Operate 242-A-81 Raw Water Strainer System

Tank Farm Plant Operating Procedure 242-A Evaporator

USQ # EV-18-0418-D, Rev. 0

CHANGE HISTORY (≤ LAST 5 REV-MODS)

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-3</td>
<td>03/19/2018</td>
<td>Operations request</td>
<td>Delete the “AND EXIT this section. “ from both subsections 5.7.1.1 and 5.7.2.1 on page 16</td>
</tr>
<tr>
<td>L-2</td>
<td>02/26/2018</td>
<td>Changes made during a periodic review.</td>
<td>Removed blank row at the bottom of a tables and updated the records section to match format.</td>
</tr>
<tr>
<td>L-1</td>
<td>12/05/2017</td>
<td>Operations request</td>
<td>Deleting sub-steps 5.3.1.2, 5.3.1.3, 5.3.2.2, and 5.3.2.3</td>
</tr>
<tr>
<td>L-0</td>
<td>02/18/2016</td>
<td>Periodic Review</td>
<td>Removal of warnings from procedure.</td>
</tr>
<tr>
<td>K-4</td>
<td>07/22/2014</td>
<td>Operations request</td>
<td>Step 4.3.4 – Changed EE Number for BFP-RW-1 to EE-001599.</td>
</tr>
</tbody>
</table>

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for operating the 242-A-81 Raw Water Strainer system at the 242-A Evaporator and sampling the Water Service Building sump.

1.2 Scope

This procedure applies to Raw Water Strainers F-RW-1 and F-RW-2 and their associated valving and instrumentation at the 242-A Evaporator.

2.0 INFORMATION

2.1 General Information

2.1.1 Additional general information on systems is provided in Attachment 1.

2.1.2 Sampling and Mobile Labs (S&ML) personnel are responsible for sample handling (bottle labeling, sample seals, chain of custody, transport) for protocol sampling.

2.1.3 The F-RW-1 and F-RW-2 Raw Water Strainers are used to remove dirt and other large, unwanted debris from the incoming raw water.

2.1.4 Debris that collects on the outside of the rotating screen inside the Raw Water Strainer is flushed away by opening the blow-off valve and allowing some of the water flow through strainer to flush the debris out of the strainer to a drain through a different pipe than the normal backwashing flow.

2.1.5 Sampling of the Water Service Building sump is required for compliance with HNF-SD-W049H-ICD-001. Samples are obtained only when requested by TEDF.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Adherence to facility postings during evaporator operations is required. Ear plugs as a minimum are required while performing strainer blow-off.

3.2 Equipment Safety

3.2.1 The strainers should not be operated without being filled with water, because the strainers are lubricated by the water passing through them. A slight seepage of water should be observed around the strainer's packing gland when the strainer(s) is in use.

3.2.2 Do not allow dirty strainer elements to dry out, because the strainer mesh will become clogged with embedded debris. Strainer backwash should always be performed before a strainer is shut down.

3.2.3 Raw Water Strainer damage may result if strainers are operated with a total pressure drop greater than 15 psig.

3.2.4 Before a Raw Water Strainer can be backwashed, the strainer must be operating per Section 5.1 or 5.2.

4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies will be needed to perform this procedure:

- Hearing protection
- Gloves
- Wrist watch or stopwatch that reads out in seconds
- Silicone tube (sampling only)
- Peristaltic sampling pump (sampling only).

4.2 Performance Documents

The following documents may be needed to perform the procedure:

- TO-600-123, Startup and Shutdown E-C-1, E-C-2, and E-C-3 Condensers
- TO-600-060, Shut Down 242-A Evaporator System.
4.3 Field Preparation

NOTE - The following conditions must be met before this procedure may commence:

4.3.1 PERFORM the following valving as indicated below:

<table>
<thead>
<tr>
<th>Valve #</th>
<th>Description</th>
<th>Position</th>
<th>Check Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>117R</td>
<td>Raw Water Supply Line</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-30</td>
<td>Isolation Valve to PT-RW-2</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-36</td>
<td>PSV-RW-1 Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-37</td>
<td>PSV-RW-2 Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-41</td>
<td>PI-RW-4 Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-44</td>
<td>PI-RW-4 Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-43</td>
<td>Isolation Valve to PI-RW-3</td>
<td>OPEN</td>
<td></td>
</tr>
</tbody>
</table>

4.3.2 REQUEST Instrument Technician perform the following valving indicated below:

<table>
<thead>
<tr>
<th>System</th>
<th>Valve #</th>
<th>Description</th>
<th>Position</th>
<th>Check Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-RW-1</td>
<td>PDT-RW-1-1A</td>
<td>Differential Pressure Instrumentation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PDT-RW-1-1B</td>
<td>Differential Pressure Instrumentation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PDT-RW-1-1C</td>
<td>Differential Pressure Instrumentation Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>F-RW-2</td>
<td>PDT-RW-2-1A</td>
<td>Differential Pressure Instrumentation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PDT-RW-2-1B</td>
<td>Differential Pressure Instrumentation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PDT-RW-2-1C</td>
<td>Differential Pressure Instrumentation Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PT-RW-2-1</td>
<td>Pressure Transmitter PT-RW-2 Instrumentation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
</tbody>
</table>

4.3.3 CHECK Raw water is valved into Raw Water Service Building as determined by PI-RW-2 (G11, F17), F-RW-1/2 FILTER UPSTREAM PRESSURE reading greater than 100 psig.

4.3.4 PRIOR to placing Raw Water Strainer F-RW-1 or F-RW-2 in service, CHECK Backflow Preventer Assembly is tested and available.

<table>
<thead>
<tr>
<th>Backflow Preventer Assembly</th>
<th>PM Number</th>
<th>Date Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFP-RW-1</td>
<td>EE-001599</td>
<td></td>
</tr>
<tr>
<td>BFP-RW-2</td>
<td>EE-001600</td>
<td></td>
</tr>
</tbody>
</table>
5.0 PROCEDURE

NOTE - Sections 5.1 through 5.14 of this procedure may be performed in any order or independently.

- During Evaporator outage/shutdown, the raw water strainer motors may be shutdown and operated during strainer blow-off or operated per Shift Manager direction.
- Section 5.1 only needs to be performed if F-RW-1 is not already energized.

5.1 Energize Raw Water Strainer F-RW-1

NOTE - Control Switch KY-RW-1 for backwash valve PDV-RW-1 is located on the east wall inside the Raw Water Service Building.

5.1.1 IF F-RW-1 is not energized, PERFORM Steps 5.1.2 through 5.1.19.

5.1.2 PERFORM the following initial valving as indicated below:

<table>
<thead>
<tr>
<th>VALVE</th>
<th>DESCRIPTION</th>
<th>POSITION</th>
<th>CHECK Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV-RW-47</td>
<td>Hose Connection</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-27</td>
<td>F-RW-1 Inlet Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>PDV-RW-1</td>
<td>F-RW-1 Backwash Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-26</td>
<td>PDT-RW-1-1A Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-25</td>
<td>PDT-RW-1-1B Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>VENT</td>
<td>F-RW-1 Strainer Vent Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-28</td>
<td>F-RW-1 Blowoff Drain Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-67</td>
<td>10” Isolation valve to pressure control valve PCV-RW-1</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-65</td>
<td>10” Isolation valve to pressure control valve PCV-RW-1</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-70</td>
<td>3” Isolation valve to pressure control valve PCV-RW-1A</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-68</td>
<td>3” Isolation valve to pressure control valve PCV-RW-1A</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-55</td>
<td>BFP-RW-1 Test Cock Valve #1</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-21</td>
<td>BFP-RW-1 Backflow Preventer Inlet Isolation Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-56</td>
<td>BFP-RW-1 Test Cock Valve #2</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-57</td>
<td>BFP-RW-1 Test Cock Valve #3</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-58</td>
<td>BFP-RW-1 Test Cock Valve #4</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-45</td>
<td>Hose connection</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-46</td>
<td>PCV-RW-1 Downstream Pressure Sense Line Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-49</td>
<td>Hose Connection</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-20</td>
<td>BFP-RW-1 Backflow Preventer Outlet Isolation Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
</tbody>
</table>

5.1.3 OPEN the Raw Water Strainer F-RW-1 strainer vent ball valve.
5.1 **Energize Raw Water Strainer F-RW-1 (Cont.)**

**NOTE** - When raw water begins to flow into the strainer, there should be a slight hissing sound as air is forced out through the strainer vent.

5.1.4 **SLOWLY CRACK OPEN** HV-RW-27, F-RW-1 Raw Water Inlet valve to pressurize and fill the strainer.

5.1.5 **WHEN** water begins to flow from the Raw Water Strainer F-RW-1 vent, **CLOSE** the strainer vent ball valve.

5.1.6 **SLOWLY OPEN** (fully) HV-RW-27 F-RW-1 Raw Water Inlet valve.

**NOTE** - Strainer Motor control button HS-RW-1 is located on the east wall inside the Raw Water Service Building.

- When the Raw Water Strainer motors are operating, a slight seepage of water should be observed around the strainer's packing gland at the base of the shaft.
- The Raw Water Strainers may be operated without the motors.

5.1.7 **IF** directed by Management to operate the strainers with the motors, **PERFORM** the following:

5.1.7.1 **ENSURE** the Raw Water Strainer is completely full of water.

5.1.7.2 **PRESS** START button HS-RW-1 for the Raw Water Strainer F-RW-1 strainer motor.

5.1.8 **IF** directed by Management, **PERFORM** approximately 30-second backwash on F-RW-1 as follows:

5.1.8.1 **POSITION** Control Switch KY-RW-1 for backwash valve PDV-RW-1 to OPEN.

5.1.8.2 **CHECK** the following:

- The yellow indicator on backwash valve PDV-RW-1 positioner is in the OPEN position
- The BACKWASH OPEN light on the controller is ON.

5.1.8.3 **AFTER** backwashing F-RW-1 for approximately 30 seconds, **POSITION** Control Switch KY-RW-1 for backwash valve PDV-RW-1 to CLOSED.
5.1 Energize Raw Water Strainer F-RW-1 (Cont.)

5.1.8.4 CHECK the following:
- The yellow indicator on backwash valve PDV-RW-1 positioner is in the CLOSED position
- The BACKWASH OPEN light on the controller is OFF.

5.1.8.5 WAIT 3 to 5 minutes to allow the Raw Water Service Building sump to drain.

5.1.8.6 OPEN HV-RW-28 Blow-Off Drain valve for approximately 30 seconds to remove debris from the strainer (located under Strainer F-RW-1).

5.1.8.7 AFTER approximately 30 seconds, CLOSE HV-RW-28 Blow-Off Drain valve.

5.1.9 SLOWLY OPEN HV-RW-21, BFP-RW-1 Backflow Preventer Inlet Isolation valve.

5.1.10 CONFIRM Backflow Preventer Assembly has been satisfactorily tested.

5.1.11 SLOWLY OPEN HV-RW-20, BFP-RW-1 Backflow Preventer Outlet Isolation valve.

5.1.12 IF directed by Management to shutdown strainer motor, PRESS HS-RW-1 Raw Water Strainer F-RW-1 Strainer Motor STOP button.

NOTE - The following steps establish flow through F-RW-1 to validate the discharge pressure of PCV-RW-1.
- To obtain the desired full capacity raw water flow to test the discharge pressure, the evaporator condenser must be placed in service.

5.1.13 IF directed by Shift Manager to validate PCV-RW-1 discharge pressure, PERFORM Steps 5.1.14 through 5.1.16.2 to establish flow through the evaporator condenser per TO-600-123.
5.1 Energize Raw Water Strainer F-RW-1 (Cont.)

5.1.14 OPEN flow to the desired system flow rate per Shift Manager direction or Process Memo.

5.1.15 WHEN system flow rate of greater than or equal to 600 gpm as monitored on FIC-EC1-1 is achieved, CLOSE HV-RW-68, 3 Inch Isolation valve to pressure control valve PCV-RW-1A.

5.1.16 CHECK PCV-RW-1 discharge pressure reading on PI-RW-4 is at 100 psi (99 to 101 psi).

5.1.16.1 IF PI-RW-4 does not read 100 psi (99 to 101 psi), ADJUST PCV-RW-1 flow regulator to obtain 100 psi (99 to 101 psi).

5.1.16.2 IF 100 psi (99 to 101 psi) cannot be obtained, NOTIFY Shift Manager.

5.1.17 IF directed by Shift Manager, SECURE flow through evaporator condensers per TO-600-123.

5.1.18 OPEN HV-RW-68.

NOTE - After performing Step 5.1.19, F-RW-1 will be energized and may be put into operation per Section 5.3 if desired.

5.1.19 CLOSE HV-RW-20.
5.2 Energize Raw Water Strainer F-RW-2

5.2.1 IF F-RW-2 is not energized. **PERFORM** Steps 5.2.2 through 5.2.19.

NOTE - Control switch KY-RW-2 for backwash valve PDV-RW-2 is located on the east wall inside the Raw Water Service Building.

5.2.2 **PERFORM** the following valving as indicated below:

<table>
<thead>
<tr>
<th>VALVE</th>
<th>DESCRIPTION</th>
<th>POSITION</th>
<th>CHECK</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV-RW-31</td>
<td>F-RW-2 Inlet Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>PDV-RW-2</td>
<td>F-RW-2 Backwash Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-34</td>
<td>F-RW-2 Blowoff Drain Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-32</td>
<td>PDT-RW-2-1A Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-33</td>
<td>PDT-RW-2-1B Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>VENT</td>
<td>F-RW-2 Strainer Vent Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-61</td>
<td>PCV-RW-2 Inlet Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-59</td>
<td>PCV-RW-2 Outlet Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-64</td>
<td>PCV-RW-2A Inlet Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-62</td>
<td>3” Isolation valve to pressure control valve PCV-RW-2A</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-51</td>
<td>BFP-RW-2 Test Cock Valve #1</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-39</td>
<td>BFP-RW-2 Backflow Preventer Inlet Isolation Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-52</td>
<td>BFP-RW-2 Test Cock Valve #2</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-53</td>
<td>BFP-RW-2 Test Cock Valve #3</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-54</td>
<td>BFP-RW-2 Test Cock Valve #4</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-40</td>
<td>BFP-RW-2 Backflow Preventer Outlet Isolation Valve</td>
<td>CLOSED</td>
<td></td>
</tr>
<tr>
<td>HV-RW-42</td>
<td>PCV-RW-2 Downstream Pressure Sense Line Isolation Valve</td>
<td>OPEN</td>
<td></td>
</tr>
<tr>
<td>HV-RW-48</td>
<td>Hose Connection</td>
<td>CLOSED</td>
<td></td>
</tr>
</tbody>
</table>

5.2.3 **OPEN** the Raw Water Strainer F-RW-2 strainer vent ball valve.

NOTE - When raw water begins to flow into the strainer, there should be a slight hissing sound as air is forced out through the strainer vent.

5.2.4 **SLOWLY CRACK OPEN** HV-RW-31, F-RW-2 Raw Water Inlet valve to pressurize and fill the strainer.

5.2.5 **WHEN** water begins to flow from the Raw Water Strainer F-RW-2 vent, **CLOSE** the strainer vent ball valve.

5.2.6 **SLOWLY OPEN** (fully) HV-RW-31 F-RW-2 Raw Water Inlet valve.
5.2 **Energize Raw Water Strainer F-RW-2 (Cont.)**

**NOTE** - Strainer Motor control button HS-RW-2 is located on the east wall inside the Raw Water Service Building.

- When the Raw Water Strainer motors are operating, a slight seepage of water should be observed around the strainer's packing gland at the base of the shaft.
- The Raw Water Strainers may be operated without the motors.

5.2.7 **IF** directed by Management to operate the strainers with the motors, **PERFORM** the following:

5.2.7.1 **ENSURE** the Raw Water Strainer is completely full of water.

5.2.7.2 **PRESS** START button HS-RW-2 for the Raw Water Strainer F-RW-2 strainer motor.

5.2.8 **IF** directed by Management, **PERFORM** approximately 30-second backwash on F-RW-2 as follows:

5.2.8.1 **POSITION** Control Switch KY-RW-2 for backwash valve PDV-RW-2 to OPEN.

5.2.8.2 **CHECK** that yellow indicator on backwash valve PDV-RW-2 positioner is in OPEN position and the BACKWASH OPEN light on the controller is ON.

5.2.8.3 **AFTER** backwashing F-RW-2 for approximately 30 seconds, **POSITION** Control Switch KY-RW-2 for backwash valve PDV-RW-2 to CLOSED.

5.2.8.4 **CHECK** that yellow indicator on backwash valve PDV-RW-2 positioner is in CLOSED position and the BACKWASH OPEN light on the controller is OFF.

5.2.8.5 **WAIT** 3 to 5 minutes to allow the Raw Water Service Building Sump to drain.

5.2.8.6 **OPEN** HV-RW-34, Blow-Off Drain valve for approximately 30 seconds to remove debris from the strainer (located under Strainer F-RW-2).

5.2.8.7 **AFTER** approximately 30 seconds, **CLOSE** HV-RW-34, Blow-Off drain valve.
5.2 Energize Raw Water Strainer F-RW-2 (Cont.)


5.2.10 CONFIRM Backflow Preventer Assembly has been satisfactorily tested.

5.2.11 SLOWLY OPEN HV-RW-40, BFP-RW-2 Backflow Preventer Outlet Isolation valve is OPEN.

5.2.12 IF directed by Management to shutdown strainer motor, PRESS HS-RW-2 Raw Water Strainer F-RW-2 Strainer Motor STOP button.

NOTE - The following steps establish flow through F-RW-2 to validate the discharge pressure of PCV-RW-2.
- To obtain the desired full capacity raw water flow to test the discharge pressure, the evaporator condenser must be placed in service.

5.2.13 IF directed by Shift Manager to validate PCV-RW-2 discharge pressure, PERFORM Steps 5.2.14 through 5.2.16.2 to establish flow through the evaporator condenser per TO-600-123.

5.2.14 OPEN flow to the desired system flow rate per Process Memo or Shift Manager direction.

5.2.15 WHEN system flow rate of greater than or equal to 600 gpm as monitored on FIC-EC1-1 is achieved, CLOSE HV-RW-62, 3 Inch Isolation valve to pressure control valve PCV-RW-2A.

5.2.16 CHECK PCV-RW-2 discharge pressure reading on PI-RW-4 is at 100 psi (99 to 101 psi).

5.2.16.1 IF PI-RW-4 does not read 100 psi (99 to 101 psi), ADJUST PCV-RW-2 flow regulator to obtain 100 psi (99 to 101 psi).

5.2.16.2 IF 100 psi (99 to 101 psi) cannot be obtained, NOTIFY Shift Manager.

5.2.17 IF directed by Shift Manager, SECURE flow through evaporator condensers per TO-600-123.

5.2.18 OPEN HV-RW-62.

NOTE - After performing Step 5.2.19, F-RW-2 will be energized and may be put into operation per Section 5.3 if desired.

5.2.19 CLOSE HV-RW-40.
5.3 Starting F-RW-1 or F-RW-2 Raw Water System for Operation

NOTE - If starting up the raw water system for the first time, normally F-RW-1 will be placed into service first.

5.3.1 IF placing F-RW-1 into operation, PERFORM the following:
   5.3.1.1 SLOWLY OPEN HV-RW-20.

5.3.2 IF placing F-RW-2 into operation, PERFORM the following:
   5.3.2.1 SLOWLY OPEN HV-RW-40.

5.4 Operate both F-RW-1 and F-RW-2 in Parallel

NOTE - Operations may require F-RW-1 and F-RW-2 to be on-line in parallel.

5.4.1 PERFORM Step 5.3.1 for F-RW-1.

5.4.2 PERFORM Step 5.3.2 for F-RW-2.

5.4.3 NOTIFY 242-A SM that both F-RW-1 and F-RW-2 are on-line in parallel.
5.5 Switching from F-RW-1 to F-RW-2 Raw Water System for Operation

5.5.1 ENSURE F-RW-2 has been energized per Section 5.2.

NOTE - When both system valves HV-RW-62/HV-RW-40 and HV-RW-68/HV-RW-20 valves are open minor flow oscillations may occur which is acceptable.

5.5.2 ENSURE HV-RW-62, 3 Inch Isolation valve to pressure control valve PCV-RW-2A is OPEN.

5.5.3 ENSURE valve HV-RW-68, 3 Inch Isolation valve to pressure control valve PCV-RW-1A is OPEN.

5.5.4 SLOWLY OPEN valve HV-RW-40, BFP-RW-2 Backflow Preventer Outlet Isolation Valve.

5.5.5 SLOWLY CLOSE valve HV-RW-20, BFP-RW-1 Backflow Preventer Outlet Isolation Valve.

5.5.6 IF F-RW-2 is to be operated in high capacity mode (flows ≥ 600 gpm) CLOSE HV-RW-62, 3 Inch Isolation valve to pressure control valve PCV-RW-2A when flow reaches 600 gpm.

5.5.7 NOTIFY Shift Manager that F-RW-2 Raw Water strainer is in operation.
5.6 Switching from F-RW-2 to F-RW-1 Raw Water System for Operation

5.6.1 **ENSURE** F-RW-1 has been energized per Section 5.1.

**NOTE** - When both system valves HV-RW-62/HV-RW-40 and HV-RW-68/HV-RW-20 valves are open minor flow oscillations may occur which is acceptable.

5.6.2 **ENSURE** HV-RW-68, 3 Inch Isolation valve to pressure control valve PCV-RW-1A is OPEN.

5.6.3 **ENSURE** valve HV-RW-62, 3 Inch Isolation valve to pressure control valve PCV-RW-2A is OPEN.

5.6.4 **SLOWLY OPEN** valve HV-RW-20, BFP-RW-1 Backflow Preventer Outlet Isolation Valve.

5.6.5 **SLOWLY CLOSE** valve HV-RW-40, BFP-RW-2 Backflow Preventer Outlet Isolation Valve.

5.6.6 **IF** F-RW-1 is to be operated in high capacity mode (flows ≥ 600 gpm), **CLOSE** HV-RW-68, 3 Inch Isolation valve to pressure control valve PCV-RW-1A when flow reaches 600 gpm.

5.6.7 **NOTIFY** Shift Manager that F-RW-1 Raw Water strainer is in operation.
5.7 Perform Weekly Strainer Blow-Off

NOTE - This section is normally performed once per week while the Raw Water System is in operation, or more frequently (at Engineering direction) if the amount of solids in the water requires it.

5.7.1 IF F-RW-1 is in operation, PERFORM the following:

5.7.1.1 ENSURE Strainer Motor for Raw Water Strainer F-RW-1 is OPERATING.

a. IF the Raw Water Strainer motor is not operational, NOTIFY the Shift Manager.

5.7.1.2 FOR approximately 30 seconds, OPEN HV-RW-28 F-RW-1 Blow-Off Drain valve (located under Strainer F-RW-1).

5.7.1.3 AFTER approximately 30 seconds, CLOSE valve HV-RW-28.

5.7.1.4 IF directed by Management to shutdown strainer motor, PRESS HS-RW-1 Raw Water Strainer F-RW-1 Strainer Motor STOP button.

5.7.2 IF F-RW-2 is in operation, PERFORM the following:

5.7.2.1 ENSURE Strainer Motor for Raw Water Strainer F-RW-2 is OPERATING.

a. IF the Raw Water Strainer motor is not operational, NOTIFY the Shift Manager.

5.7.2.2 FOR approximately 30 seconds, OPEN HV-RW-34 F-RW-2 Blow-Off Drain valve (located under Strainer F-RW-2).

5.7.2.3 AFTER approximately 30 seconds, CLOSE valve HV-RW-34.

5.7.2.4 IF directed by Management to shutdown strainer motor, PRESS HS-RW-2 Raw Water Strainer F-RW-2 Strainer Motor STOP button.
5.8 Backwash Raw Water Strainer F-RW-1 Manually

NOTE - Before Raw Water Strainer F-RW-1 may be backwashed, it must be in operation per Section 5.1.

- Backwash Valve Controller KY-RW-1 is located on the east wall, inside the Raw Water Service Building.

5.8.1 ENSURE Strainer Motor for Raw Water Strainer F-RW-1 is OPERATING.

5.8.1.1 IF the Raw Water Strainer motor is not operational, NOTIFY the Shift Manager AND EXIT this section.

5.8.2 FOR approximately 30 seconds, POSITION Control Switch KY-RW-1 for backwash valve PDV-RW-1 to OPEN to backwash F-RW-1.

5.8.3 CHECK that yellow indicator on backwash valve PDV-RW-1 positioner is in OPEN position and the BACKWASH OPEN light on the controller is ON.

5.8.4 AFTER backwashing F-RW-1 for approximately 30 seconds, POSITION Control Switch KY-RW-1 for backwash valve PDV-RW-1 to CLOSED.

5.8.5 CHECK that yellow indicator on backwash valve PDV-RW-1 positioner is in CLOSED position and the BACKWASH OPEN light on the controller is OFF.

5.8.6 WAIT 3 to 5 minutes to allow Raw Water Service Building Sump to drain.

5.8.7 FOR approximately 30 seconds, OPEN HV-RW-28, F-RW-1 Blow-Off Drain valve (located under Strainer F-RW-1) to remove debris from the Strainer.

5.8.8 AFTER approximately 30 seconds, CLOSE HV-RW-28, F-RW-1 Blow-Off Drain valve.
5.8 Backwash Raw Water Strainer F-RW-1 Manually (Cont.)

5.8.9 CHECK Raw Water Strainer F-RW-1 ΔP readings from PDI-RW-3.

5.8.10 IF Raw Water Strainer F-RW-1 ΔP reads greater than 15 psid, REPEAT Steps 5.8.2 through 5.8.9, at Shift Manager’s direction, to lower ΔP to less than 13 psid.

5.8.11 IF Raw Water Strainer F-RW-1 ΔP CANNOT be lowered to less than 13 psid by backwashing, PERFORM the following:

5.8.11.1 SWITCH to F-RW-2 raw water system per Section 5.5.

5.8.11.2 NOTIFY Shift Manager that Raw Water Strainer F-RW-1 has been isolated for excessive ΔP.

5.8.12 IF Strainer motor is to be shut down, PRESS HS-RW-1, Raw Water Strainer F-RW-1 Strainer Motor STOP button.
5.9 Backwash Raw Water Strainer F-RW-2 Manually

NOTE - Before Raw Water Strainer F-RW-2 may be backwashed, it must be in operation per Section 5.2.

- Backwash Valve Controller KY-RW-2 is located on the east wall, inside the Raw Water Service Building.

5.9.1 ENSURE the Strainer Motor for Raw Water Strainer F-RW-2 is OPERATING.

5.9.1.1 IF the Raw Water Strainer motor is not operational, NOTIFY the Shift Manager AND EXIT this section.

5.9.2 FOR approximately 30 seconds, POSITION Control Switch KY-RW-2 for backwash valve PDV-RW-2 to OPEN to backwash F-RW-2.

5.9.3 CHECK that yellow indicator on backwash valve PDV-RW-2 positioner is in OPEN position and the BACKWASH OPEN light on the controller is ON.

5.9.4 AFTER backwashing F-RW-2 for approximately 30 seconds, POSITION Control Switch KY-RW-2 for backwash valve PDV-RW-2 to CLOSED.

5.9.5 CHECK that yellow indicator on backwash valve PDV-RW-2 positioner is in CLOSED position and the BACKWASH OPEN light on the controller is OFF.

5.9.6 WAIT 3 to 5 minutes to allow the Raw Water Service Building Sump to drain.

5.9.7 FOR approximately 30 seconds, OPEN HV-RW-34, F-RW-2 Blow-Off Drain valve (located under Strainer F-RW-2) to remove debris from the Strainer.

5.9.8 AFTER approximately 30 seconds, CLOSE HV-RW-34, F-RW-2 Blow-Off Drain valve.
5.9 Backwash Raw Water Strainer F-RW-2 Manually (Cont.)

5.9.9 CHECK Raw Water Strainer F-RW-2 ΔP readings from PDI-RW-4.

5.9.10 IF Raw Water Strainer F-RW-2 ΔP reads greater than 15 psid, REPEAT Steps 5.9.2 through 5.9.9, at Shift Manager’s direction, to lower ΔP to less than 13 psid.

5.9.11 IF Raw Water Strainer F-RW-2 ΔP CANNOT be lowered to less than 13 psid by backwashing, PERFORM the following:

5.9.11.1 SWITCH to F-RW-1 raw water system per Section 5.6.

5.9.11.2 NOTIFY Shift Manager that Raw Water Strainer F-RW-2 has been isolated for excessive ΔP.

5.9.12 IF Strainer motor is to be shut down, PRESS HS-RW-2 Raw Water Strainer F-RW-2 Strainer Motor STOP button.
5.10 Shut Down Raw Water Strainer F-RW-1

5.10.1 IF Raw Water Strainer F-RW-1 is being shut down due to an emergency situation, GO TO Step 5.10.10.

5.10.2 ENSURE Strainer Motor for Raw Water Strainer F-RW-1 is OPERATING.

5.10.3 FOR approximately 30 seconds, POSITION Control Switch KY-RW-1 for backwash valve PDV-RW-1 to OPEN to back wash F-RW-1.

5.10.4 CHECK that yellow indicator on backwash valve PDV-RW-1 positioner is in OPEN position and the BACKWASH OPEN light on the controller is ON.

5.10.5 AFTER backwashing F-RW-1 for approximately 30 seconds, POSITION Control Switch KY-RW-1 for backwash valve PDV-RW-1 to CLOSED.

5.10.6 CHECK that yellow indicator on backwash valve PDV-RW-1 positioner is in CLOSED position and the BACKWASH OPEN light on the controller is OFF.

5.10.7 WAIT 3 to 5 minutes to allow the Raw Water Service Building Sump to drain.

5.10.8 FOR approximately 30 seconds, OPEN HV-RW-28, F-RW-1 Blow-Off Drain valve (located under Strainer F-RW-1) to remove debris from the Strainer.

5.10.9 AFTER approximately 30 seconds, CLOSE HV-RW-28, F-RW-1 Blow-Off Drain valve.

5.10.10 PRESS HS-RW-1 Raw Water Strainer F-RW-1 Strainer Motor STOP button.

5.10.11 CHECK backwash Valve PDV-RW-1 Control Switch KY-RW-1 is in CLOSED.

5.10.12 CLOSE HV-RW-20, BFP-RW-1 Backflow Preventer Outlet Isolation Valve.
5.10 Shut Down Raw Water Strainer F-RW-1 (Cont.)

5.10.13 IF directed by Shift Manager to perform a complete isolation of F-RW-1, PERFORM the following steps:

5.10.13.1 CLOSE HV-RW-21, BFP-RW-1 Backflow Preventer Inlet Isolation Valve.

5.10.13.2 CLOSE HV-RW-27 Raw Water Strainer F-RW-1 Inlet valve.

5.10.14 IF maintenance will be performed on the F-RW-1 Strainer, PERFORM the following:


5.10.14.2 OPEN the Raw Water Strainer F-RW-1 Strainer Vent ball valve.

5.10.15 NOTIFY Shift Manager Raw Water Strainer F-RW-1 has been isolated AND WHEN F-RW-1 raw water system is required to be placed back into operation, RE-ENERGIZE system per Section 5.1.
5.11 Shut Down Raw Water Strainer F-RW-2

5.11.1 IF Raw Water Strainer F-RW-2 is being shut down due to an emergency situation, GO TO Step 5.11.10.

5.11.2 ENSURE Strainer Motor for Raw Water Strainer F-RW-2 is OPERATING.

5.11.3 FOR approximately 30 seconds, POSITION Control Switch KY-RW-2 for backwash valve PDV-RW-2 to OPEN to back wash F-RW-2.

5.11.4 CHECK that yellow indicator on backwash valve PDV-RW-2 positioner is in OPEN position and the BACKWASH OPEN light on the controller is ON.

5.11.5 AFTER backwashing F-RW-2 for approximately 30 seconds, POSITION Control Switch KY-RW-2 for backwash valve PDV-RW-2 to CLOSED.

5.11.6 CHECK that yellow indicator on backwash valve PDV-RW-2 positioner is in CLOSED position and the BACKWASH OPEN light on the controller is OFF.

5.11.7 WAIT 3 to 5 minutes to allow the Raw Water Service Building Sump to drain.

5.11.8 FOR approximately 30 seconds, OPEN HV-RW-34, F-RW-2 Blow-Off Drain valve (located under Strainer F-RW-2) to remove debris from the Strainer.

5.11.9 AFTER approximately 30 seconds, CLOSE HV-RW-34 F-RW-2 Blow-Off Drain valve.

5.11.10 PRESS HS-RW-2 Raw Water Strainer F-RW-2 Strainer Motor STOP button

5.11.11 CHECK backwash Valve PDV-RW-2 Control Switch KY-RW-2 is CLOSED.

5.11 Shut Down Raw Water Strainer F-RW-2 (Cont.)

5.11.13 IF directed by Shift Manager to perform a complete isolation of F-RW-2, PERFORM the following steps:


5.11.13.2 CLOSE HV-RW-31 Raw Water Strainer F-RW-2 Inlet valve.

5.11.14 IF maintenance will be performed on the F-RW-2 Strainer, PERFORM the following:


5.11.15 NOTIFY Shift Manager Raw Water Strainer F-RW-2 has been isolated AND WHEN F-RW-2 raw water system is required to be placed back into operation, RE-ENERGIZE system per Section 5.2.
5.12 Raw Water System Shutdown

5.12.1 **CHECK** the Evaporator is in a SHUTDOWN MODE in accordance with TO-600-060, “Shut Down 242-A Evaporator System.”

5.12.2 **CHECK** all 242-A Raw Water loads are SHUT DOWN and raw water is no longer needed.

5.12.3 **SHUT DOWN** the Raw Water system by performing both Section 5.10 and Section 5.11.

5.13 Replace Sampling Pump Tube

**NOTE** - A new sampling pump tube will be used for each sampling event. The tube installed in the pump prior to this sampling should be retained for replacement after the sampling event is completed. This Section is performed only if not using a pump supplied by Sampling and Mobile Labs (S&ML). If using a S&ML pump, a new tube will be installed in the pump by S&ML prior to the sampling event.

5.13.1 **IF** using a pump supplied by S&ML, **EXIT** this section.

5.13.2 **CHECK** sampling pump is disconnected from power.

5.13.3 **REMOVE** pump housing thumb screws.

5.13.4 **REMOVE** outer half of pump housing.

5.13.5 **REMOVE** old pump tube from pump.

5.13.6 **REMOVE** clamps from old pump tube.

**NOTE** - The required length of the new pump tube will be determined by the operator at the time of sampling.

5.13.7 **OBTAIN** a new pump tube of the proper length as determined by the operator at time of sampling.

5.13.8 **POSITION** clamps on new pump tube with grooves spaced at 11\(\frac{1}{2}\) in.

5.13.9 **PLACE** new pump tube inside pump housing.

5.13.10 **REINSTALL** outer half of pump housing.

5.13.11 **REINSTALL** pump housing thumb screws.
5.14 Sample Water Service Building Sump

5.14.1 PLACE sample pump near sampling location.

NOTE - If using the pump supplied by S&ML, tube weight will be inserted into the ends of the sample pump tubing. These weights will be supplied by S&ML.

5.14.2 IF using S&ML pump, INSTALL tube weights as directed by S&ML.

5.14.3 INSERT sampling pump lower tube into sump to a depth specified by S&ML.

5.14.4 POSITION sampling pump upper tube so that it drains back into the sump.

5.14.5 TURN pump flowrate knob to maximum flowrate (fully clockwise).

5.14.6 START sampling pump by positioning pump switch to FORWARD.

5.14.7 PURGE tubing as directed by S&ML.

5.14.8 STOP sampling pump by positioning pump switch to OFF.

5.14.9 REMOVE sampling pump upper tube from sump.

5.14.10 OPERATE sampling pump as directed by S&ML as follows:

5.14.10.1 TURN sampling pump flowrate knob to minimum flowrate (fully counterclockwise).

5.14.10.2 START sampling pump by positioning pump switch to FORWARD.

5.14.10.3 ADJUST sampling pump to desired flowrate.

5.14.10.4 STOP sampling pump by positioning pump switch to OFF.

5.14.10.5 REPEAT Steps 5.14.10.1 through 5.14.10.4 as directed by S&ML until all samples are taken.

5.14.11 REMOVE liquid hold-up in sampling pump by positioning pump switch to REVERSE.

5.14.12 AFTER several seconds, POSITION pump switch to OFF.

5.14.13 REMOVE sampling pump lower tube from sump.
5.14 Sample Water Service Building Sump (Cont.)

5.14.14 REMOVE tube weights from sample pump tube as directed by S&ML.

5.14.15 REPLACE sample tube in sample pump as follows:

5.14.15.1 CHECK that sampling pump is disconnected from power.

5.14.15.2 REMOVE pump housing thumb screws.

5.14.15.3 REMOVE outer half of pump housing.

5.14.15.4 REMOVE pump tube from pump.

5.14.15.5 REMOVE clamps from pump tube.

5.14.15.6 DISPOSE of pump tube as directed by S&ML.

NOTE - Normally, the old sample pump tubing will be returned to the sample pump at this time in preparation for future sampling.

5.14.15.7 INSPECT old silicone pump tube for damage.

5.14.15.8 IF pump tube appears worn, ruptured, or deformed, DISCARD the pump tube AND

   OBTAIN new silicone tube for replacement in the sample pump.

5.14.15.9 POSITION clamps on pump tube with grooves spaced at 11 \( \frac{1}{4} \) in.

5.14.15.10 PLACE pump tube inside pump housing.

5.14.15.11 REINSTALL outer half of pump housing.

5.14.15.12 REINSTALL pump housing thumb screws.

5.15 Records

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.
1. Backwashing is the process of cleaning the internal mechanism of one of the Raw Water Strainers by forcing a large volume of water through the Strainer in a direction reverse to normal flow.

2. Blow-off is the process of removing accumulated solids from the Raw Water Strainer vessel by allowing water to flush out the bottom of the vessel. Blow-off is usually performed once per week.


4. A small part of the water flowing through the Raw Water Strainers is used to sweep the concentrated debris from the rotating strainer screens into a cavity at the center of the screen. When the Raw Water Strainer is backwashed, the debris passes through the hollow shaft of the backwash arm out of the Raw Water Strainer to a drain.