Shut Down 242-A Evaporator System

USQ # EV-18-1987-S, 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>R-19</td>
<td>01/14/2019</td>
<td>DOE-0359 Change Implementation</td>
<td>Updated Safety section regarding preventative maintenance and applicable ERA to use.</td>
</tr>
<tr>
<td>R-18</td>
<td>09/26/2018</td>
<td>Operations request</td>
<td>Added an attachment “EPN's Inhibited per TO-600-060 Evaporator Shutdown” 2.1.5 – Delete “waste” and change to “bulk temperature change with respect of time of 10 °F/hr per the OSD-T-151-00007 operating specification.” Global – changed “BOTTOM DUMP VALVES” to “BOTTOMS DUMP VALVES” throughout procedure.</td>
</tr>
<tr>
<td>R-17</td>
<td>08/15/2018</td>
<td>Operations request</td>
<td>Modified Step 5.3.38 to give flexibility to go to multiple sections from there. Updated Records Section.</td>
</tr>
<tr>
<td>R-16</td>
<td>05/03/2018</td>
<td>Operations request</td>
<td>Page 17 - Step 5.2.14 changed from &quot;0.5&quot; to &quot;0.8&quot; inches HG.</td>
</tr>
<tr>
<td>R-15</td>
<td>03/15/2018</td>
<td>Operations request</td>
<td>Added: New NOTE after sub-section 5.2.11. Added a new sub-section 5.2.11. Added a new sub-section 5.2.16.</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

To provide instructions for placing the 242-A Evaporator to one of three following states:

- Recirculation with vacuum
- Recirculation without vacuum
- Empty Pot (pot emptied via volume reduction, controlled dump, automatic dump, or by slurrying out).

1.2 Scope

1.2.1 This procedure applies to:
- 242-A Evaporator, its systems, and components.
2.0 INFORMATION

2.1 General Information

2.1.1 During a loss of vacuum or sudden change, it is not uncommon for the WFI or SpG instruments to go out of range. When vacuum is restored, readings are typically regained.

2.1.2 When Evaporator recirculation pump PB-1 shuts down, an 8-minute timer starts; when this timer times out, Interlock #2 will automatically initiate a 60-second Evaporator Flush, followed by an automatic Pot Dump to AW-102. (The Pot Dump is indicated to have started when FQI-RW-1 BOTTOMS FLUSH TOTALIZR reading stops increasing). To prevent Interlock #2 activation and automatic Pot Dump, PB1-BYPAS PB-1 SHUT DOWN BYPASS must be activated and BOT-DUMP BOTTOMS DUMP VALVES must be placed to BLOCK position within 8 minutes of Pump PB-1 shutdown.

2.1.3 General Function 43, performed on one of the operating Consoles, inhibits alarms for EPNs shown on faceplate 90, 91, and 92. General function 43 must be followed by General Function 14, performed on one of the operating consoles, to reset the alarm system and regenerate the lists of active alarms. For a list of all EPNs inhibited by general function 43, see Faceplates 90, 91, and 92 on the MCS system.

2.1.4 PIC-CA1-7 cannot read vacuum greater than 200 torr, therefore PI-CA1-11 is used for measuring vacuum in inches Hg.

2.1.5 Dumping pot contents to AW-102 without cooling may result in a violation of Tank Farm’s bulk temperature change with respect of time of 10 °F/hr per the OSD-T-151-00007 operating specification.
2.1 General Information (Cont.)

2.1.6 There are three modes of operation for the 242-A Evaporator.

(HNF-15279, Sect. 1.6)

- OPERATION MODE defined as having waste in the C-A-1 vessel, but the 242-A Evaporator is not in LIMITED WASTE MODE.
- LIMITED WASTE MODE defined as follows:
  - Feed valve HV-CA1-1 is OPEN
  - Feed pump 241-AW-P-102-1 breaker is OPEN
  - Steam to the E-A-1 reboiler is isolated
  - Recirculation pump P-B-1 breaker is OPEN
  - Only when dump valves HV-CA1-7 and/or HV-CA1-9 cannot be opened to EMPTY the C-A-1 vessel. The LIMITED WASTE MODE is an off-normal condition that results in approximately 2,700 gallons of residual waste remaining in the C-A-1 vessel.
- SHUTDOWN MODE defined as follows:
The 242-A Evaporator C-A-1 vessel is empty of waste. Empty is the condition when dump valves HV-CA1-7 and HV-CA1-9 have been opened and as much waste as possible has been allowed to drain. Residual waste may remain on some surfaces. After draining, the dump valves may be closed. The C-A-1 vessel is allowed to contain water, antifoaming agents, process condensate, inhibited water (e.g., water treated with hydroxide and/or nitrite used for corrosion control), etc., which may be added to support maintenance, testing, or startup activities.

2.1.7 Equipment call outs in this procedure reference MCS tags and may not exactly match P&ID/Smart Plant Foundation EINs. For this procedure, dashes and spaces are considered non-essential for Equipment Call Outs.

2.1.8 IF any of the following analog signal alarms occur during the performance of this procedure, NOTIFY Shift Manager AND REQUEST Shift Manager evaluation of the situation to determine if maintenance and/or a change in the process is required.

<table>
<thead>
<tr>
<th>ALARM</th>
<th>CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNTR</td>
<td>Pulse in counter error</td>
</tr>
<tr>
<td>TMR</td>
<td>Pulse in timer error</td>
</tr>
<tr>
<td>UNDR</td>
<td>Input signal under range</td>
</tr>
<tr>
<td>IBAD</td>
<td>Input error</td>
</tr>
<tr>
<td>OCD</td>
<td>Open circuit detection</td>
</tr>
<tr>
<td>OVER</td>
<td>Input over range</td>
</tr>
<tr>
<td>OBAD</td>
<td>Error in sending output value to MUX</td>
</tr>
</tbody>
</table>
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 When working on or around steam lines, wear long sleeve shirt or coverall, made of natural fibers and gloves, leather or equivalent.

3.1.2 Per DOE-0359, an Electrical Risk Assessment (ERA) is not required for DC circuits; single-phase circuits; or three phase circuits rated less than 240 volts and supplied by transformers (or equivalent), or generator, rated at less than 125 kVA. The electrical components used in this procedure have been evaluated and fall within this exception.

3.1.3 Follow facility postings for hearing protection. If entrance to the condenser room with the condensers running is required, ensure wearing ear plugs or ear muffs.
3.2 Radiation and Contamination Control

3.2.1 When this procedure is worked in radiological areas, an approved radiological work permit (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 Environmental Compliance

3.3.1 Immediately report any spills and/or releases to the appropriate Shift Office and Environmental per TF-REC-001. This includes discovery of spilled or leaked waste to secondary containment.
3.4 Limits

HNF-15279, Technical Safety Requirements for the 242-A Evaporator

LCO 3.1 C-A-1 Vessel Flammable Gas Control System.
LCO 3.2 C-A-1 Vessel Waste High Level Control System.
LCO 3.3 C-A-1 Vessel Seismic Dump System.

Operating Specification Document


1.3.1, 1.3.2 Primary Tank Vapor Space and Annulus Pressure.
1.3.3 Solution and Concrete Temperatures.


12.2.3 PB-1 Recirculation Pump Characteristics.
   Maximum Current: 260 Amps
   Min/Max Seal Water Pressure: 35/90 psig
   Min/Max Seal Water Flowrate: 0.25/3.0 gpm

12.2.4 PB-2 Slurry Pump Characteristics
   Maximum Current: 224 Amps
   Min/Max Seal Water Pressure: 60/75 psig
   Min Seal Water Flowrate: 0.94 gpm
   Max Discharge Pressure: 92 psig

DANGEROUS WASTE REGULATIONS OF THE WASHINGTON ADMINISTRATIVE CODE

WAC 173-303-380 Facility Record Keeping.
WAC 173-303-640 (4) (c) (iv)
4.0 PREREQUISITES

4.1 Special Tools and Equipment
   - Thermal Gun.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- TF-AOP-EVAP-009, Response to Process Upset
- TO-600-030, Start Up 242-A Evaporator System
- TO-600-055, Start Up and Shut Down Evaporator 10 Lb Steam System
- TO-600-056, Start Up and Shut Down Evaporator 90 Lb Steam System
- TO-600-123, Startup and Shutdown E-C-1, E-C-2, and E-C-3 Condensers
- TO-600-210, Operate PB-1 and PB-2 Seal Water Filter System
- TO-600-530, Inhibit MCS Alarms at the 242-Evaporator
- TO-620-200, Vessel Vent Ammonia Monitor
- TO-640-020, Operate 242-A Process Condensate System
- TO-640-140, Operation of LERF Encasement Line Purge Air
- TO-650-095, Rinse and Jet 242-A Pump Room Sump
- TO-650-140, Flush 242-A Evaporator Vessel, Recirculation Loop and De-Entrainer Pads
- TO-660-141, Inject Anti-Foam Chemicals into the 242-A Vapor/Liquid Separator C-A-1
- TO-660-150, Weight Factor Dip Tube Flush
- TF-OR-OSR-01, 242 A Evaporator Environmental Verification Surveillance
- TF-OPS-OPER-C-22, Control and Use of Administrative Locks
- TF-REC-01, Response to Environmental Condition.
4.3 **Field Preparation**

4.3.1 **NOTIFY** Johnson Controls, Inc. as early as possible prior to shutting down the steam systems.

4.3.2 **NOTIFY** Export Water Services as early as possible prior to shutting down the water systems.

4.3.3 **NOTIFY** Effluent Treatment Facility (ETF) as early as possible the used Raw Water System is being shutdown.
5.0 PROCEDURE

NOTE - Process upset condition can occur when one or more process-related abnormal conditions or failures, such as loss of vacuum, seal water supply, feed, slurry, etc.

Special Instructions

- Sections 5.1 through 5.7 in this procedure may be performed in parallel or in any logical order at the discretion of Shift Manager to ensure facility safety and stability.
- Section 5.1 will need to be performed prior to performing Section 5.2.
- Shift Manager may direct process condensate system to be shut down per TO-640-020 at any time during the performance of Section 5.1.
- Shift Manager may direct PB-1 pump to be shut down at any time during the performance of Section 5.1 through 5.7.
- Shift Manager may direct PB-2 pump to be shut down at any time during the performance of Section 5.1.

5.1 Recirculation with Vacuum

5.1.1 AS directed by the Shift Manager, PLACE HC1-INLK1 (G20/10, F10) VESSEL VENT HEATER INTERLOCK BYPASS to Bypass.

5.1.2 IF PB-1 shuts down while performing this section, PERFORM the following:

5.1.2.1 IMMEDIATELY RE-START PB-1 (G12/6, F5) RECIRC PUMP by placing PB-1 to ON.

a. CHECK II-PB1-1 (G12, F5) PB-1 RECIRC PUMP CURRENT reads 140 to 240 amps after 5 seconds.

b. IF II-PB1-1 does not read 140 to 240 amps after 5 seconds, SHUT DOWN PB-1 AND

SET PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.

5.1.2.2 IF PB-1 does not re-start, IMMEDIATELY PLACE PB1-BYPAS in BYP ON status AND

IF directed by shift manager, GO TO TF-AOP-EVAP-009, Process Upset.
5.1 Recirculation with Vacuum (Cont.)

5.1.3 AS reboiler steam is lowered, **MONITOR** LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR or LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.

5.1.4 **SET** FIC-EA1-1 (G13/8, F12) REBOILER STEAM FLOW to MANUAL AND **GRADUALLY REDUCE** output to 0%.

5.1.5 **SET** FV-EA1-1 to OFF.

5.1.6 **ENSURE** FV-EA1-1 (G13/10, F3) REBOILER STEAM FLOW VALVE status is STM OFF.

5.1.7 **ENSURE** HV-EA1-4 (G14/1) STEAM CONDENSATE BLOCK VALVE closes approximately 5 minutes after FV-EA1-1 (G13/10, F3) REBOILER STEAM FLOW VALVE status changes to “STM OFF”.

5.1.8 **CLOSE** valve H-30.

5.1.9 **IF** PI-EA1-1 (G13, F12) REBOILER STEAM INLET PRESSURE value does not read 25 to 35 psia, **NOTIFY** Shift Manager.

5.1.10 **UNTIL** condensate flow stops, **MONITOR** FI-EC1-2 (G16, F14 or Current Trend 16) E-C-1 CONDENSER PC FLOW.

5.1.11 **IF** Evaporator volume per LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR or LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR is not 23,500 to 25,000 gallons, **NOTIFY** Shift Manager.

5.1.12 **IF** directed by Process Memo or Shift Manager, **SHUT DOWN** feed pump as follows:

5.1.12.1 **SET** P-AW-102 (G301/7) to OFF status.

5.1.12.2 **IF** HV-CA1-1 (G301/8, F0) EVAP FEED VALVE has not CLOSED, **SET** HV-CA1-1 to CLOSED status.

5.1.12.3 **SET** FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW to MANUAL and 0% output.
5.1 Recirculation with Vacuum (Cont.)

5.1.13 **IF** PB-2 is operating, **SET** PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to OFF status, as instructed by Shift Manager.

5.1.13.1 **CHECK** II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT value goes to less than 4.0 amps.

5.1.13.2 **IF** II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT does not decrease to less than 4.0 amps, **NOTIFY** Shift Manager.

5.1.14 **ENSURE** HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES are in MANUAL and BLOCK status.

**Flush Slurry Line to Current Slurry Receiver Tank**

**NOTE** - Steps 5.1.15 through 5.1.21 may be performed at Shift Manager’s discretion.

5.1.15 **RECORD** initial FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) reading in gallons on Data Sheet 1.

5.1.16 **IDENTIFY** minimum slurry line flush volumes of applicable Slurry Receiver Tank/Tank Farms from table below.

<table>
<thead>
<tr>
<th>Tank Farm</th>
<th>Volume (gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>241-AN</td>
<td>575</td>
</tr>
<tr>
<td>241-AW</td>
<td>200</td>
</tr>
<tr>
<td>241-AP</td>
<td>500</td>
</tr>
</tbody>
</table>

5.1.17 **ADD** minimum slurry line flush volume from Step 5.1.16 to FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) initial value from Step 5.1.15 to obtain FQI-RW-1 desired end reading **AND**

**RECORD** the desired final minimum on Data Sheet 1.

5.1.18 **START** slurry line flush as follows:

5.1.18.1 **SET** HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL and FARM FLUSH position.
5.1 Recirculation with Vacuum (Cont.)

5.1.19 **AFTER** FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) indicates at least minimum flush volume for slurry receiver tank in use as determined in Step 5.1.17, **SET** HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to BLOCK AND **RECORD** ending FQI-RW-1 reading on Data Sheet 1.

5.1.20 **CHECK** that FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) is NOT increasing.

5.1.20.1 **IF** FQI-RW-1 totalizer value is continuing to increase, **NOTIFY** Shift Manager.

5.1.21 **IF** directed by Shift Manager, **PERFORM** the following to shut down de-entrainer sprays:

5.1.21.1 **SET** HV-PDSPRY (G10/4, F3) DE-ENTRN PADSPRAY VALVES to OFF.

5.1.21.2 **SET** FIC-CA1-6 (G10/5, F3) UPPER DE-ENTRN SPRAY FLOW to MANUAL and 100% output.

5.1.21.3 **IF** Evaporator will be shut down for longer than 7 days, **REQUEST** Backside Operator CLOSE FV-CA1-6 Isolation Valve 5-97.

5.1.22 **IF** Evaporator will be shut down for longer than 7 days, **REQUEST** Backside Operator slowly close Valve H-16.

5.1.23 **IF** directed by Shift Manager, **SHUTDOWN** Chemical Injection Pump P-E-102 by one of the following methods:

5.1.23.1 **PRESS** the local P-E-102 STOP button HS-E102-2 (located on the TK-E-102 instrument Panel), to shutdown the Chemical Injection Pump (TO-660-141).

**OR**

**SET** P-E-102 (G19/7, F35) ANTIFOAM TANK PUMP to CF-OFF status.
5.1 Recirculation with Vacuum (Cont.)

5.1.24 IF requested by Shift Manager, **SWITCH** seal water source from PC to FRW per TO-600-210 **AND**

**RECORD** status on Data Sheet 1.

5.1.25 **NOTIFY** Shift Manager Evaporator is in recirculation mode with vacuum **AND**

**RECORD** time of notification on Data Sheet 1.

5.1.26 **IF** Evaporator is to be restarted from this point, **GO TO** TO-600-030.

5.1.27 **IF** recirculation without vacuum is desired, **GO TO** Section 5.2.
5.2 Recirculation without Vacuum

NOTE - Shift Manager may direct process condensate system to be shut down per TO-640-020 at any time during the performance of this section.

5.2.1 ENSURE applicable steps of Section 5.1 (secure reboiler steam flow, feed pump P-AW-102 and slurry pump PB-2) are complete.

NOTE - Cooling down the contents of C-A-1 vessel will be accomplished by allowing the pot contents to boil while recirculating under vacuum with no steam supplied to the reboiler.

- Cooling down the contents of C-A-1 vessel is not required if emptying the pot by slurrying out per section 5.3.

5.2.2 IF Shift Manager has requested the contents of the C-A-1 vessel to be cooled down prior to a controlled or automatic dump, PERFORM the following:

5.2.2.1 SET PIC-CA1-7 (G16/10, F14) EVAP ABSOLUTE PRESSURE to AUTO with a setpoint of 25-30 torr.

5.2.2.2 MONITOR TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP as pot boils and cools.

5.2.2.3 WHEN TI-CA1-6 reads within the range of 105 to 115 °F or a temperature specified by Process Memo, CONTINUE on with this Section to remove vacuum from C-A-1 vessel.

NOTE - When vacuum is removed from the Evaporator vessel, high vessel pressure alarms will occur.

- When PT-CA1-7 reaches 170 torr, interlock 56 will open valve HV-CA1-20 (G400) and provide purge air to C-A-1 vessel.

- Reducing Evaporator vacuum too rapidly may cause an erratic vessel level reading(s) that may result in PB-1 shutdown due to low indicated level.

- Air bleed-in valve PV-CA1-7 will be 100% OPEN when PIC-CA1-7 OUTPUT is 0%.

5.2.3 SET PIC-CA1-7 (G16/10, F14) EVAP ABSOLUTE PRESSURE to MANUAL and 40% output.
5.2 Recirculation without Vacuum (Cont.)

NOTE - Interlock S2 trips on the following conditions: 1.) vessel absolute pressure is greater than 190 torr and vessel purge air flow is less than 3.1 SCFM for 30 minutes, or 2.) Temperature downstream of E-A-1 Reboiler reaches \( \geq 157 \) °F for greater than 5 seconds. (Graphic 13, TI-EA1-1 and/or TI-EA1-1S).

5.2.4 **WHEN** C-A-1 vessel absolute pressure reaches 170 torr, **CHECK** vessel purge air flow on FI-CA1-20 (G400).

5.2.4.1 **IF** FI-CA1-20 (G400) is not reading 4.5 to 6 scfm, **MANUALLY ADJUST** FC-CA1-20 (located in the condenser room 5th floor, South End of East Wall, top row of the instrument rack) to 4.5 to 6 scfm (read on FI-CA1-20).

5.2.5 **MONITOR** PI-CA1-11 (current trend 15) EVAP VACUUM 0-30 IN HG until Evaporator vacuum has stabilized.

5.2.6 **WHEN** PIC-CA1-7 (G16/10, F14) EVAP ABSOLUTE PRESSURE stabilizes and any boil off that may have occurred has stopped, **SET** PB-1 ILK:15 BYPASS to BYPASS status as follows:

5.2.6.1 **SELECT** PB-1 pump graphic (G12/6).

5.2.6.2 **SELECT** diamond in lower left corner.

5.2.6.3 **SELECT** Software ILK:15: LI-CA1-1 and LI-CA1-2 bypass box.

5.2.7 **IF** PB-1 shuts down while performing this section, **PERFORM** the following:

5.2.7.1 **IMMEDIATELY RE-START** PB-1 (G12/6, F5) RECIRC PUMP by placing PB-1 to ON.

a. **CHECK** II-PB1-1 (G12, F5) PB-1 RECIRC PUMP CURRENT reads 140 to 240 amps after 5 seconds.

b. **IF** II-PB1-1does not read 140 to 240 amps after 5 seconds, **SHUT DOWN** PB-1 **AND**

**SET** PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.
5.2 Recirculation without Vacuum (Cont.)

5.2.7.2 IF PB-1 does not re-start, IMMEDIATELY PLACE PB1-BYPAS in BYP ON status AND

IF directed, GO TO TF-AOP-EVAP-009, Process Upset.

5.2.8 SET PIC-CA1-7 (G16/10, F14) EVAP ABSOLUTE PRESSURE to MANUAL and output to a value not more than 5% less than the current output to open the air bleed-in valve

OR

IF PI-CA1-11 already reads 0, SET PIC-CA1-7 (G16/10, F14) EVAP Absolute Pressure to 0% output AND

PROCEED to Step 5.2.13.

5.2.9 MONITOR PI-CA1-11 (current trend 15) EVAP VACUUM 0-30 IN HG until Evaporator vacuum has stabilized.

5.2.10 AFTER vacuum has stabilized, REPEAT Steps 5.2.8 and 5.2.9 until output value of PIC-CA1-7 (G16/10, F14) EVAP ABSOLUTE PRESSURE is 0%.

5.2.11 WAIT until PI-CA1-11 (current trend 15) EVAP VACUUM 0-30 IN HG reads less than 3.0 +/- 0.5 inches Hg.

NOTE - Once the output value of PIC-CA1-7 is 0% and PI-CA1-11 has stabilized it may necessary to slowly close valve 4-19 to further decrease EVAP VACUUM to less than 3.0 +/- 0.5 inches Hg.

5.2.12 IF directed by Shift Manager, REQUEST backside Operator to SLOWLY CLOSE Valve 4-19.

5.2.13 SET HVEC2/3-1 (G16/7, F14) VACUUM JETS STEAM VALVE to CF-CLOSD status.

5.2.14 WAIT until PI-CA1-11 (current trend 15) EVAP VACUUM 0-30 IN HG reads less than 0.8 inches Hg.

5.2.15 SET HV-EC1-1 (G16/6, F14) VACUUM BREAKER VALVE to OPEN status.

5.2.16 IF Valve 4-19 was CLOSED in step 5.2.12, OPEN Valve 4-19.
5.2 Recirculation without Vacuum (Cont.)

**Shutdown De-Entrainer Pad Sprays**

5.2.17 IF de-entrainer Pad Sprays are still operating, **PERFORM** the following to shut down de-entrainer sprays:

5.2.17.1 SET HV-PDSPRY (G10/4, F3) DE-ENTRN PADSPRAY VALVES to OFF.

5.2.17.2 SET FIC-CA1-6 (G10/5, F3) UPPER DE-ENTRN SPRAY FLOW to MANUAL and 100% output.

5.2.17.3 IF Evaporator will be shut down for longer than 7 days, **REQUEST** Backside Operator close FV-CA1-6 Isolation Valve 5-97.

5.2.18 IF directed by Shift Manager, **SHUT DOWN** process condensate system per TO-640-020.

5.2.19 IF directed by Shift Manager, **SET** PB-1 ILK 15 BYPASS to NOBYPASS.

5.2.20 **AS** directed by the Shift Manager, **PLACE** HC1-INLK1 (G20/10, F10) VESSEL VENT HEATER INTERLOCK BYPASS to NOBYPASS.

5.2.21 **NOTIFY** Shift Manager Evaporator is in recirculation mode without vacuum AND **RECORD** time of notification on Data Sheet 1.

5.2.22 IF Evaporator is to be restarted from this point, **GO TO** TO-600-030.

5.2.23 IF recirculation without vacuum is to be maintained, **FORWARD** completed Data Sheet 1 to Shift Manager.

5.2.24 IF Evaporator pot is to be emptied by slurrying out, **GO TO** Section 5.3 as directed by Shift Manager.

5.2.25 IF Evaporator pot is to be emptied by volume reduction, **GO TO** Section 5.4 as directed by Shift Manager.

5.2.26 IF Evaporator pot is to be emptied by controlled dump, **GO TO** Section 5.5 as directed by Shift Manager.

5.2.27 IF Evaporator pot is to be emptied by automatic dump, **GO TO** Section 5.6 as directed by Shift Manager.
5.3 Empty Evaporator Pot by Slurrying Out

5.3.1 **OBTAIN** Shift Managers approval to initiate slurry flow to empty evaporator pot on Data Sheet 1.

5.3.2 **NOTIFY** TMACS and Tank Farms Central Shift Manager that 242-A Evaporator will be emptied to Slurry Receiver Tank designated by Process Memo AND residual liquid will be dumped to AW-102.

5.3.3 **PREPARE** to initiate slurry flow as follows:

5.3.3.1 **REQUEST** an NCO be stationed at a TFMCS HMI, with continuous communications link between the NCO and the 242-A “At the Controls” Operator to monitor for leak detection and potential tank pressurization.

5.3.3.2 **SET** PB-2 ILK:15 Low Level Evaporator Vessel C-A-1 interlock BYPASS to BYPASS as follows:

   a. **SELECT** PB-2 pump graphic (G15/6).

   b. **SELECT** diamond in lower left corner.

   c. **SELECT** Software ILK:15: LI-CA1-1 and LI-CA1-2 bypass box.

5.3.3.3 **SET** Low Flow HS-SLF-SP (G15/18, F10) SLURRY FLOW INTERLOK SETPOINT to 42 gpm or 33 gpm per process memo.

5.3.3.4 **RECORD** FQI-CA1-4 (G15/14, F10/5) SLURRY TO FARMS TOTALIZER (X10) reading on Data Sheet 1.
5.3 Empty Evaporator Pot by Slurrying Out (Cont.)

NOTE - When shutting down PB-1, level indicator LI-CA1-3 may temporarily read erratically.

5.3.4 SET PB-1 (G12/6, F5) RECIRC PUMP to OFF status.

5.3.5 SET PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.

5.3.6 ENSURE BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES are in MANUAL and status is BLOCK.

5.3.7 SET HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL and SL OUT status.

5.3.8 CHECK that FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) is not increasing.

5.3.9 IF FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) totalizer value continues to increase SET HV-CA1-2 (G15/11, G47/0, F9) SLURRY FLUSH VALVES is in MANUAL and BLOCK status AND

NOTIFY Shift Manager.

5.3.10 IF Gravity Slurry Flow is designated by Process Memo, GO TO Step 5.3.24.

5.3.11 SET SIC-PB2-1 (G15/15, F10) SLURRY PUMP SPEED CONTROLR MANUAL and to 0% output.

NOTE - SIC-PB2-1 will require several seconds for the change from MANUAL to AUTO modes to take effect.

5.3.11.1 SET SIC-PB2-1 to AUTO mode.

5.3.11.2 IF SIC-PB2-1 shows an OPEN Cascade (a white "O"), SET CASC to close the Cascade (a green "C").

5.3.12 ENSURE FIC-CA1-4 (G15/14, F10) EVAP SLURRY FLOW is in AUTO mode.

5.3.13 SET FIC-CA1-4 SETPOINT to 0.

5.3.14 CHECK graphic #46 for active PB-2 interlocks listed on Table 1 AND

IF any are active, ATTEMPT to clear them (See Table 1).
5.3 Empty Evaporator Pot by Slurrying Out (Cont.)

5.3.15 **MONITOR** II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT reads less than 150 amps after 5 seconds once the pump has been started.

5.3.16 **SET** PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to ON.

5.3.17 **CHECK** II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT AND **RECORD** on Data Sheet 1.

5.3.18 **IF** II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT reads 150 amps or greater after 5 seconds, **SET** PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to OFF.

5.3.18.1 **SET** HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL mode and BLOCK position.

5.3.18.2 **NOTIFY** Shift Manager that Pump PB-2 requires maintenance troubleshooting.

5.3.19 **AFTER** Pump PB-2 is operating normally, **SET** FIC-CA1-4 (G15/14, F10) EVAP SLURRY FLOW to a value greater than the selected Low Flow Interlock setpoint as specified in Process Memo.

5.3.20 **MONITOR** PI-CA1-8 (G15, F10) PB-2 SLURRY OUTLET PRESSURE.

5.3.21 **IF** PI-CA1-8 (G15, F10) PB-2 SLURRY OUTLET PRESSURE reading cannot be maintained less than 87 psig, **SET** PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to OFF:

5.3.21.1 **SET** HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL and BLOCK status.

5.3.21.2 **NOTIFY** Shift Manager of potential Slurry Line blockage.

5.3.22 **AS** Evaporator drains, **MONITOR** WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD.
5.3 Empty Evaporator Pot by Slurrying Out (Cont.)

NOTE - The PB-2 slurry pump should be shut down when WFI-CA1-3 reads 180 to 200 inches to prevent pump cavitation created by insufficient pump suction head.

5.3.23 IF slurrying out with PB-2 in operation and WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reads < 200 inches, SET PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to OFF status.

5.3.23.1 CHECK II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT value goes to less than 4 amps.

5.3.23.2 IF II-PB2-1 (G15, F9) SLURRY PUMP CURRENT does not go to less than 4.0 amps, NOTIFY Shift Manager.

5.3.24 IF further slurrying out is requested by Shift Manager/Engineering or slurrying out by gravity, PERFORM slurry out until WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reads 25 (0 to 50) or level specified by Shift Manager.

5.3.25 IF directed by Shift Manager, SET PB-2 ILK 15 Low Level Evaporator Vessel C-A-1 interlock BYPASS to NOBYPASS.

5.3.26 SET HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL and to BLOCK status.

5.3.27 RECORD FQI-CA1-4 (G15, F10) SLURRY TO FARMS TOTALIZER (X10) ending reading on Data Sheet 1.

5.3.28 CHECK FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) is not increasing.

5.3.28.1 IF FQI-RW-1 totalizer value is increasing, NOTIFY Shift Manager.
5.3 Empty Evaporator Pot by Slurrying Out (Cont.)

Flush Slurry Line

5.3.29 RECORD initial FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) reading in gallons on Data Sheet 1.

5.3.30 IDENTIFY minimum Slurry Line flush volumes of applicable Slurry Receiver Tank/Tank Farms from table below.

<table>
<thead>
<tr>
<th>Tank Farm</th>
<th>Volume (gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>241-AW</td>
<td>200</td>
</tr>
<tr>
<td>241-AP</td>
<td>500</td>
</tr>
<tr>
<td>241-AN</td>
<td>575</td>
</tr>
</tbody>
</table>

5.3.31 ADD minimum slurry line flush volume from Step 5.3.30 to FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) initial value from Step 5.3.29 to obtain FQI-RW-1 desired end reading AND RECORD the desired final minimum on Data Sheet 1.

5.3.32 START slurry line flush as follows:

5.3.32.1 SET HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL and FARM FLUSH position.

5.3.33 MONITOR FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR reading during slurry line flush.

5.3.34 AFTER FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) indicates at least minimum target flush volume for slurry receiver tank in use as recorded in Step 5.3.31, SET HV-CA1-2 (G15/11, F9) SLURRY FLUSH VALVES to MANUAL and to BLOCK status AND RECORD ending FQI-RW-1 reading on Data Sheet 1.

5.3.35 RECORD AW-102 Level and Slurry Receiver Tank Level on Data Sheet 1.
5.3 Empty Evaporator Pot by Slurrying Out (Cont.)

5.3.36 **CHECK** that FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) is NOT increasing.

5.3.36.1 **IF** FQI-RW-1 totalizer value is continuing to increase, **NOTIFY** Shift Manager.

5.3.37 **PLACE** PB-2 pump seal water in short term shutdown per TO-600-210.

5.3.38 **GO TO** the following Sections at the Shift Managers discretion:
- Section 5.4
- Section 5.5
- Section 5.6.
5.4 Reduce Evaporator Volume

NOTE - Section 5.4 may be performed at any time as directed by Shift Manager to reduce the volume in the C-A-1 vessel by draining to AW-102.

5.4.1 ENSURE feed pump P-AW-102 (G301/7, F0) FEED PUMP is set to OFF.

5.4.2 ENSURE that HV-CA1-1 (G301/8, F0) EVAP FEED VALVE status is CLOSED.

Drain to 241-AW-02E Feed Pit

5.4.3 CONFIRM position of the following valve located in the 241-AW-02E feed pit: (TSR-006, AC 5.8.3)

<table>
<thead>
<tr>
<th>VALVE NUMBER</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>AW02E-WT-V-107</td>
<td>OPEN from PUMP to 3” SN-269 TO BLDG 242-A AND SN-272 TO PUMP PIT 02A</td>
</tr>
</tbody>
</table>

5.4.4 SET HV-CA1-1 (G301/8, F0) EVAP FEED VALVE status to OPEN.

5.4.5 AFTER target level is reached per Shift Manager, CLOSE HV-CA1-1.

5.4.6 RETURN to applicable section of this procedure by direction of Shift Manager.
5.5 Shutdown by Controlled Dump

Perform Pot Dump Prerequisites

NOTE - The idea of a “Controlled Dump” is to release the contents of CA1 vessel to tank AW-102 in a controlled fashion so that tank AW-102 ventilation is not overwhelmed by the incoming waste, causing a pressurization to occur in tank AW-102. By monitoring tank AW-102 pressure and closing the dump valves before vacuum is less than -1.1 in. WG or ensuring KY-102-3 activates if vacuum decreases below -1.0 in. WG, automatically closing the dump valves, is utilizing a controlled dump.

5.5.1 PERFORM the following prerequisites:

5.5.1.1 OBTAIN Shift Manager approval to empty Evaporator pot by a controlled dump AND

RECORD approval on Data Sheet 1.

5.5.1.2 IF not in recirculation without vacuum PERFORM section 5.2 then return to step 5.5.1.3.

5.5.1.3 NOTIFY TMACS, Central Shift Manager and all personnel at AW Tank Farm of impending Evaporator dump to AW-102.

5.5.1.4 IF emptying the C-A-1 without cooling, NOTIFY the Central Shift Manager AND


NOTE - Monitoring AW-102 pressures on the Tank Farm Monitoring and Control System (TFMCS) is the most accurate indication of tank pressures.

5.5.1.5 REQUEST an NCO be stationed at a TFMCS HMI AND

ESTABLISH a continuous communications link between the NCO and the 242-A “At the Controls” Operator. (OSD-T-151-00007).

5.5.1.6 ENSURE DUMP-INLK (G301/12, F1) AW-102 PRESSURE INTERLOK BYPASS is in NOBYPASS status.

5.5.1.7 ENSURE KY-102-3 (G301/11, F1) AW-102 PRESSURE CLEAR TIME is in Auto set to SETPOINT and “5”.
5.5 Shutdown by Controlled Dump (Cont.)

NOTE - When shutting down PB-1, level indicator LI-CA1-3 may temporarily read erratically.

5.5.2 IF pump PB-1 is running, SET PB-1 (G12/6, F5) RECIRC PUMP to OFF status.

NOTE - When PB1-BYPAS is in BYP OFF status, an Evaporator dump cannot be stopped from the MCS console. PB1-BYPAS must be placed in BYP ON status before the bottoms dump valves can be manually placed in BLOCK position.

5.5.3 SET PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.
5.5 Shutdown by Controlled Dump (Cont.)

Start Controlled Dump

5.5.4 SET BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES to DUMP status AND

RECORD time Evaporator dump begins on Data Sheet 1.

5.5.5 AS vessel drains, MONITOR WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD and PDI-220 (G301, F0 or current trend #0) AW-102 FEED TANK PRESSURE.

NOTE - While performing a controlled dump, re-opening of dump valves may be necessary after each AW-102 pressurization time-out.

5.5.6 IF PDI-220 (G301, F0 or current trend #0) AW-102 FEED TANK PRESSURE nears -1.1 in. WG, ATTEMPT to set BOTTOMS DUMP VALVES (G12/14, F8) to BLOCK status before KY-102-3 (G301/11, F1) AW-102 PRESSURE CLEAR TIME interlock activates.

5.5.6.1 WHEN PDI-220 stabilizes, SET BOT-DUMP to DUMP status to resume the Evaporator dump.

5.5.7 IF AW-102 tank pressure on the TFMCS HMI or PDI-220 (G301, F0 or current trend #0) AW-102 FEED TANK PRESSURE reads less than -1.0 in. WG during Evaporator dump, ENSURE BOTTOMS DUMP VALVES (G12/14, F8) have gone to BLOCK status.

5.5.7.1 AFTER the KY-102-3 (G301/11, F1) AW-102 PRESSURE CLEAR TIME times out and AW-102 vacuum stabilizes greater than -1.1 in. WG, SET BOT-DUMP to DUMP status to resume the Evaporator dump.

5.5.8 REPEAT Steps 5.5.6 through Step 5.5.7.1 until WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reads less than 6 inches.

5.5.9 AFTER WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reads less than 6 inches, OPEN HV-CA1-1.

5.5.10 AFTER 20 minutes, ENSURE PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.

5.5.11 ENSURE BOTTOMS DUMP VALVES (G12/14, F8) are in BLOCK position to end the pot dump.

5.5.12 CLOSE HV-CA1-1.
5.5 Shutdown by Controlled Dump (Cont.)

5.5.13 CHECK FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR WIDE is not increasing.

5.5.13.1 IF FQI-RW-1 is increasing, NOTIFY Shift Manager.

5.5.14 RECORD status of the following on Data Sheet 1.
- Time Evaporator Pot Dump Completed
- AW-102 Level
- FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR WIDE
- Slurry Receiver Tank Level (N/A for cold runs).

5.5.15 NOTIFY TMACS and Central Shift Manager 242-A Evaporator dump is complete.

NOTE - Waste in the C-A-1 vessel without being in OPERATION MODE will result in a TSR violation.
(Critical Step)

5.5.16 PRIOR to entering SHUTDOWN MODE, VERIFY C-A-1 vessel is empty of waste. (LCO 3.1, 3.2, 3.3)

_________________________ / ________________/ __________________________
Signature Print (First & Last) Date
Shift Manager /OE

5.5.17 DIRECT Shift Manager to document in 242-A Shift Manager log book that SHUTDOWN MODE has been declared. (LCO 3.1, 3.2, 3.3).

5.5.18 STOP trend monitoring in TF-OR-A-04.

5.5.19 IF the 241-AW-P-102-1 Pump administrative lock is installed, PERFORM the following:

5.5.19.1 NOTIFY Central Shift Manager.

5.5.20 IF directed by Shift Manager, GO TO Section 5.7.
5.6 Shutdown by Automatic Dump

Perform Pot Dump Prerequisites

5.6.1 PERFORM the following prerequisites:

5.6.1.1 OBTAIN Shift Manager approval to empty Evaporator pot by an automatic dump AND

RECORD approval on Data Sheet 1.

5.6.1.2 IF not in recirculation without vacuum PERFORM section 5.2 then return to step 5.6.1.3.

5.6.1.3 NOTIFY TMACS, Central Shift Manager and all personnel at AW Tank Farm of impending Evaporator dump to AW-102.

5.6.1.4 IF emptying the C-A-1 without cooling, NOTIFY Central Shift Manager AND


NOTE - Monitoring AW-102 pressures on the Tank Farm Monitoring and Control System (TFMCS) is the most accurate indication of tank pressures.

5.6.1.5 REQUEST an NCO be stationed at a TFMCS HMI AND

ESTABLISH a continuous communications link between the NCO and the 242-A “At the Controls” Operator. (OSD-T-151-00007).

5.6.1.6 ENSURE DUMP-INLK (G301/12, F1) AW-102 PRESSURE INTERLOK BYPASS is in NOBYPASS status.

5.6.1.7 ENSURE KY-102-3 (G301/11, F1) AW-102 PRESSURE CLEAR TIME is set in Auto to SETPOINT of “5”.
5.6 Shutdown by Automatic Dump (Cont.)

5.6.2 **MONITOR** AW-102 tank pressure on PDI-220 (G301, F0 or current trend #0) AW-102 FEED TANK PRESSURE during the Evaporator dump. (OSD-T-151-00007).

**Start Automatic Dump**

**NOTE** - When shutting down PB-1, level indicator LI-CA1-3 may temporarily read erratically.

5.6.3 **IF** pump PB-1 is running, **SET** PB-1 (G12/6, F5) RECIRC PUMP to OFF status.

5.6.3.1 **SET** PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.

**NOTE** - During an Evaporator automatic mode dump with PB1-BYPAS PB-1 SHUT DOWN BYPASS in BYP OFF status, the bottoms dump valves will automatically go to the BLOCK position if pressure in AW-102 decreases to less than -1.0 in. WG. When AW-102 pressure recovers to greater than -1.1 in. WG, a timer will start. When this timer times out (a minimum of 5 minutes), the bottoms dump valves will automatically reopen to the DUMP position.

- When PB1-BYPAS is in BYP OFF status, an Evaporator dump cannot be stopped from the MCS console. PB1-BYPAS must be placed in BYP ON status before the bottoms dump valves can be manually placed in BLOCK position.

- When PB1-BYPAS is placed in BYP OFF, BOT-DUMP goes to POT FLSH status for 60 seconds then automatically goes to BOT DUMP status.

5.6.4 **SET** PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP OFF status.

5.6.5 **AFTER** 60 seconds, **CHECK** BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES status changes to DUMP.

5.6.6 **RECORD** time Evaporator dump begins on Data Sheet 1.
5.6 Shutdown by Automatic Dump (Cont.)

5.6.7 AS vessel drains, **MONITOR** WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD and PDI-220 (G301, F0 or current trend #0) AW-102 FEED TANK PRESSURE.

5.6.8 **IF** PDI-220 (G301, F0 or current trend #0) AW-102 FEED TANK PRESSURE reads less than -1.0 in. WG at any time during Evaporator dump and automated dump sequence has not stopped the dump in progress; **ENSURE** Evaporator dump is STOPPED as follows:

5.6.8.1 **SET** PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON.

5.6.8.2 **SET** BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES to BLOCK status.

5.6.8.3 **AFTER** AW-102 vacuum has stabilized at greater than -1.1 in. WG, **SET** PB1-BYPAS (G12/8, F5) to BYP OFF.

5.6.9 **IF** WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reading is not less than 6 inches, **REPEAT** Steps 5.6.8.1 through 5.6.8.3 to lower WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reading to less than 6 inches.

5.6.10 **AFTER** WFI-CA1-3 (G10, F3) EVAP CA1-3 WF NOT CORRECTD reads less than 6 inches, **SET** PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYP ON status.

5.6.11 **ENSURE** BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES are set to BLOCK position to end the pot dump.

5.6.12 **SET** BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES to DUMP status.

5.6.13 **OPEN** HV-CA1-1 (G301/8).

5.6.14 **AFTER** 20 minutes, **CLOSE** HV-CA1-1 (G301/8).

5.6.15 **SET** BOT-DUMP (G12/14, F8) BOTTOMS DUMP VALVES to BLOCK.
5.6 Shutdown by Automatic Dump (Cont.)

5.6.16 CHECK FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) is not increasing.

5.6.16.1 IF FQI-RW-1 is increasing, NOTIFY Shift Manager.

5.6.17 RECORD status of the following on Data Sheet 1.
- Time Evaporator Pot Dump Completed
- AW-102 Level
- FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE)
- Slurry Receiver Tank Level (N/A for cold runs).

5.6.18 NOTIFY TMACS and Central Shift Manager 242-A Evaporator dump is complete.

NOTE - Waste in the C-A-1 vessel without being in OPERATION MODE will result in a TSR violation.

5.6.19 PRIOR to entering SHUTDOWN MODE, VERIFY C-A-1 vessel is empty of waste. (LCO 3.1, 3.2, 3.3)

________________________ / __________________________ / __________
Signature Print (First & Last) Date
Shift Manager /OE

5.6.20 DIRECT Shift Manager to document in 242-A Shift Manager log book that SHUTDOWN MODE has been declared. (LCO 3.1, 3.2, 3.3).

5.6.21 STOP trend monitoring in TF-OR-A-04.

5.6.22 IF 241-AW-P-102-1 Pump administrative lock is installed, PERFORM the following:

5.6.22.1 NOTIFY Central Shift Manager 241-AW-P-102 Pump Administrative Lock is installed.

   a. STOP material balance.

5.6.23 IF directed by Shift Manager, GO TO Section 5.7.
5.7 Shut Down Evaporator Systems

5.7.1 IF campaign is complete and/or directed by Shift manager, **PERFORM** the following:

5.7.1.1 IF directed by Shift Manager, **PERFORM** C-A-1 Vessel deep flush per TO-650-140, Flush Vessel and Recirculation Loop and return to this procedure.

5.7.1.2 IF directed by Shift Manager, **PERFORM** dip tube flush per TO-660-150, Weight Factor Dip Tube Flush and return to this procedure.

5.7.2 IF directed by Process Memo

OR

5.7.3 **PERFORM** shutdown of the condenser cooling water system per TO-600-123 and return to this procedure.

5.7.4 **ENSURE** HV-CA1-10 (G12/15, F6) SEAL WATER VALVE is positioned to CF-FRW position.

5.7.5 **ENSURE** P-C-106 (G18/10, F27) CONDSATE RECYCLE PUMP is set to MANUAL and CF-OFF position.

**NOTE** - Waiting at least 10 minutes will allow for flush of the sock filters with filtered raw water.

5.7.6 **WAIT** at least 10 minutes before proceeding.

5.7.7 IF P-C-105 (G12/12, F6) SEAL WATER PUMP and/or P-C-105A (G12/13, F6) SEAL WATER PUMP are running, **SHUT DOWN** as follows:

5.7.7.1 **SET** P-C-105A to MANUAL and CF-OFF status.

5.7.7.2 **SET** P-C-105 to MANUAL and CF-OFF status.
5.7 Shut Down Evaporator Systems (Cont.)

5.7.8 SHUT DOWN RC-1 steam condensate sampling system as follows:

5.7.8.1 OPEN valve RC1-34.

5.7.8.2 CLOSE valve RC1-29.

5.7.8.3 CLOSE valve RC1-22.

5.7.8.4 SET RC1-SAMP (G14/8, F30) STEAM CONDENSATE SAMPLER SYSTEM to CF-OFF status.

5.7.9 REQUEST Backside Operator ensure the following valves are positioned as indicated.

<table>
<thead>
<tr>
<th>Valve #</th>
<th>Valve Description</th>
<th>Location</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-40</td>
<td>Raw Water to Dump Line</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>5-45A</td>
<td>PB-1 Seal Water</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>5-43</td>
<td>PB-2 Seal Water</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>5-47</td>
<td>RW to Slurry Flush and Dump Lines</td>
<td>Condenser Room 5th Level</td>
<td>CLOSED</td>
</tr>
<tr>
<td>5-49</td>
<td>FQT-RW-1 Isolation</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>5-50</td>
<td>FQT-RW-1 Bypass</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>5-52</td>
<td>FQT-RW-1 Isolation</td>
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<td>CLOSED</td>
</tr>
<tr>
<td>5-59</td>
<td>RW to Slurry Flush and Dump Lines</td>
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<td>CLOSED</td>
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<tr>
<td>5-60</td>
<td>RW to Evaporator Dump Lines and Slurry Flush Lines</td>
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<td>CLOSED</td>
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<tr>
<td>5-97</td>
<td>FV-CA1-6 Isolation Valve</td>
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<td>4-19</td>
<td>Steam Jet Isolation</td>
<td>Condenser Room 4th Level</td>
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<td>4-50A</td>
<td>BFP-CA1-1 Outlet Isolation Valve</td>
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<td>CLOSED</td>
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<tr>
<td>4-99A</td>
<td>NH3 Monitor Isolation Valve</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>2-6</td>
<td>FI-RC1-3 Isolation Valve</td>
<td>Condenser Room 2nd Level</td>
<td>CLOSED</td>
</tr>
<tr>
<td>2-7</td>
<td>FI-RC1-3 Isolation Valve</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>1-89</td>
<td>F-C-4 Isolation Valve</td>
<td>Condenser Room 1st Level</td>
<td>CLOSED</td>
</tr>
<tr>
<td>1-85</td>
<td>F-C-5 Isolation Valve</td>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td>H-16</td>
<td>PCV-EA1-1 Isolation Valve</td>
<td>HVAC Room</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>
5.7 Shut Down Evaporator Systems (Cont.)

NOTE - General Function 43, performed on one of the operating Consoles, inhibits alarms for EPNs shown on Faceplates 90, 91, and 92. General Function 43 must be followed by one other general function command to reset the alarm system: General Function 14, performed on one of the operating Consoles, regenerates the lists of active alarms. For a list of all EPNs inhibited by general function 43, see Faceplates 90, 91, and 92 on the MCS system.

5.7.10 **INHIBIT** shutdown alarms as follows:

NOTE - Step 5.7.10.1 takes place at one of operating Consoles.

5.7.10.1 **PRESS** GENL FCTN, “43,” and “ENTER” to inhibit the shutdown alarms.

5.7.10.2 **WAIT** until screen changes and displays “GENERAL FUNCTION 43 IS COMPLETE / RUN GENERAL FUNCTION 14”.

NOTE - Step 5.7.10.3 takes place at one of operating Consoles.

5.7.10.3 **PRESS** GENL FCTN, “14,” and “ENTER” to regenerate the alarm list.

5.7.10.4 **WAIT** until screen changes and displays “GENERAL FUNCTION 14 IS COMPLETE”.

5.7.11 **CHECK** faceplates 90, 91, and 92 to confirm all alarms are inhibited.

5.7.11.1 **IF** alarms are not inhibited, **MANUALLY** inhibit alarms per TO-600-530.
5.7 Shut Down Evaporator Systems (Cont.)

5.7.12 IF directed by Shift Manager, PLACE Ammonia Monitoring into STANDBY MODE status per TO-620-200 AND RECORD time, date and status of Ammonia Monitor on Data Sheet 1.

5.7.13 NOTIFY Shift Manager Evaporator pot is empty and Evaporator shut down is complete AND RECORD Date and Time of shutdown on Data Sheet 1.

5.7.14 IF directed by Shift Manager, PLACE administrative locks on applicable devices in accordance with the Administrative Lock Program from TFC-OPS-OPER-C-22.

5.7.14.1 NOTIFY Central Shift Manager Administrative Locks are installed.

5.7.14.2 STOP material balance.

5.7.15 STOP performance of TF-OR-OSR-01.

5.7.16 ENSURE LERF encasement line purge air has been started per TO-640-140.

5.7.17 SHUTDOWN 10 lb. and 90 lb. Steam Systems per TO-600-055 and TO-600-056.

5.7.18 IF not already performed, FLUSH anti-foam tank, pump and transfer piping with water per TO-660-141.

5.7.19 DON proper PPE for per Step 3.1.

5.7.20 ENSURE electrical components listed on Data Sheet 2 are placed in the OFF position as directed by Shift Manager.

5.7.21 CLOSE valve HV-H-29 to secure air loss through 242-A-8 trap.

5.7.22 FORWARD completed Data Sheets to Shift Manager.
5.8 Records

5.8.1 PERFORM the following for records identified within this procedure.

5.8.1.1 RECORD the number of times the record was generated in applicable column.

OR

PLACE a check mark (✓) in the N/A column.

5.8.1.2 SUBMIT the package for verification of completed records.

<table>
<thead>
<tr>
<th>Records Submittal Checklist</th>
<th>Number of times completed</th>
<th>N/A (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 Shutdown by Controlled Dump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 5.5.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.6 Shutdown by Automatic Dump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 5.6.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheet 1 - 242-A Evaporator Shutdown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheet 2 - 242-A Evaporator Electrical Shutdown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FWS/OE/Shift Manager SEND the completed records to the Central Shift Office for records retention.

____________________________________ / ______________________________ / __________
Signature  Print (First & Last)  Date

FWS/OE/Shift Manager

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.
### Table 1 - PB-2 Slurry Pump Interlocks

<table>
<thead>
<tr>
<th>Software Interlocks</th>
<th>Interlock Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB-2 ILK:15</td>
<td>LI-CA1-1</td>
</tr>
<tr>
<td></td>
<td>LI-CA1-2</td>
</tr>
<tr>
<td></td>
<td>&lt; 35.88 inches</td>
</tr>
<tr>
<td></td>
<td>&lt; 35.83 inches</td>
</tr>
<tr>
<td>HV-CA1-2</td>
<td>HV-CA1-2</td>
</tr>
<tr>
<td></td>
<td>Valve in EVAP FL,</td>
</tr>
<tr>
<td></td>
<td>FARM FL or BLOCK position</td>
</tr>
<tr>
<td>YS-PB2-IL</td>
<td>A Hardware Interlock is active</td>
</tr>
<tr>
<td>PSH-CA1-3*</td>
<td>Slurry Flush Line Pressure</td>
</tr>
<tr>
<td></td>
<td>&gt; 235 psig</td>
</tr>
<tr>
<td>PI-CA1-8</td>
<td>Slurry Flush Line Pressure</td>
</tr>
<tr>
<td></td>
<td>&gt; 87 psig</td>
</tr>
<tr>
<td>TSH-PB2-1*</td>
<td>Pump PB-2 Motor Windings Temperature High</td>
</tr>
<tr>
<td></td>
<td>(internal to Motor - Temp Controller located inside SC-PB2-1 Cabinet)</td>
</tr>
<tr>
<td>PI-CA1-10</td>
<td>Pump PB-2 Seal Water Pressure</td>
</tr>
<tr>
<td></td>
<td>≤ 60 psig</td>
</tr>
<tr>
<td>FI-CA1-2</td>
<td>Pump PB-2 Seal Water Flow</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.95 gpm</td>
</tr>
<tr>
<td>YS-VFD-1</td>
<td>FAULT Condition at VFD</td>
</tr>
</tbody>
</table>

* These points are also hardware interlocks.
# Data Sheet 1 - 242-A Evaporator Shutdown

## Sheet 1 of 3

### Section 5.1. Recirculation with Vacuum

**Flush Slurry Line to current Slurry Receiver Tank:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) reading (Step 5.1.15)</td>
<td></td>
</tr>
<tr>
<td>FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) (desired final, minimum)</td>
<td></td>
</tr>
<tr>
<td>Ending FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) Reading (Step 5.1.19)</td>
<td></td>
</tr>
</tbody>
</table>

**Status of Seal Water (Step 5.1.24)**

<table>
<thead>
<tr>
<th>Status</th>
<th>Time Shift Manager notified evaporator is in Recirculation with vacuum mode (Step 5.1.25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(✓)</td>
<td></td>
</tr>
</tbody>
</table>

**Operator:**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Print (First &amp; Last)</th>
<th>Date</th>
</tr>
</thead>
</table>

### Section 5.2. Recirculation without Vacuum

**SM Enter time and date vacuum was removed and sign:**

<table>
<thead>
<tr>
<th>Time vacuum removed:</th>
<th>Date vacuum removed:</th>
<th>SM Signature/Print (First &amp; Last)/Time:</th>
</tr>
</thead>
</table>

### Section 5.3. Empty Evaporator Pot by Slurrying Out

**Evaporator is to be emptied by Slurrying Out: (Step 5.3.1)**

**Record Initial Shutdown Data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial FQI-CA1-4 (G15, F10) SLURRY TO FARMS TOTALIZER (X10) (Step 5.3.3.4)</td>
<td>(gallons)</td>
</tr>
<tr>
<td>II-PB2-1 (G15, F9) PB-2 SLURRY PUMP CURRENT (Step 5.3.17)</td>
<td>(Amps)</td>
</tr>
<tr>
<td>FQI-CA1-4 (G15, F10) SLURRY TO FARMS TOTALIZER (X10) ending reading (Step 5.3.27)</td>
<td>(gallons)</td>
</tr>
<tr>
<td>Initial FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) (desired final, minimum)</td>
<td>(gallons)</td>
</tr>
<tr>
<td>FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) reading (Step 5.3.31)</td>
<td>(gallons)</td>
</tr>
<tr>
<td>Ending FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) Reading (Step 5.3.34)</td>
<td>(gallons)</td>
</tr>
</tbody>
</table>

**Record Final Shutdown Data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slurry Receiver Tank Level (Step 5.3.35)</td>
<td></td>
</tr>
<tr>
<td>AW-102 Level (Step 5.3.35)</td>
<td></td>
</tr>
</tbody>
</table>

**Operator:**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Print (First &amp; Last)</th>
<th>Date</th>
</tr>
</thead>
</table>

---

**Type:** CONTINUOUS  
**Document No.:** TO-600-060  
**Rev/Mod:** R-19  
**Release Date:** 01/14/2019  
**Page:** 41 of 45
## Data Sheet 1 - 242-A Evaporator Shutdown (Cont.)
### Sheet 2 of 3

### Section 5.5 Shutdown by Controlled Dump

<table>
<thead>
<tr>
<th>Shift Manager Signature/Print (First &amp; Last)/Time:</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporator is to be emptied by Controlled Dump (Step 5.5.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Evaporator Dump begins (Step 5.5.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Record Final Shutdown Data

<table>
<thead>
<tr>
<th>Time/Date Evaporator Pot Dump Completed (Step 5.5.14)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) (Step 5.5.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AW-102 Level (Step 5.5.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slurry Receiver Tank Level (Step 5.5.14)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operator: ___________________________ / ___________________________ / ___________________________
Signature Print (First & Last) Date

### Section 5.6. Shutdown by Automatic Dump

<table>
<thead>
<tr>
<th>Shift Manager Signature</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporator is to be emptied by Auto Dump (Step 5.6.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Evaporator Dump begins (Step 5.6.6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Record Final Shutdown Data

<table>
<thead>
<tr>
<th>Time/Date Evaporator Pot Dump Completed (Step 5.6.17)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FQI-RW-1 (G15, F10) BOTTOMS FLUSH TOTALIZR (WIDE) (Step 5.6.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AW-102 Level (Step 5.6.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slurry Receiver Tank Level (Step 5.6.17)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operator: ___________________________ / ___________________________ / ___________________________
Signature Print (First & Last) Date
## Section 5.7. Shut Down Evaporator Systems

<table>
<thead>
<tr>
<th>Action</th>
<th>Time</th>
<th>Date</th>
<th>Shut Down (✓)</th>
<th>Standby (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutdown of 10 lb. and 90 lb. (Step 5.7.17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status of Ammonia Monitor (Step 5.7.12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time and Date that Shift Manager was notified Evaporator is shut down (Step 5.7.13)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operator: __________________________ / __________________________ / ________________

Signature: __________________________

Print (First & Last): __________________________

Date: __________________________
## Data Sheet 2 - 242-A Evaporator Electrical Shutdown

### MCC-1 Circuit Breaker Checklist

<table>
<thead>
<tr>
<th>Cubicle</th>
<th>Description</th>
<th>Position</th>
<th>Check</th>
<th>Initial</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Agitator A-E-102</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td>241-AW-P-102-1 Feed and Blend Pump 241-AW-102 Pit 02E</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>Condensate Pump P-C-100</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G6</td>
<td>Condensate Recycle Pump P-C106</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MCC-3 Circuit Breaker Checklist

<table>
<thead>
<tr>
<th>Description</th>
<th>Position</th>
<th>Check</th>
<th>Initial</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Recirc Pump P-B-1</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PB-2 Variable Frequency Drive Checklist

<table>
<thead>
<tr>
<th>Description</th>
<th>Position</th>
<th>Check</th>
<th>Initial</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slurry Pump P-B-2 disconnect switch PB2-1-DS</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Panelboard B Circuit Breaker Checklist

<table>
<thead>
<tr>
<th>Description</th>
<th>Ckt. No</th>
<th>Position</th>
<th>Check</th>
<th>Initial</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal Water Pump P-C-105 (1½ HP)</td>
<td>12</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-E-102 (1/4 HP), AMU Room</td>
<td>18</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump P-RC1-1 (1/3 HP)</td>
<td>26</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal Water Pump P-C105A (1½ HP)</td>
<td>29</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Signature / Operator Print (First & Last) Date

Signature / Shift Manager /OE Print (First & Last) Date
Shut Down 242-A Evaporator System

Attachment 1

EPN’s Inhibited per TO-600-060 Evaporator Shutdown

When the Evaporator is being shut down to Shutdown mode the following EPN’s are inhibited using General Function 43 per TO-600-060 and Stay inhibited until the facility is restarted using General Function 34 per TO-600-020.

To verify the most current EPN’s inhabited by the General Function 43 check faceplates 90, 91 and 92.

### Faceplate 90

<table>
<thead>
<tr>
<th>PI-CA1-11</th>
<th>PIC-CA1-7</th>
<th>LIC-CA1</th>
<th>LIC-CA1-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIC-CA1-3</td>
<td>FIC-CA1-6</td>
<td>VI-PB1-2A</td>
<td></td>
</tr>
<tr>
<td>VI-PB1-1A</td>
<td>VI-PB1-3A</td>
<td>FI-CA1-1</td>
<td>FI-CA1-9</td>
</tr>
<tr>
<td>FI-CA1-3</td>
<td>PI-CA1-20</td>
<td>SIC-PB2-1</td>
<td>VI-PB2-1A</td>
</tr>
</tbody>
</table>

### Faceplate 91

<table>
<thead>
<tr>
<th>FI-CA1-2</th>
<th>PI-CA1-10</th>
<th>FIC-CA1-4</th>
<th>PI-EA1-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIC-EA1-1</td>
<td>PI-EC1-2</td>
<td>PI-EC2-2</td>
<td>FIC-EC3-1</td>
</tr>
<tr>
<td>PIC-EC1-2</td>
<td>PI-EC1-9</td>
<td>AI-RW-1</td>
<td>FI-RC2-1A</td>
</tr>
<tr>
<td>AI-STM-1</td>
<td>FI-RC1-1A</td>
<td>YS-AW102</td>
<td>PSH-CA111</td>
</tr>
</tbody>
</table>

### Faceplate 92

<table>
<thead>
<tr>
<th>YS-PB1-1</th>
<th>TSH-PB2-1</th>
<th>YS-VFD-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-EA1-1C</td>
<td>YS-P-C100</td>
<td>RC2-PIG</td>
</tr>
<tr>
<td>RC3-PIG</td>
<td>RC1-PIG</td>
<td></td>
</tr>
</tbody>
</table>