discharge pressure for fluctuation.

NOTE – SOM will review trends on computer to determine actual run time.

5.8.9.4 **RUN** pump for two hours, or as directed by SOM.

a. IF SOM direction provided, **RECORD** in ETF Control Room Logbook.

5.8.10 **CLOSE** 60D-302, peroxide skid isolation valve, **AND** **IMMEDIATELY OPEN** 60D-338.

5.8.11 **CLOSE** 60D-374, DI water transfer valve.

5.8.12 **CLOSE** 95D-014, DI skid isolation valve.
5.9 Draining UV-1 or UV-2

**Special Instructions**

Both chambers of UV-1 or UV-2 must be off line to drain either chamber; however, only the chamber(s) undergoing maintenance needs to be drained.

Catch container is needed for steps opening sample valves or removing vent plugs.

SOM will monitor MCS computer trends of sump levels to determine if UV units are to be drained.

5.9.1 **IF** draining UV-1A, **PERFORM** the following:

5.9.1.1 **ENSURE** the following lamp enclosure drain valves are CLOSED:

- 60D-425
- 60D-426.

5.9.1.2 **CLOSE** the following UV chamber isolation valves:

<table>
<thead>
<tr>
<th>60D-110</th>
<th>60D-144</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-128</td>
<td>60D-145</td>
</tr>
</tbody>
</table>

5.9.1.3 **OPEN** 60D-125 drain valve to Sump 2.

5.9.1.4 **OPEN** the following UV chamber vent and drain valves:

<table>
<thead>
<tr>
<th>60D-167</th>
<th>60D-173</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-166</td>
<td>60D-172</td>
</tr>
<tr>
<td>60D-165</td>
<td>60D-161</td>
</tr>
<tr>
<td>60D-171</td>
<td>60D-160</td>
</tr>
</tbody>
</table>

5.9.1.5 **ENSURE** catch container is in place to capture liquid.

5.9.1.6 **REMOVE** plugs in vent tubing above the following:

- 60D-160
- 60D-171.

5.9.1.7 **WHEN** directed by SOM, **SLOWLY OPEN** 60D-116 sample valve.

5.9.1.8 **WHEN** directed by SOM, **CLOSE** the following chamber vent, drain valves, and sample valve:

<table>
<thead>
<tr>
<th>60D-116</th>
<th>60D-171</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-125</td>
<td>60D-173</td>
</tr>
<tr>
<td>60D-167</td>
<td>60D-172</td>
</tr>
<tr>
<td>60D-166</td>
<td>60D-161</td>
</tr>
<tr>
<td>60D-165</td>
<td>60D-160</td>
</tr>
</tbody>
</table>
5.9.1.9 RE-INSTALL plugs in tubing above 60D-160 and 60D-171.
5.9 Draining UV-1 or UV-2 (Cont.)

5.9.2 IF draining UV-1B, PERFORM the following:

5.9.2.1 ENSURE the following lamp enclosure drain valves are CLOSED:
- 60D-427
- 60D-428.

5.9.2.2 CLOSE the following UV chamber isolation valves:

<table>
<thead>
<tr>
<th>60D-118</th>
<th>60D-147</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-129</td>
<td>60D-148</td>
</tr>
</tbody>
</table>

5.9.2.3 OPEN 60D-126 drain valve to Sump 2.

5.9.2.4 OPEN the following UV chamber vent and drain valves:

<table>
<thead>
<tr>
<th>60D-187</th>
<th>60D-183</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-186</td>
<td>60D-182</td>
</tr>
<tr>
<td>60D-185</td>
<td>60D-181</td>
</tr>
<tr>
<td>60D-184</td>
<td>60D-180</td>
</tr>
</tbody>
</table>

5.9.2.5 ENSURE catch container is in place to capture liquid.

5.9.2.6 REMOVE plugs in vent tubing above the following:
- 60D-180
- 60D-184.

5.9.2.7 WHEN directed by SOM, SLOWLY OPEN 60D-124, sample valve.

5.9.2.8 WHEN directed by SOM, CLOSE the following chamber vent, drain valves, and sample valve:

<table>
<thead>
<tr>
<th>60D-124</th>
<th>60D-184</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-126</td>
<td>60D-183</td>
</tr>
<tr>
<td>60D-187</td>
<td>60D-182</td>
</tr>
<tr>
<td>60D-186</td>
<td>60D-181</td>
</tr>
<tr>
<td>60D-185</td>
<td>60D-180</td>
</tr>
</tbody>
</table>

5.9.2.9 RE-INSTALL plugs in tubing above 60D-180 and 60D-184.
5.9 Draining UV-1 or UV-2 (Cont.)

5.9.3 IF draining UV-2 A, **PERFORM** the following:

5.9.3.1 **ENSURE** the following lamp enclosure drain valves are CLOSED:
- 60D-429
- 60D-430.

5.9.3.2 **CLOSE** the following UV chamber isolation valves:

<table>
<thead>
<tr>
<th>60D-210</th>
<th>60D-244</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-228</td>
<td>60D-245</td>
</tr>
</tbody>
</table>

5.9.3.1 **OPEN** 60D-225, drain valve, to Sump 2.

5.9.3.2 **ENSURE** catch container is in place to capture liquid.

5.9.3.3 **WHEN** directed by SOM, **SLOWLY OPEN** 60D-216 sample valve.

5.9.3.4 **WHEN** directed by SOM, **CLOSE** the following
- 60D-216, sample valve
- 60D-225, drain valve.
5.9 Draining UV-1 or UV-2 (Cont.)

5.9.4 **IF** draining UV-2 B, **PERFORM** the following:

5.9.4.1 **ENSURE** the following lamp enclosure drain valves are CLOSED:
- 60D-431
- 60D-432.

5.9.4.2 **CLOSE** the following UV chamber isolation valves:

<table>
<thead>
<tr>
<th>60D-218</th>
<th>60D-247</th>
</tr>
</thead>
<tbody>
<tr>
<td>60D-229</td>
<td>60D-248</td>
</tr>
</tbody>
</table>

5.9.4.3 **OPEN** 60D-226, drain valve, to Sump 2.

5.9.4.4 **ENSURE** catch container is in place to capture liquid.

5.9.4.5 **WHEN** directed by SOM, **SLOWLY OPEN** 60D-224, sample valve.

5.9.4.6 **WHEN** directed by SOM, **CLOSE** the following:
- 60D-224, sample valve
- 60D-226, drain valve.

5.9.4.7 **WHEN** directed by SOM, **DRAIN** containers used for collecting liquid into Sump 1 or Sump 2.
5.10 Charging UV1 or UV2

NOTE – The SOM may designate locked-out components as not requiring lineup per ETF-60-006. Bypassed chambers per Section 5.2 of this procedure should also be designated as not requiring lineup to allow charging of only the intended chamber(s).

5.10.1 ENSURE UV1 or UV2 line up is completed per ETF-60-006.

5.10.2 ENSURE UV/OX Cooler, pH Adjust, PDMs, and PDM filter line ups are completed per ETF-60-006, or as otherwise directed as follows:

5.10.2.1 IF directed by SOM or per process memo, BYPASS PDMs per ETF-60-002.

5.10.2.2 IF directed by SOM or per process memo, BYPASS PDM filters per ETF-60-002.

NOTE – UV/OX inlet cooler should only be bypassed if the cooling water system is inoperable. UV/OX lamps must not be operated while UV/OX inlet cooler is inoperable.

5.10.2.3 IF directed by SOM or per process memo, BYPASS UV/OX Inlet Cooler as follows:

a. ENSURE UV/OX Cooler Inlet Isolation Valve 60B-001 is CLOSED.

b. ENSURE UV/OX Cooler to UV/OX Unit Valve 60B-002 is CLOSED.

c. ENSURE UV/OX Cooler Bypass Valve 60B-003 is OPEN.

NOTE – Steps “d” and “e” are performed concurrently.

d. DURING charging of the UV/OX, MONITOR pH adjust tank temperature TE-60C-112.

e. IF TE-60C-112 is >100°F, SHUT DOWN 60C-P-1A or 1B.

5.10.2.4 IF performing actions directed by SOM or Process Memo, DOCUMENT actions on ETF Control Room Logbook.
5.10 Charging UV1 or UV2 (Cont.)

5.10.3 **ENSURE** UV chambers that are not being charged are bypassed per Section 5.2.

5.10.4 **ENSURE** LCV111 (LIC60C111) is in MANUAL/CLOSED.

**NOTE** – Placing the following valves in manual will prevent UV/OX from being in READY mode. READY is not required for the following evolution.

5.10.5 **PLACE** 60B074 (AOV60B074) in MANUAL RECIRC.

5.10.6 **PLACE** 60B080 (AOV60B080) in MANUAL/OPEN.

5.10.7 **IF** flooding UV1, **PLACE** FCV104 (FIC60D104) in MANUAL at 30%.

5.10.8 **IF** flooding UV2, **PLACE** FCV204 (FIC60D204) in MANUAL at 30%.

5.10.9 **LOCALLY ENSURE** 60C-007, pH adjust pump discharge valve for pump 1A (60C-011 for pump B), is CLOSED.

5.10.10 **POSITION** 60C-013, ½ OPEN.

**NOTE** – UV module(s) (UV-1 or UV-2) might not enable and UV chamber(s) (e.g. UV-1A) might not be able to be selected if some components are locked-out. UV module(s) are not required to be enabled and the UV chamber(s) to be flooded are not required to be selected. Selecting the UV module(s) will provide instrument indications. If only a UV module is selected, then only alarms will function for the emergency stop button, overpressure relief, control power switch, circuit breaker CB-1, peroxide module stop switch, temperature high and high-high alarms, and pressure high and high-high alarms.

5.10.11 **ON** graphic, **CONFIRM** module containing chamber(s) to be flooded (UV-1) [UV-2] is selected.
5.10 Charging UV1 or UV2 (Cont.)

5.10.12 IF flooding UV1, ENSURE the following air operated valves are in AUTO;
  • 60D111 (AOV60D111)
  • 60D112 (AOV60D112)
  • 60D113 (AOV60D113)
  • 60D114 (AOV60D114)
  • 60D119 (AOV60D119)
  • 60D120 (AOV60D120)
  • 60D121 (AOV60D121)
  • 60D122 (AOV60D122)

5.10.13 IF flooding UV2, ENSURE the following air operated valves are in AUTO;
  • 60D211 (AOV60D211)
  • 60D212 (AOV60D212)
  • 60D213 (AOV60D213)
  • 60D214 (AOV60D214)
  • 60D219 (AOV60D219)
  • 60D220 (AOV60D220)
  • 60D221 (AOV60D221)
  • 60D222 (AOV60D222)

5.10.14 IF using pH adjust pump P1A (60C-P-1A), PLACE pump in MANUAL/START AND
  SLOWLY OPEN 60C-007.

5.10.15 IF using pH adjust pump P1B (60C-P-1B), PLACE pump in MANUAL/START AND
  SLOWLY OPEN 60C-011.

NOTE - If Lockout/Tagout has been applied to permit opening a UV chamber(s) lamp end enclosures, they can be opened to aid monitoring the filling and provide early indication of any UV tube leaking. Otherwise, the lamp end enclosure moisture alarm will provide indication of leakage if the UV chamber is enabled.

5.10.16 CONFIRM no leaks.
5.10 Charging UV1 or UV2 (Cont.)

5.10.17 IF leaks are found, SHUT DOWN pH adjust pump 1A or 1B AND NOTIFY SOM and HPT.

5.10.18 WHEN flow (FT60D104 or FT60D204) is steady, PLACE 60C-013 to slightly less than ½ OPEN.

5.10.19 WHEN charging is complete, SHUT DOWN 60C-P-1A or 1B.

5.10.20 PLACE LCV60C-111 in AUTO at 50%.

5.10.21 PLACE AOV 60B-074 back to AUTO.

5.10.22 PLACE AOV 60B-080 back to AUTO.

5.10.23 IF Step 5.10.7 was performed, REPLACE FCV104 (FIC60D104) to 0% (CLOSED).

5.10.24 IF Step 5.10.8 was performed, REPLACE FCV204 (FIC60D204) to 0% (CLOSED).
5.11 Drain UV-1/UV-2 Rupture Disk Header

5.11.1 REQUEST RCT coverage.

5.11.2 PLACE containment under valve 60D-051.

5.11.3 ENSURE valve 60D-051 is CLOSED AND

REMOVE cap under 60D-051.

5.11.4 SLOWLY OPEN valve 60D-051 to drain liquid from header piping.

5.11.5 WHEN liquid has been drained or containment has been filled, CLOSE valve 60D-051.

5.11.6 REPEAT Steps 5.11.4 and 5.11.5 as required to drain piping.

5.11.7 RE-INSTALL cap under valve 60D-051.

5.11.8 REMOVE containment under valve 60D-051.

5.12 Records

The performance of this procedure generates no records.

The record custodian identified in the company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.