# Tank Farm Alarm Response Procedure

## 242-A Evaporator

### USQ # EV-18-0445-D, Rev. 1

**CHANGE HISTORY (≤ LAST 5 REV-MODS)**

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<th>Release Date</th>
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</tr>
</thead>
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<tr>
<td>J-4</td>
<td>09/19/2018</td>
<td>Operations Request</td>
<td>Added step to PDI-CA1-1 (HIGH-HIGH) Alarm to “PERFORM Evaporator shutdown per TO-600-060 per Shift Manager direction.”</td>
</tr>
</tbody>
</table>
| J-3     | 06/04/2018   | Operations request | Page 12 under Automatic Actions:  
* Delete "Clears" and replace with "Removes".  
* Delete period and add "from being in 'BYPASS', and will not allow PB-1 Wight Factor interlock bypass, back into 'BYPASS' until Li-CA1-3 is clear."  
Page 12 under step 3:  
* Delete "0.10" and replace with "0.05".  
* Add after "plugged" the following: "or plugging"  
Page 13 inside the Table:  
* Add the word "Nozzle" before 1D, 1F, 2E, and 2G  
* Add a "*" at the end of "WFI-CA1-1 (uncorrected)" and "WFI-CA1-2 (uncorrected)".  
Page 13 at the bottom of the Table:  
* Add the following: "* Found on C-A-1 sub graphic 025, or current trend #1." |
| J-2     | 03/21/2018   | Operations request | Modified procedure alarms for technical clarifications |
| J-1     | 09/26/2017   | Operations request | Pages 3, 18, 22 added new steps "IF Evaporator is shut down and is empty, or is in the process of being shut down per TO-600-060, EXIT this ARP."  
Page 3 also added new NOTE |
| J-0     | 02/24/2016   | Periodic Review | No changes identified for this review. |

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<tr>
<th>Alarm #</th>
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<th>Color</th>
<th>Page</th>
</tr>
</thead>
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<td>LIC-CA1-1</td>
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<td>RED</td>
<td>3</td>
</tr>
<tr>
<td>LIC-CA1-1</td>
<td>(LOW-LOW)...EVAP CA1-1 CONTROLR</td>
<td>RED</td>
<td>5</td>
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<tr>
<td>LIC-CA1-2</td>
<td>(HIGH-HIGH)...EVAP CA1-2 LEVEL CONTROLR</td>
<td>RED</td>
<td>8</td>
</tr>
<tr>
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<td>(LOW-LOW)...EVAP CA1-2 LEVEL CONTROLR</td>
<td>RED</td>
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</tr>
<tr>
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<td>(LOW)...EVAP CA1-3 CORRECTD WT FACTOR</td>
<td>RED</td>
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</tr>
<tr>
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<td>RED</td>
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<td>22</td>
</tr>
</tbody>
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Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

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RECORDS

No records are generated during the performance of this procedure.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10                  Alarm #: N/A
Panel: N/A

Source: Calculated (WF ÷ SpG) Setpoint: 26,000 gallons

Alarm Class: Plant Stability
Alarm Description: EVAP CA1-1 CONTROLR (HIGH-HIGH) (G10/9, F2); Evaporator volume as measured on LIC CA1-1 is over High-High Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, NO actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - It is permissible to exceed the 26,000 gallon limit during performance of a deep flush or a chemical flush.

[2] IF a deep flush or chemical flush is being performed, EXIT Alarm Response Procedure.

[3] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[4] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[4.1] IF the High-High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND GO TO Weight Factor Dip Tube Flush TO-660-150, EXIT this ARP.

[5] SET P-AW-102 (G301) FEED PUMP status to OFF.

[6] ENSURE FIC-CA1-1 is set to MANUAL and OUTPUT 0%.

[7] ENSURE HV-CA1-1 (G301) EVAP FEED VALVE is CLOSED.

[8] IF Evaporator volume as measured on LIC CA1-1 is still over High-High Alarm setpoint.

[8.1] GO TO Start Up 242 A Evaporator System TO-600-030 or Shut Down 242-A Evaporator System TO-600-060 to Reduce Evaporator Volume.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 26,000 gallons

Immediate Actions (Cont.):

NOTE - The dip tubes are paired LIC-CA1-1 with DI-CA1-1 and LIC-CA1-2 with DI-CA1-2. The pairs should always be selected together unless multiple dip tubes are plugging at the same time.

[9] IF there is evidence a dip tube is plugging, PERFORM the following:

[9.1] ENSURE the following have unaffected points selected for control:
- SELECT-DI POT (G10/11, F2) SPG SELECTOR FOR LEVL CONTROL
- SELECT-WF POT (G10/8, F2) WF SELECTOR FOR LEVL CONTROL.

[10] IF it was necessary to stop P-AW-102, WHEN alarm is clear and levels in normal range, GO TO Start Up 242-A Evaporator System TO-600-030.

Probable Causes:

1. High level in CA1.
2. Plugged Dip Tube.

References:

Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10                      Alarm #: N/A
Panel: N/A                      LIC-CA1-1
Source: Calculated (WF ± SpG)   Setpoint: 23,000 gallons
Alarm Class: Plant Stability
Alarm Description: EVAP CA1-1 CONTROLR (LOW-LOW) (G10/9, F2); Evaporator volume as measured on LIC-CA1-1 is below Low-Low Alarm setpoint.

Automatic Actions:

NOTE - Interlock #15 is activated only if both LIC-CA1-1 and LIC-CA1-2 are below low-low alarm setpoint.
1. Activates Interlock #15:
   • Shuts Down PB-1 RECIRC PUMP unless PB-1 ILK-15 is in BYPASS
   • Shuts Down PB-2 SLURRY TRANSFER PUMP unless PB-2 ILK-15 is in BYPASS.

Immediate Actions:

NOTE - If Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, this alarm is normally ON, and NO actions are required.
[1] IF Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, EXIT this ARP.
[2.1] IF LIC-CA1-2 level indicates normal, NOTIFY Shift Manager of instrument trouble on LIC-CA1-1 AND EXIT this Alarm Response Procedure.
[2.2] IF level on LIC-CA1-2 has also decreased but has not reached Low-Low setpoint, ENSURE feed is available to Evaporator by performing the following:
[2.2.1] ENSURE P-AW-102 (G301/7, F0) FEED PUMP is ON status.
[2.2.2] ENSURE HV-CA1-1 (G301/8, F0) EVAP FEED VALVE is OPEN status.
[2.2.3] ENSURE FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW indicates flow.
[2.3] IF a loss of feed is indicated and cannot be re-started, GO TO Shut Down 242-A Evaporator System per TO-600-060.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator

**Graphic:** 10

**Alarm #:** N/A

**Panel:** N/A

**Source:** Calculated (WF \(\div\) SpG)

**Setpoint:** 23,000 gallons

---

**Immediate Actions (Cont.):**

[3] **IF** Evaporator is shut down but not intentionally empty, **GO TO** Step [8].

[4] **IF** Evaporator is in continuous operation, **ENSURE** vessel liquid level is between 23,500 and 26,000 gallons.

[5] **IF** necessary to add water to the C-A-1 vessel, **ADD** water per TO-600-031.

**NOTE** - Shutting down PB-1 while Evaporator is operating will cause erratic weight factor (WF) readings.

- **IF** Pump PB-1 shuts down, it is necessary to bypass PB-1 Shutdown interlock to prevent Pot from automatically dumping (via Interlock #2) 8 minutes after PB-1 shuts down.

[6] **IF** PB-1 shuts down during response to this ARP, **SET** PB1-BYPAS (G12/8, F5) PB-1 SHUT DOWN BYPASS to BYPASS status.

[7] **SET** PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to OFF status.

[7.1] **CHECK** that PB-2 (G15/6, F9) II-PB2-1 amps value goes to less than 4.

[8] **CHECK** the following points are in status indicated to assure Evaporator is not inadvertently draining.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT-DUMP BOTTOMS DUMP VALVES</td>
<td>G12/14, F8</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-2 SLURRY FLUSH VALVES</td>
<td>G15/11, G47/0, F9</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>G301/8, F0</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

[9] **NOTIFY** Shift Manager of all conditions.

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Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

<table>
<thead>
<tr>
<th>Graphic: 10</th>
<th>Alarm #: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel: N/A</td>
<td></td>
</tr>
<tr>
<td>Source: Calculated (WF ÷ SpG)</td>
<td>Setpoint: 23,000 gallons</td>
</tr>
</tbody>
</table>

Probable Causes:
1. Low level in CA1.
2. Plugged Dip Tube.

References:
Documents: TO-660-150, Weight Factor Dip Tube Flush
OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
TO-600-060, Shut Down 242-A Evaporator System
TO-600-031, Add Water to 242-A Evaporator C-A-1 Vessel.
Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 26,000 gallons
Alarm Class: Plant Stability
Alarm Description: EVAP CA1-2 LEVEL CONTROLR (HIGH-HIGH) (G10/10, F2); Evaporator volume as measured on LIC-CA1-2 is over High-High Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, No actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT Alarm Response Procedure.

NOTE - It is permissible to exceed the 26,000 gallon limit during performance of a deep flush or a chemical flush.

[2] IF a deep flush or chemical flush is being performed, EXIT Alarm Response Procedure.

[3] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[4] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[4.1] IF the High-High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND GO TO Weight Factor Dip Tube Flush TO-660-150, EXIT this ARP.

[5] SET P-AW-102 (G301/7, F0) FEED PUMP - status to OFF.

[6] ENSURE FIC-CA1-1 is set to MANUAL and OUTPUT 0%.

[7] ENSURE HV-CA1-1 (G301/8, F0) EVAP FEED VALVE is CLOSED.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10                      Alarm #: N/A
Panel: N/A                      Setpoint: 26,000 gallons
Source: Calculated (WF ÷ SpG)    RED

Immediate Actions (Cont.):
[8] IF Evaporator volume as measured on LIC CA1-1 is still over High-High Alarm setpoint.
    [8.1] GO TO Start Up 242 A Evaporator System TO-600-030 or Shut Down 242-A Evaporator System TO-600-060 to Reduce Evaporator Volume.
[9] IF it was necessary to stop P-AW-102, WHEN alarm is clear and levels in normal range,
    GO TO Start Up 242 A Evaporator System per TO-600-030.

Probable Causes:
1. High level in CA1.
2. Plugged Dip Tube.

References:
Documents: TO-600-060, Shut Down 242-A Evaporator System
            OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
            TO-600-030, Start Up 242-A Evaporator System
            TO-660-150, Weight Factor Dip Tube Flush.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A

Source: Calculated (WF ÷ SpG)  Setpoint: 23,000 gallons

Alarm Class: Plant Stability
Alarm Description: EVAP CA1-2 LEVEL CONTROLR (LOW-LOW) (G10/10, F2); Evaporator volume as measured on LIC-CA1-2 is below Low-Low Alarm setpoint.

Automatic Actions:

NOTE - Interlock #15 is activated only if both LIC-CA1-2 and LIC-CA1-1 are below low-low alarm setpoint.

1. Activates Interlock #15:
   - Shuts Down PB-1 RECIRC PUMP unless PB-1 ILK 15 is in BYPASS
   - Shuts Down PB-2 SLURRY TRANSFER PUMP unless PB-2 ILK 15 status is in BYPASS.

Immediate Actions:

NOTE - If Evaporator is shut down and intentionally empty, or is in process of being shut down per TO-600-060, this alarm is normally ON, and no actions are required.

[1] IF Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, EXIT this ARP.

[2] CHECK level on LIC-CA1-1 (G10, F2).


[4] IF level on LIC-CA1-1 has also decreased but has not reached Low-Low setpoint, ENSURE feed is available to Evaporator by performing the following:
   [4.1] ENSURE P-AW-102 (G301/7, F0) FEED PUMP is ON status.
   [4.2] ENSURE HV-CA1-1 (G301/8, F0) EVAP FEED VALVE is OPEN status.
   [4.3] ENSURE FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW indicates flow.

[5] IF a loss of feed is indicated and cannot be re-started, GO TO Shut Down 242-A Evaporator System TO-600-060.


(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 23,000 gallons
Source: Calculated (WF ÷ SpG)

Immediate Actions (Cont.):

[7] IF Evaporator is SHUT DOWN but not intentionally empty, GO TO Step [12].
[8] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.
[9] IF necessary to add water to the C-A-1 vessel, ADD water per TO-600-031.

NOTE - Shutting down PB-1 while Evaporator is operating will cause erratic weight factor (WF) readings.
- IF Pump PB-1 shuts down, it is necessary to bypass PB-1 Shutdown interlock to prevent Pot from automatically dumping (via Interlock #2) eight minutes after PB-1 shuts down.
[10] IF PB-1 shuts down during response to this ARP, SET PB1-BYPAS (G12/8, F5) PB-1 SHUTDOWN BYPASS to BYPASS status.
[11.1] CHECK that PB-2 (G15/6, F9) II-PB2-4 amps value goes to less than 4.
[12] CHECK the following points are in status indicated to assure Evaporator is not inadvertently draining.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT-DUMP BOTTOMS DUMP VALVES</td>
<td>G12/14, F8</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-2 SLURRY FLUSH VALVES</td>
<td>G15/11, G47/0, F9</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>G301/8, F0</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

[13] NOTIFY Shift Manager of all conditions.

Probable Causes:
1. Low level in CA1.
2. Plugged Dip Tube.

References:
Documents: TO-660-150, Weight Factor Dip Tube Flush
OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
TO-600-060, Shut Down 242-A Evaporator System
TO-600-031, Add Water to 242-A Evaporator C-A-1 Vessel.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 370 inches
Source: Calculated  (WFI-CAI-3 ÷ DI-CA1-1 OR DI-CA1-2)  
Alarm Class: Plant Stability
Alarm Description: EVAP CA1-3 CORRECTD WT FACTOR (LOW) (G10, F3); Evaporator level as determined by LI-CA1-3 is below Low Alarm setpoint.

Automatic Actions:
1. Removes PB-1 Weight Factor interlock bypass from being in “BYPASS”, and will not allow PB-1 Weight Factor interlock bypass back into “BYPASS” until LI-CA1-3 is in clear.

Immediate Actions:
NOTE - If Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, this alarm is normally ON, and NO actions are required.

[1] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

[2] CHECK the following readings:
  • DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
  • DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
  • DI-CA1-3 (G10, F4, current trend #2) Recirc Bypass Slurry Density.

[3] IF DI-CA1-1 and DI-CA1-2 Density readings differ by greater than 0.05, CHECK the following to determine if there are any plugged or plugging Dip Tubes:
  • DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
  • DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
  • WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
  • WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD
  • Dip Tube Plugging Chart (on next page).

[3.1] CHECK DI-CA1-1 and DI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 370 inches

Source: Calculated  (WFI-CAI-3 ÷ DI-CA1-1 OR DI-CA1-2)

Immediate Actions (Cont.):

[3.2] CHECK WFI-CA1-1 and WFI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

<table>
<thead>
<tr>
<th>MCS Point</th>
<th>Number of Plugging Dip Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nozzle 1D</td>
</tr>
<tr>
<td>I-CA1-4-M31</td>
<td>Increase</td>
</tr>
<tr>
<td>I-CA1-7-M31</td>
<td>No Change</td>
</tr>
<tr>
<td>I-CA1-6-M31</td>
<td>Decrease</td>
</tr>
<tr>
<td>I-CA1-5-M31</td>
<td>No Change</td>
</tr>
</tbody>
</table>

* Found on CA-1 subgraphic 025, or current trend #1.

[4] IF evidence in Steps [3] to [3.2] shows a Dip Tube is plugging, PERFORM the following:

[4.1] ENSURE the following have unaffected points selected for control:

- SELECT DI (G10/11, F2) SPG SELECTOR FOR LEVL CONTROL
- SELECT WF (G10/8, F2) WF SELECTOR FOR LEVL CONTROL.

[4.2] NOTIFY Shift Manager maintenance may be required on affected Dip Tube.


(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10

Panel: N/A

Source: Calculated

Alarm #: N/A

Setpoint: 370 inches

(WFI-CAI-3 ÷ DI-CA1-1 OR DI-CA1-2)

Immediate Actions (Cont.):

[7] IF level on LIC-CA1-1 and LIC-CA1-2 have also decreased but have not reached Low-Low setpoint, ENSURE feed is available to Evaporator by performing the following:

[7.1] SET P-AW-102 (G301/7, F0) FEED PUMP to ON status.

[7.2] ENSURE HV-CA1-1 (G301/8, F0) EVAP FEED VALVE is OPEN status.

[7.3] ENSURE FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW indicates flow.

[8] IF a loss of feed is indicated and cannot be re-started, GO TO TF-AOP-EVAP-009, Response to Process Upset AND PERFORM the Attachment 1 - Process Upset Duty Card.

[9] ENSURE Bottom Dump Valves (G12/14, F8) are positioned to BLOCK by performing the following:

[9.1] ENSURE HV-CA1-7 CF-CLOSD.

[9.2] ENSURE HV-CA1-8 CF-OPEN.

[9.3] ENSURE HV-CA1-9 CF-CLOSD.

[10] SET PB-2 (G15/6, F9) SLURRY TRANSFER PUMP to OFF status.

[10.1] CHECK that PB-2 (G15/6, F9) II-PB2-4 amps value goes to less than 4.

[11] CHECK the following points are in status indicated to assure Evaporator is not inadvertently draining.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT-DUMP BOTTOMS DUMP VALVES</td>
<td>G12/14, F8</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-2 SLURRY FLUSH VALVES</td>
<td>G15/11, G47/0, F9</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>G301/8, F0</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

[12] NOTIFY Shift Manager of all conditions.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A    Setpoint: 370 inches
Source: Calculated (WFI-CAI-3 ÷ DI-CA1-1 OR DI-CA1-2)

Probable Causes:
1. Low level in CA1.
2. Plugged Dip Tube.

References:
Drawings: H-2-98988.
Documents: TF-AOP-EVAP-009, Response to Process Upset
OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
TO-600-060, Shut Down 242-A Evaporator System.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10                     Alarm #: N/A
Panel: N/A
Source: PIC-CA1-7              Setpoint: 170 torr

Alarm Class: Equipment Status
Alarm Description: EVAPORATOR ABSOLUTE PRESSURE (HIGH-HIGH) (G10, F4)

Automatic Actions:
1. Activates interlock 56:
   - Opens valve HV-CA1-20.

Immediate Actions:
NOTE - This alarm only applies when the C-A-1 vessel contains feed/slurry.
[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.
[3] IF an unplanned decrease of vacuum of >170 torr occurs, PERFORM the following:
   [3.1] CHECK for FI-CA1-20 (G400, F33/1) flow is ≥ 5 scfm and ≤ 6 scfm.
   [3.1.1] IF flow is not between 5 and 6 scfm, ADJUST FIC-CA1-20.
   [3.2] NOTIFY Shift Manager.
   [3.3] REQUEST engineering/maintenance to trouble shoot cause.

Probable Causes:
1. Intentional recirculation without vacuum.
3. Equipment Failure.

References:
Drawings: H-2-98988, Sheet 1.
Documents: None.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 20.0 inches Hg
Source: PT-CA1-11  Alarm Class: Plant Stability

Alarm Description: EVAP VACUUM 0-30 IN HG (LOW-LOW) (F3); Evaporator Vessel pressure is over High pressure setpoint (vacuum is low).

Automatic Actions:

1. Activates software Interlock #8:
   - Closes FV-EA1-1, REBOILER STEAM FLOW VALVE
   - Opens HV-EA1-3, AIR SUPPLY VALVE TO REBOILER, to pressurize reboiler with 18 psig air.

Immediate Actions:

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.
[4] VERIFY air to reboiler is on as follows:
   [4.1] SELECT “PI-EA1-1 (G13, F12/11) REBOILER STEAM INLET PRESSURE”.
   [4.2] ENSURE HV-EA1-4 (G14/1) STEAM CONDSATE BLOCK VALVE closes approximately 5 minutes after FV-EA1-1 (G13/10, F12) REBOILER STEAM FLOW VALVE status changes to STM OFF.
   NOTE - PI-EA1-1 pressure will not read greater than 28 psia until valve HV-EA1-4 is closed.
   [4.3] CHECK that PI-EA1-1 pressure Reads greater than 28 psia.
[5] CHECK HV-EC1-1 (G16/6, F14) VACUUM BREAKER VALVE status.
[6] IF HV-EC1-1 status is OPEN, GO TO TF-AOP-EVAP-009, Response to Process Upset AND
   PERFORM the Attachment 1 - Process Upset Duty Card.
[7] IF HV-EC1-1 status is CLOSED and multiple process alarms have not activated, CONTINUE.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: PT-CA1-11  Setpoint: 20.0 inches Hg

(Continued)

Immediate Actions (Cont.):

[8] CHECK current trend Display of PIC-CA1-7 EVAP ABSOLUTE PRESSURE for recent pressure changes by performing the following:

[8.1] CHECK PIC-CA1-7 current trend #15 trace for recent pressure increases.

[9] CHECK FI-EC2/3 VACUUM JETS STEAM FLOW current trend trace for recent flow changes by performing the following:

[9.1] CHECK FI-EC2/3 current trend #15 trace for recent decreases.

[10] IF steam flow has recently dropped, NOTIFY JCI of 90 lb. steam LOW.


[12] NOTIFY Shift Manager of all actions.

Probable Causes:

1. Vacuum breaker (HV-EC1-1) (G16/6) open.
2. Plugged De-Entrainment pads.
3. Low cooling water or steam flow to steam jets.

References:

Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: PDT-CA1-2  Setpoint: 4.5 inches WG

Alarm Class: Plant Stability
Alarm Description: EVAP UPPER DE-ENTRN DELTA-P (HI-HI) (F3); ΔP across upper C-A-1 De-Entrainer pad is above High-High Alarm setpoint, indicating the De-Entrainer is plugged.

Automatic Actions:
1. Activates Interlock #14:
   • Shuts down P-AW-102, EVAPORATOR FEED PUMP
   • Closes HV-CA1-1, EVAPORATOR FEED VALVE
   • Opens HV-EC1-1, VACUUM BREAKER VALVE, which also CLOSES HVEC2/3-1 VACUUM JETS STEAM VALVE
   • Closes FV-EA1-1, REBOILER STEAM FLOW, and OPENS HV-EA1-3.

Immediate Actions:
[1] NOTIFY Shift Manager.

Probable Causes:
1. De-Entrainer clogged.
2. Instrument malfunction.

References:
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator  
Graphic: 10  
Panel: N/A  
Source: DI-CA1-1  
Setting: 1.56 SpG  
Alarm Class: Equipment Status  
Alarm Description: EVAP VESSEL SLURRY SPECIFIC GRAVITY (HIGH-HIGH) (G10, F2).

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, NO actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[2] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[2.1] IF the High-High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND 
GO TO Weight Factor Dip Tube Flush TO-660-150.

[2.2] NOTIFY Shift Manager this instrument is out of service AND 
EXIT this ARP.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 1.56 SpG
Source: DI-CA1-1

Immediate Actions (Cont.):

[3] IF DI-CA1-1 is in service and DI-CA1-3 is in service, NOTIFY Shift Manager that SpG may be out of process memo range AND

     RESPOND to DI-CA1-3 as appropriate.

[4] IF DI-CA1-1 is in service, and DI-CA1-3 is out of service, CONTINUE with this alarm response.

     NOTE - The FIC-CA1-4 flowrate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

[5] INCREASE slurry flow rate as follows:

     [5.1] ENSURE FIC-CA1-4 is in Auto.

     [5.2] ENTER desired gpm “SETPOINT,” greater than the low slurry flow interlock setpoint.

     [5.3] CONFIRM FIC-CA1-4 setpoint changes to the required value.

[6] REDUCE FIC-EA1-1 REBOILER STEAM FLOW until output is 0%

[7] MONITOR to ensure specific gravity of DI-CA1-1 has returned to limit identified by the process memo.

[8] NOTIFY the Shift Manager of actions and status.

Probable Causes:

1. High Slurry temperature.
2. Instrument malfunction.

References:

Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10
Panel: N/A
Source: DI-CA1-2

Alarm #: N/A
Setpoint: 1.56 SpG

Alarm Class: Equipment Status
Alarm Description: EVAP VESSEL SLURRY SPECIFIC GRAVITY (HIGH-HIGH) (G10, F2).

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, NO actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[2] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[2.1] IF the High-High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND
GO TO Weight Factor Dip Tube Flush TO-660-150.

[2.2] NOTIFY Shift Manager this instrument is out of service AND
EXIT this ARP.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator
**Graphic:** 10  **Alarm #:** N/A
**Panel:** N/A  **Setpoint:** 1.56 SpG

(Continued)

### Immediate Actions (Cont.):

1. **IF** DI-CA1-2 is in service and DI-CA1-3 is in service, **NOTIFY** Shift Manager that SpG may be out of process memo range **AND**
   
   **RESPOND** to DI-CA1-3 as appropriate.

2. **IF** DI-CA1-2 is in service, and DI-CA1-3 is out of service, **CONTINUE** with this alarm response.

### NOTE

- The FIC-CA1-4 flowrate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

3. **INCREASE** slurry flow rate as follows:
   
   3.1 **ENSURE** FIC-CA1-4 is in Auto
   
   3.2 **ENTER** desired gpm “SETPOINT,” greater than the low slurry flow interlock setpoint.

   3.3 **CONFIRM** FIC-CA1-4 setpoint changes to the required value.

4. **REDUCE** FIC-EA1-1 REBOILER STEAM FLOW until output is 0%.

5. **MONITOR** to ensure specific gravity of DI-CA1-2 has returned to limit identified by the process memo.

6. **NOTIFY** the Shift Manager of actions and status.

### Probable Causes:

1. High Slurry temperature.
2. Instrument malfunction.

### References:

- **Drawings:** H-2-98988, H-2-98989, H-2-98999.
- **Documents:** TF-AOP-EVAP-009, Response to Process Upset OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A

Source: DI-CA1-3  Setpoint: 1.56 SpG

Alarm Class: Equipment Status

Alarm Description: EVAP VESSEL SLURRY SPECIFIC GRAVITY (HIGH-HIGH) (G10, F4).

Automatic Actions:
None.

Immediate Actions:

[1] CHECK DI-CA1-3 (G10, F4) EVAP VESSEL SLURRY SPECIFIC GRAVITY.
NOTE - DI-CA1-1 (G10, F2, current trend #1) and DI-CA1-2 (G10, F2, current trend #1) should have very similar readings. A large difference between either of the two pairs could indicate instrument problems such as a plugged dip tube.

[2] CHECK the following SpG instruments:
- DI-CA1-1 (G10, F2, current trend #1), EVAP VESSEL SLURRY SPECIFIC GRAVITY
- DI-CA1-2 (G10, F2, current trend #1), EVAP VESSEL SLURRY SPECIFIC GRAVITY.

[3] REVIEW current trend #1 for DI-CA1-1, DI-CA1-2, and current trend #2 for DI-CA1-3 for indications of rapid change in SpG.

[4] IF BOTH of the following conditions are met, then DI-CA1-3 should be considered out of service:
- DI-CA1-3 current trend shows a rapid change in SpG and DI-CA1-1 and DI-CA1-2 do not show a rapid change in SpG
- DI-CA1-1 and DI-CA1-2 read within 0.05 SpG of each other and DI-CA1-3 is > 0.1 SpG of DI-CA1-1 and DI-CA1-2.

[4.1] IF DI-CA1-3 is out of service, CHECK SpG on DI-CA1-1 and DI-CA1-2 AND RESPOND to alarms, as appropriate for those instruments.

[4.2] IF DI-CA1-3 is out of service, REQUEST engineering/maintenance to trouble shoot DI-CA1-3.

[4.3] NOTIFY Shift Manager this instrument is out of service AND EXIT this ARP.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator

**Graphic:** 10  
**Alarm #:** N/A  
**Panel:** N/A  
**Source:** DI-CA1-3  
**Setpoint:** 1.56 SpG

(Continued)

**NOTE** - The FIC-CA1-4 flowrate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

[5] **INCREASE** slurry flow rate as follows:

[5.1] **SET** “FIC-CA1-4” (G15/14, F10) to AUTO mode.

[5.2] **ENTER** desired gpm “SETPOINT,” greater than the low slurry flow interlock setpoint.

[5.3] **CONFIRM** FIC-CA1-4 setpoint changes to the required value.

[6] **REDUCE** FIC-EA1-1 REBOILER STEAM FLOW until output is 0%

[7] **MONITOR** to ensure specific gravity of DI-CA1-3 has returned to limit identified by the process memo.

[8] **NOTIFY** the Shift Manager of actions and status.

**Probable Causes:**

1. High Slurry temperature.
2. Instrument malfunction.

**References:**

**Drawings:** H-2-98988, H-2-98989, H-2-98999.

**Documents:** TF-AOP-EVAP-009, Response to Process Upset OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 150°F

Source: TE-CA1-6

Alarm Class: Equipment Status

Alarm Description: EVAP VESSEL SLURRY TEMP (HIGH-HIGH) (F4); Temperature of contents of Evaporator Pot are above High-High Temperature Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

[1] CHECK TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP temperature.

[2] CHECK the following temperatures:
   - TI-EA1-1 (G13, F13) REBOILER OUTLET SLURRY TEMP
   - TI-EA1-1S (G13, F13) REBOILER OUTLET SLURRY TEMP
   - TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T
   - TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP
   - TI-EA1-7S (G13, F13) REBOILER INLET SLURRY SPARE T.

[3] IF TI-CA1-6 temperature does not read within 5°F of points in Step [2], NOTIFY Shift Manager of failure of Temperature Indicator TI-CA1-6.

[4] REDUCE FIC-EA1-1 until output is 0%.

[5] ENSURE FV-EA1-1 is STM OFF.

[6] ENSURE HV-EA1-3 is OPEN.


Temperature of TI-CA1-6 is >147 °F, but ≤ 157 °F

[8] IF TI-CA1-6 temperature >147 °F, but ≤ 157 °F PERFORM the following to ensure C-A-1 cool down.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 150°F
Source: TE-CA1-6 (Continued)

Immediate Actions (Cont.):

[9]  **INCREASE** vacuum slowly to process memo limit.

   **OR**

   AS DIRECTED by Shift Manager.

[10]  **IF** temperature does not decrease to process memo limits, **GO TO** TO-600-060 SHUTDOWN 242-A Evaporator System. =

[11]  **IF** necessary to maintain C-A-1 vessel level, **ADD** water per procedure TO-600-031.

[12]  **MONITOR** one of the following for stable Evaporator Liquid Level:
   
   * LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
   * LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.

[13]  **MONITOR** the following as the vessel temperature decreases to the Process Memo limit:
   
   * TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP
   * TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T.

[14]  **NOTIFY** the Shift Manager of actions and status.

Probable Causes:

1.  High Slurry temperature.
2.  Instrument malfunction.

References:

Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10    Alarm #: N/A
Panel: N/A    TI-CA1-6S
Source: TE-CA1-6S    Setpoint: 150°F

Alarm Class: Equipment Status
Alarm Description: EVAP VESSEL SLURRY TEMP (HIGH-HIGH) (F4); Temperature of contents of Evaporator Pot are above High-High Temperature Alarm setpoint.

Automatic Actions:
None

Immediate Actions:
[1]  CHECK TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY TEMP (G10, F4) temperature.
[2]  CHECK the following temperatures:
   •  TI-EA1-1 (G13, F13) REBOILER OUTLET SLURRY TEMP
   •  TI-EA1-1S (G13, F13) REBOILER OUTLET SLURRY TEMP
   •  TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY SPARE T
   •  TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP
   •  TI-EA1-7S (G13, F13) REBOILER INLET SLURRY SPARE T.
[3]  IF TI-CA1-6S temperature does not read within 5°F of points in Step [2], NOTIFY Shift Manager of failure of Temperature Indicator TI-CA1-6S.
[4]  REDUCE FIC-EA1-1 until output is 0%.
[5]  ENSURE FV-EA1-1 is STM OFF.
[6]  ENSURE HV-EA1-3 is OPEN.
[7]  IF TI-CA1-6S temperature >147 °F, but ≤ 157 °F, PERFORM the following to ensure C-A-1 cool down:
   Temperature of TI-CA1-6S is >147 °F, but ≤ 157 °F
[8]  INCREASE vacuum slowly to process memo limit
   OR
   AS DIRECTED by Shift Manager.
[9]  IF temperature does not decrease to process memo limits, GO TO TO-600-060 SHUTDOWN 242-A Evaporator System.

(Continued on Next Page)
Facility: 242-A Evaporator
Graphic: 10          Alarm #: N/A
Panel: N/A          Setpoint: 150°F
Source: TE-CA1-6S   (Continued)

Immediate Actions (Cont.):

[10] IF necessary to maintain C-A-1 vessel level, ADD water per procedure TO-600-031.
[11] MONITOR one of the following for stable Evaporator Liquid Level:
    - LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
    - LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.
[12] MONITOR the following as the vessel temperature decreases to the Process Memo limit:
    - TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP
    - TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T.

Probable Causes:
1. High Slurry temperature.
2. Instrument malfunction.

References:
Documents: OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
    TO-600-031, Add Water to 242-A Evaporator C-A-1 Vessel.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A

Source: PSH-CA1-11  Setpoint: 18 inches Hg

Alarm Class:  Plant Stability
Alarm Description:  EVAP VESSEL PRESSURE HIGH (F3); Evaporator Vessel pressure is over
High pressure setpoint (vacuum is low).

NOTE - This alarm is normally ON when Evaporator is shut down.

Automatic Actions:
1. Activates software Interlock #8:
   - Closes FV-EA1-1, REBOILER STEAM FLOW VALVE
   - Opens HV-EA1-3, AIR SUPPLY VALVE TO REBOILER, to pressurize reboiler
     with 18 psig air.

Immediate Actions:

[1] SET FV-EA1-1 (G13/10, F12) REBOILER STEAM FLOW VALVE status to STM OFF.
[2] CHECK HV-EC1-1 (G16/6, F14) VACUUM BREAKER VALVE status.
[3] IF HV-EC1-1 status is OPEN, GO TO TF-AOP-EVAP-009, Response to Process Upset AND 
   PERFORM the Attachment 1 - Process Upset Duty Card.
[4] IF HV-EC1-1 status is CLOSED and multiple process upset alarms have not activated, 
   CONTINUE.
[5] CHECK FI-EC2/3 current trend #15 VACUUM JETS STEAM FLOW trace for recent decreases.
[6] IF steam flow has recently dropped, NOTIFY JCI of 90 lb. steam LOW.
[7] IF HV-EC2/3-1 status is not OPEN, SET HV-EC2/3-1 to CF-OPEN.
[8] NOTIFY Shift Manager of all actions.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10

Panel: N/A

Source: PSH-CA1-11  Setpoint: 18 inches Hg

Probable Causes:

1. Vacuum breaker (HV-EC1-1) (G16/6) open.
2. Plugged De-Entrainment pads.
3. Low cooling water or steam flow to Steam Jets.

References:

Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10

Panel: N/A

Source: PDT-CA1-1

Alarm #: N/A

Setpoint: 4.5 inches WG

Alarm Class: Plant Stability

Alarm Description: EVAP LOWER DE-ENTRN DELTA-P (HIGH-HIGH) (F3); ΔP across lower C-A-1 De-Entrainer pad is above High-High Alarm setpoint, indicating the De-Entrainer is plugged.

Automatic Actions:

1. Activates Interlock #14:
   - Shuts down P-AW-102, EVaporator Feed Pump
   - Closes HV-CA1-1, EVaporator Feed Valve
   - Opens HV-EC1-1, VACuum Breaker Valve, which also CLOSES HVEC2/3-1 VACuum Jets STEAM Valve

Immediate Actions:

[1] ENSURE Interlock #14 has activated.
[4] PERFORM Evaporator shutdown per TO-600-060 per Shift Manager direction.

Probable Causes:

1. De-Entrainer clogged.
2. Instrument malfunction.

References:

Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  PDSH-CA1

Source: PSH-CA1-1  Setpoint: 10.0 inches WG

Alarm Class: Plant Stability
Alarm Description: LOWER DE-ENTRN PAD DP HIGH (F3); ΔP across lower Evaporator De-Entrainment pad is above Alarm setpoint of a Hardwired Interlock.

Automatic Actions:
1. Closes HV-CA1-1, Evaporator feed valve.
2. Opens vacuum breaker valve HV-EC1-1.

Immediate Actions:
[1] NOTIFY Shift Manager.
[2] ENSURE HV-CA1-1 (G301/7, F0) is CLOSED.
[3] ENSURE HV-EC1-1 (G16/6, F14) is OPEN.
[4] ENSURE Interlock #14 has activated.

Probable Causes:
1. De-Entrainment Pad clogged.
2. Instrument malfunction.

References:
Drawings: H-2-70387, Sheet 1, H-2-98988, Zones C-4 and E-6, H-2-98999, Zone E-8
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: UIT-CA1-3  Setpoint: Loss of instrument signal

RED

Alarm Class: Plant Stability
Alarm Description: UIT-CA1-3 FAIL (G10, F4); Loss of instrument signal from UIT-CA1-3.

Automatic Actions:
None

Immediate Actions:
[1] IF Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, No actions are required, EXIT this ARP.

Probable Causes:
1. Failure of UIT-CA1-3.
2. Ongoing maintenance PM.

References:
Drawings: H-2-98989
Documents: None.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: PIC-CA1-7  Setpoint: 100 torr

Alarm Class: Plant Stability
Alarm Description: EVAPORATOR ABSOLUTE PRESSURE (HIGH) (G10/13, F3)

Automatic Actions:
None

Immediate Actions:

NOTE - This alarm only applies when the C-A-1 vessel contains feed/ slurry.

[1] NOTIFY Shift Manager.

[2] IF an unplanned decrease of vacuum of >100 torr occurs, REQUEST engineering/maintenance to trouble shoot cause.


Probable Causes:

1. Intentional recirculation without vacuum.
3. Equipment Failure.

References:

Drawings: H-2-98988, Sheet 1
Documents: None
## Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator

**Graphic:** 10

**Panel:** N/A

**Source:** PT-CA1-11

**Alarm Class:** Plant Stability

**Alarm Description:** EVAP VACUUM 0-30 IN HG (LOW) (G10, F3); Evaporator Vessel pressure is over High pressure setpoint (vacuum is low).

**Automatic Actions:**

None

**Immediate Actions:**

NOTE - This alarm only applies when the C-A-1 vessel contains feed/slurry.

1. **NOTIFY** Shift Manager.

2. **IF** an unplanned decrease of vacuum of < 23 inches Hg. occurs, **REQUEST** engineering/maintenance to trouble shoot cause.

3. **IF** intentionally re-circulating without vacuum, **DISREGARD** alarm.

**Probable Causes:**

1. Intentional recirculation without vacuum.
3. Equipment Failure.

**References:**

- Drawings: H-2-98988, Sheet 1
- Documents: None.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: TE-CA1-6  Setpoint: 140 °F

Alarm Class: Equipment Status
Alarm Description: EVAP VESSEL SLURRY TEMP (HIGH) (G10, F4); Temperature of contents of Evaporator Pot are above High Temperature Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

[1] IF performing a deep flush, EXIT this ARP.
[2] CHECK TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP temperature.
[3] CHECK the following temperatures:
   - TI-EA1-1 (G13, F13) REBOILER OUTLET SLURRY TEMP
   - TI-EA1-1S (G13, F13) REBOILER OUTLET SLURRY TEMP
   - TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T
   - TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP
   - TI-EA1-7S (G13, F13) REBOILER INLET SLURRY SPARE T.
[4] IF TI-CA1-6 temperature does not read within 5 °F of points in Step [3], NOTIFY Shift Manager of failure of Temperature Indicator TI-CA1-6.
[5] IF TI-CA1-6 temperature does read within 5 °F of points in Step [3] SLOWLY LOWER FIC-EA1-1 output to 0%.
[6] ENSURE FV-EA1-1 status is STM OFF.
[7] ENSURE HV-EA1-3 air to the reboiler is ON
[8] INCREASE vacuum slowly to process memo limit.

OR

AS directed by Shift Manager.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 140 °F
Source: TE-CA1-6

Immediate Actions (Cont.):

[9] IF temperature does not decrease to process memo limits, SHUT DOWN Evaporator per TO-600-060.
[10] IF necessary to maintain C-A-1 vessel level, ADD water per procedure TO-600-031.
[11] MONITOR one of the following for stable Evaporator Liquid Level:
    • LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
    • LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.
[12] MONITOR the following as vessel temperature decreases to lower limit prescribed by Process Memo:
    • TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP
    • TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T.

Probable Causes:
1. High Slurry temperature.
2. Instrument malfunction.

References:
Drawings: H-2-98988, H-2-98989, H-2-98999
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10

Alarm #: N/A

Panel: N/A

Source: TE-CA1-6S

Setpoint: 140 °F

Alarm Class: Equipment Status

Alarm Description: EVAP VESSEL SLURRY TEMP (HIGH) (F4); Temperature of contents of Evaporator Pot are above High Temperature Alarm setpoint.

Automatic Actions:

None

Immediate Actions:

[1] IF performing a deep flush, EXIT this ARP.


[3] CHECK the following temperatures:
   - TI-EA1-1 (G13, F13) REBOILER OUTLET SLURRY TEMP
   - TI-EA1-1S (G13, F13) REBOILER OUTLET SLURRY TEMP
   - TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY SPARE T
   - TI-EA1-7 (G13, F13) REBOILER INLET SLURRY TEMP
   - TI-EA1-7S (G13, F13) REBOILER INLET SLURRY SPARE T.

[4] IF TI-CA1-6 temperature does not read within 5 °F of points in Step [3], NOTIFY Shift Manager of failure of Temperature Indicator TI-CA1-6.

[5] IF TI-CA1-6 temperature does read within 5 °F of points in Step [3] SLOWLY LOWER FIC-EA1-1 output to 0%.

[6] ENSURE FV-EA1-1 status is STM OFF.

[7] ENSURE air to the reboiler is ON.

(Continued on Next Page)
### Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator  
**Graphic:** 10  
**Panel:** N/A  
**Source:** TE-CA1-6S  
**Alarm #:** N/A  
**Setpoint:** 140 °F  

**YELLOW**  
**TI-CA1-6S**

(Continued)

**Immediate Actions (Cont.):**

[8] **IF** necessary to maintain C-A-1 vessel level, **ADD** water per procedure TO-600-031.

[9] **MONITOR** one of the following for stable Evaporator Liquid Level:
- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.

[10] **MONITOR** the following as vessel temperature decreases to Process Memo Limit:
- TI-CA1-6 (G10, F4) EVAP VESSEL SLURRY TEMP
- TI-CA1-6S (G10, F4) EVAP VESSEL SLURRY SPARE T.


**Probable Causes:**

1. High Slurry temperature.
2. Instrument malfunction.

**References:**

**Drawings:** H-2-98988, H-2-98989, H-2-98999  
**Documents:** OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 1.52 SpG
Source: DI-CA1-1

Alarm Class: Equipment Status
Alarm Description: EVAP VESSEL SLURRY SPECIFIC GRAVITY (HIGH) (G10, F2).

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, NO actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[2] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[2.1] IF the High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND GO TO Weight Factor Dip Tube Flush TO-660-150.

[3] IF DI-CA1-1 is in service and DI-CA1-3 is in service, NOTIFY Shift Manager that SpG may be out of process memo range AND RESPOND to DI-CA1-3 as appropriate.

[4] IF DI-CA1-1 is in service, and DI-CA1-3 is out of service, CONTINUE with this alarm response.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  
Alarm #: N/A

Panel: N/A

Source: DI-CA1-1  
Setpoint: 1.52 SpG

YELLOW

DI-CA1-1

Immediate Actions (Cont.):

NOTE - The FIC-CA1-4 flowrate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

[5] INCREASE slurry flow rate as follows:

[5.1] ENSURE FIC-CA1-4 is in Auto.

[5.2] ENTER desired gpm “SETPOINT,” greater than the low slurry flow interlock setpoint.

[5.3] CONFIRM FIC-CA1-4 setpoint changes to the required value.

[6] REDUCE FIC-EA1-1 REBOILER STEAM FLOW until output is 0%.

[7] MONITOR to ensure specific gravity of DI-CA1-1 has returned to limit identified by the process memo.

[8] NOTIFY the Shift Manager of actions and status.

Probable Causes:

1. High Slurry temperature.
2. Instrument malfunction.

References:

Drawings: H-2-98988, H-2-98989, H-2-98999
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10
Alarm #: N/A
Panel: N/A
Source: DI-CA1-2
Setpoint: 1.52 SpG

Alarm Class: Equipment Status
Alarm Description: EVAP VESSEL SLURRY SPECIFIC GRAVITY (HIGH) (G10, F2).

Automatic Actions: None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, No actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[2] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[2.1] IF the High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND GO TO Weight Factor Dip Tube Flush TO-660-150.

[3] IF DI-CA1-2 is in service and DI-CA1-3 is in service, NOTIFY Shift Manager that SpG may be out of process memo range AND RESPOND to DI-CA1-3 as appropriate.

[4] IF DI-CA1-2 is in service, and DI-CA1-3 is out of service, CONTINUE with this alarm response.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  
Alarm #: N/A

Panel: N/A

Source: DI-CA1-2  
Setpoint: 1.52 SpG

(Continued)

Immediate Actions (Cont.):

NOTE - The FIC-CA1-4 flowrate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

[5] INCREASE slurry flow rate as follows:

[5.1] ENSURE FIC-CA1-4 is in Auto.

[5.2] ENTER desired gpm “SETPOINT,” greater than the low slurry flow interlock setpoint.

[5.3] CONFIRM FIC-CA1-4 setpoint changes to the required value.

[6] REDUCE FIC-EA1-1 REBOILER STEAM FLOW until output is 0%.

[7] MONITOR to ensure specific gravity of DI-CA1-2 has returned to limit identified by the process memo.

[8] NOTIFY the Shift Manager of actions and status.

Probable Causes:

1. High Slurry temperature.
2. Instrument malfunction.

References:

Drawings: H-2-98988, H-2-98989, H-2-98999
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  
Alarm #: N/A

Panel: N/A

Source: DI-CA1-3  
Setpoint: 1.52 SpG

Alarm Class: Equipment Status

Alarm Description: EVAP VESSEL SLURRY SPECIFIC GRAVITY (HIGH) (G10, F4).

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, No actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[2] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[2.1] IF the High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND GO TO Weight Factor Dip Tube Flush TO-660-150.

NOTE - The FIC-CA1-4 flowrate set point should be greater than the low slurry flow interlock. The low slurry flow interlock will be 42 gpm or 33 gpm as specified in Process Memo.

[3] INCREASE slurry flow rate as follows:

[3.1] ENSURE FIC-CA1-4 is in Auto.

[3.2] ENTER desired gpm “SETPOINT,” greater than the low slurry flow interlock setpoint.

[3.3] CONFIRM FIC-CA1-4 setpoint changes to the required value.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator

**Graphic:** 10  
**Alarm #:** N/A  
**Panel:** N/A  
**Source:** DI-CA1-3  
**Setpoint:** 1.52 SpG

**YELLOW**  
**DI-CA1-3**

(Continued)

**Immediate Actions (Cont.):**

[4] **REDUCE** FIC-EA1-1 REBOILER STEAM FLOW until output is 0%.

[5] **MONITOR** to ensure specific gravity of DI-CA1-3 has returned to limit identified by the process memo.


**Probable Causes:**

1. High Slurry temperature.
2. Instrument malfunction.

**References:**

**Drawings:** H-2-98988, H-2-98989, H-2-98999  
**Documents:** OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10 Alarm #: N/A
Panel: N/A

Source: Calculated (WF ÷ SpG) Setpoint: 25,000 gallons

Alarm Class: Plant Stability
Alarm Description: EVAP CA1-1 LEVEL CONTROLR (HIGH) (G10/9, F2); Evaporator volume as measured on LIC-CA1-1 is over High Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down or is in the process of being shut down per TO-600-060, No actions are required.

[1] IF Evaporator is SHUT DOWN or is in the process of being SHUT DOWN per TO-600-060, EXIT this ARP.

NOTE - It is permissible to exceed 25,000 gallon limit during performance of a deep flush or a chemical flush.

[2] IF a deep flush or chemical flush is being performed, EXIT Alarm Response Procedure.

[3] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

NOTE - DI-CA1-1 (G10, F2, current trend #1), DI-CA1-2 (G10, F2, current trend #1), and DI-CA1-3 (G10, F4, current trend #2) should have very similar readings. A large difference between either of the two pairs or the bypass recirculation line density instrument could indicate instrument problems such as a plugged dip tube.

[4] CHECK current trend #1 and current trend #2 for indications of a plugged dip tube.

[4.1] IF the High Alarm is because of a plugged dip tube, NOTIFY Shift Manager that dip tube purge may have to be adjusted and/or dip tube flushed AND

GO TO Weight Factor Dip Tube Flush TO-660-150, EXIT this ARP.

[5] IF operating in MANUAL, PERFORM the following:

[5.1] LOWER setpoint on FIC-CA1-1 (G301/6, F0), EVAP FEED FLOW to less than the sum of:

FI-CA1-4 (G15/14, F10), EVAP SLURRY FLOW AND Boil-off rate FI-EC1-2 (G17/5, F14), E-C-1 CONDENSR URW FLOW CONTROLR.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10    Alarm #: N/A
Panel: N/A    Setpoint: 25,000 gallons

Source: Calculated (WF ÷ SpG) (Continued)

Immediate Actions (Cont.):

[5.2] MONITOR level until 23,500 to 25,000 gallons is reached AND PERFORM the following:

[5.2.1] DECREASE flow to match the sum of FI-CA1-4 and FI-EC1-2.
[5.2.2] ESTABLISH new setpoint.
[5.2.3] EXIT this Alarm Response Procedure.

[6] IF operating in Auto Cascade, PERFORM the following:

[6.1] ENSURE FIC-CA1-1 (G301/6, F0), EVAP FEED FLOW, is in AUTO CASCADE with a setpoint of 24,250 gallons, or as specified in the Process Memo.

[6.2] MONITOR level to ensure it decreases to 23,500 to 25,000 gallons.

[7] IF Evaporator is SHUT DOWN, ENSURE the following points are in status indicated.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQI-RW-1 BOTTOMS FLUSH TOTALIZR</td>
<td>(G15, F10)</td>
<td>Not increasing</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>(G301/8, F0)</td>
<td>CF-CLOSD</td>
</tr>
<tr>
<td>HV-PDSPRY DE-ENTRN PADSPRAY VALVES</td>
<td>(G10/4, F3)</td>
<td>OFF</td>
</tr>
<tr>
<td>FIC-CA1-6 UPPER DE-ENTRN SPRAY FLOW</td>
<td>(G10/5, F3)</td>
<td>MANUAL mode, Output = 100</td>
</tr>
</tbody>
</table>

[8] NOTIFY Shift Manager of all conditions.

Probable Causes:

1. High level in CA1.
2. Plugged Dip Tube.

References:

Drawings: H-2-98988, Zones D-6 and E-3, H-2-98989, Zone F-5, H-2-98999, Zones D-5 and E-8
Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 23,500 gallons
Alarm Class: Plant Stability
Alarm Description: EVAP CA1-1 LEVEL CONTROLR (LOW) (F2); Evaporator volume as measured on LIC-CA1-1 is below Low Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

NOTE - If Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, this alarm is normally ON, and NO actions are required.

[1] IF Evaporator is shut down and intentionally empty, or is in the process of being shut down per TO-600-060, EXIT this ARP.

[2] IF Evaporator is SHUT DOWN but not intentionally empty, GO TO Step [14].

[3] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

[4] IF necessary to add water to the C-A-1 vessel, ADD water per TO-600-031.

[5] ENSURE HV-CA1-1 EVAP FEED VALVE status is OPEN by performing the following:

[5.1] SET HV-CA1-1 (G301/8, F0) to MANUAL mode and OPEN status.

[6] ENSURE P-AW-102 FEED PUMP status is ON by performing the following:

[6.1] SET P-AW-102 (G301/7, F0) to MANUAL mode and ON status.

[7] ENSURE FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW indicates flow.

[7.1] IF FIC-CA1-1 (G301/6, F0) does not indicate flow, GO TO TF-AOP-EVAP-009, Response to Process Upset AND PERFORM the Attachment 1 - Process Upset Duty Card.

[8] ENSURE Bottom Dump Valves (G12/14, F8) are positioned to BLOCK as follows:

[8.1] ENSURE HV-CA1-7 CF-CLOSD.

[8.2] ENSURE HV-CA1-8 CF-OPEN.

[8.3] ENSURE HV-CA1-9 CF-CLOSD.

(Continued on Next Page)
Immediate Actions (Cont.):

[9] **IF** Evaporator Level is in MANUAL Mode (i.e., FIC-CA1-1 EVAP FEED FLOW is in AUTO mode with its Cascade OPEN), **PERFORM** the following actions:

[9.1] **SELECT** FIC-CA1-1 (G301/6, F0).

[9.2] **IF** Evaporator Level is LOW, **INCREASE** Feed flow to Evaporator by selecting SETPOINT AND

**ENTER** a flow value greater than sum of:

FI-CA1-4 (G15/14, F10), EVAP SLURRY FLOW and Boil-off rate FI-EC1-2.

[9.3] **MONITOR** the following as Evaporator Level changes.

- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR.
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.

[9.4] **ESTABLISH** new setpoint AND

**EXIT** this Alarm Response Procedure.

**NOTE** - Low level alarm limit is 23,500 gallons.

[10] **IF** Evaporator Level is in AUTO Mode (i.e., FIC-CA1-1 EVAP FEED FLOW is in AUTO mode with its Cascade CLOSED), **ENSURE** controller setpoint is above low level alarm limit.

**NOTE** - DI-CA1-1 (G10, F2, current trend #1) and DI-CA1-2 (G10, F2, current trend #1) should have very similar readings. A large difference between either of the two pairs could indicate instrument problems such as a plugged dip tube.

[11] **CHECK** the following readings:

- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY.

(Continued on Next Page)
Immediate Actions (Cont.):

[12]  **IF** DI-CA1-1 and DI-CA1-2 Density readings differ by greater than 0.10, **CHECK** the following to determine if there are any plugged Dip Tubes:

- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
- WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
- WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD
- Dip Tube Plugging Chart.

[12.1] **CHECK** DI-CA1-1 and DI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

[12.2] **CHECK** WFI-CA1-1 and WFI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

<table>
<thead>
<tr>
<th>Dip Tube Plugging Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MCS Point</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Line Number</td>
</tr>
<tr>
<td>I-CA1-4-M31</td>
</tr>
<tr>
<td>I-CA1-7-M31</td>
</tr>
<tr>
<td>I-CA1-6-M31</td>
</tr>
<tr>
<td>I-CA1-5-M31</td>
</tr>
<tr>
<td>WFI-CA1-1 (uncorrected)</td>
</tr>
<tr>
<td>WFI-CA1-2 (uncorrected)</td>
</tr>
<tr>
<td>DI-CA1-1</td>
</tr>
<tr>
<td>DI-CA1-2</td>
</tr>
</tbody>
</table>

[13]  **IF** evidence in Steps [12] to [12.2] shows a Dip Tube is plugging, **PERFORM** the following:

[13.1]  **ENSURE** the following have unaffected points selected for control:

- **SELECT** DI (G10/11, F2) SPG SELECTOR FOR LEVL CONTROL
- **SELECT** WF (G10/8, F2) WF SELECTOR FOR LEVL CONTROL.

[13.2]  **NOTIFY** Shift Manager maintenance may be required on affected Dip Tube.

(Continued on Next Page)
Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 23,500 gallons

Immediate Actions (Cont.):

[14]  **CHECK** the following points are in status indicated to assure Evaporator is not inadvertently draining.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS LOCATION</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT-DUMP BOTTOMS DUMP VALVES</td>
<td>G12/14, F8</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-2 SLURRY FLUSH VALVES</td>
<td>G15/11, G47/0, F9</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-1</td>
<td>G301/8, F0</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

[15]  **NOTIFY** Shift Manager of all conditions.

Probable Causes:

1. Low level in CA1.
2. Plugged Dip Tube.

References:

Drawings:  H-2-98988, Zones D-6 and E-3, H-2-98989, Zone F-5, H-2-98999, Zones D-5 and E-8
Documents:  TF-AOP-EVAP-009, Response to Process Upset
            OSD-T-151-00012, Operating Specifications for the 242-A Evaporator
            TO-600-060, Shut Down 242-A Evaporator System
            TO-600-031, Add Water to 242-A Evaporator C-A-1 Vessel.
Facility: 242-A Evaporator

Graphic: 10  
Panel: N/A

Source: Calculated (WF ÷ SpG)  
Alarm Class: Plant Stability

Alarm #: N/A  
Setpoint: 25,000 gallons

Alarm Description: EVAP CA1-2 LEVEL CONTROLR (HIGH) (G10/10, F2); Evaporator volume as measured on LIC-CA1-2 is over High Alarm setpoint.

Immediate Actions:

[1] IF Evaporator is SHUT DOWN, GO TO Step [8].
[2] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

NOTE - DI-CA1-1 (G10, F2, current trend #1) and DI-CA1-2 (G10, F2, current trend #1) should have very similar readings. A large difference between either of the two pairs could indicate instrument problems such as a plugged dip tube.

[3] CHECK the following readings:
  • DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
  • DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY.

[4] IF DI-CA1-1 and DI-CA1-2 Density readings differ by greater than 0.10, CHECK the following to determine if there are any plugged Dip Tubes:
  • DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
  • DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
  • WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
  • WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD
  • Dip Tube Plugging Chart.

[4.1] CHECK DI-CA1-1 and DI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 25,000 gallons

YELLOW

LIC-CA1-2

Immediate Actions (Cont.):

[4.2] CHECK WFI-CA1-1 and WFI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

<table>
<thead>
<tr>
<th>Dip Tube Plugging Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS Point</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Line Number</td>
</tr>
<tr>
<td>I-CA1-4-M31</td>
</tr>
<tr>
<td>WFI-CA1-1 (uncorrected)</td>
</tr>
<tr>
<td>WFI-CA1-2 (uncorrected)</td>
</tr>
<tr>
<td>DI-CA1-1</td>
</tr>
<tr>
<td>DI-CA1-2</td>
</tr>
</tbody>
</table>

[5] IF evidence in Steps [1] to [4.2] shows a Dip Tube is plugging, PERFORM the following:

[5.1] ENSURE the following have unaffected points selected for control:
- SELECT-DI POT SPG SELECTOR FOR LEVL CONTROL (G10/11, F2)
- SELECT-WF POT WF SELECTOR FOR LEVL CONTROL (G10/8, F2).

[5.2] NOTIFY Shift Manager maintenance may be required on affected Dip Tube.

[6] IF operating in MANUAL, PERFORM the following:

[6.1] LOWER setpoint on FIC-CA1-1 (G301/6, F0), EVAP FEED FLOW to less than the sum of:
  - FI-CA1-4 (G15/14, F10), EVAP SLURRY FLOW, and boil-off rate FI-EC1-2 (G17/5, F14), E-C-1 CONDENSR URW FLOW CONTROLR.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 25,000 gallons

(Continued)

Immediate Actions (Cont.):

[6.2]  **MONITOR** level until 23,500 to 25,000 gallons is reached AND **PERFORM** the following:

[6.2.1]  **DECREASE** flow to match sum of FI-CA1-4 and FI-EC1-2.

[6.2.2]  **ESTABLISH** new setpoint.

[6.2.3]  **EXIT** this Alarm Response Procedure.

[7]  **IF** operating in Auto Cascade, **PERFORM** the following:

[7.1]  **ENSURE** FIC-CA1-1 (G301/6, F0), EVAP FEED FLOW, is in AUTO CASCADE with a setpoint of 24,250 gallons, or as specified in the Process Memo.

[7.2]  **MONITOR** level to ensure it decreases to 23,500 to 25,000 gallons.

[8]  **IF** Evaporator is SHUT DOWN, **ENSURE** the following points are in status indicated.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS LOCATION</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQI-RW-1 BOTTOMS FLUSH TOTALIZR</td>
<td>(G15, F10)</td>
<td>Not increasing</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>(G301/8, F0)</td>
<td>CF-CLOSD</td>
</tr>
<tr>
<td>HV-PDSPRY DE-ENTRIN PADSpray VALVES</td>
<td>(G10/4, F3)</td>
<td>OFF</td>
</tr>
<tr>
<td>FIC-CA1-6 UPPER DE-ENTRIN SPRAY FLOW</td>
<td>(G10/5, F3)</td>
<td>MANUAL mode, Output = 100</td>
</tr>
</tbody>
</table>

[9]  **NOTIFY** Shift Manager of all conditions.

Probable Causes:

1. High level in CA1.
2. Plugged Dip Tube.

References:

Drawings:  H-2-98988, Zones D-6 and E-3, H-2-98989, Zone F-5, H-2-98999, Zones D-5 and E-8
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A

Source: Calculated (WF ÷ SpG)  Setpoint: 23,500 gallons

Alarm Class: Plant Stability
Alarm Description: EVAP CA1-2 LEVEL CONTROLR (LOW) (G10/10, F2); Evaporator volume as measured on LIC-CA1-2 is below the Low Alarm setpoint.

Automatic Actions: None

Immediate Actions:

NOTE - If Evaporator is shut down and intentionally empty, this alarm is normally ON, and NO actions are required.

[1] IF Evaporator is SHUT DOWN but not intentionally empty, GO TO Step [13].

[2] IF Evaporator is in continuous operation, ENSURE vessel liquid level is between 23,500 and 26,000 gallons.

[3] ENSURE HV-CA1-1 EVAP FEED VALVE status is OPEN by performing the following:
   [3.1] SET HV-CA1-1 (G301/8, F0) to MANUAL mode and OPEN status.

[4] ENSURE P-AW-102 FEED PUMP status is ON by performing the following:
   [4.1] SET P-AW-102 (G301/7, F0) to MANUAL mode and ON status.

[5] ENSURE FIC-CA1-1 (G301/6, F0) EVAP FEED FLOW indicates flow.
[6] IF FIC-CA1-1 (G301/6, F0) does not indicate flow, GO TO TF-AOP-EVAP-009, Response to Process Upset AND
   PERFORM the Attachment 1 - Process Upset Duty Card.

[7] ENSURE Bottom Dump Valves (G12/14, F8) are positioned to BLOCK as follows:
   [7.1] ENSURE HV-CA1-7 CF-CLOSD.
   [7.2] ENSURE HV-CA1-8 CF-OPEN.
   [7.3] ENSURE HV-CA1-9 CF-CLOSD.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 23,500 gallons

Immediate Actions (Cont.):

[8] IF Evaporator Level is in MANUAL Mode (i.e., FIC-CA1-1 EVAP FEED FLOW is in AUTO mode with its Cascade OPEN), PERFORM the following actions:

[8.1] SELECT FIC-CA1-1 (G301/6, F0).

[8.2] IF Evaporator Level is LOW, INCREASE Feed flow to Evaporator by selecting SETPOINT AND ENTER a flow value greater than sum of:
FI-CA1-4 (G15/14, F10), EVAP SLURRY FLOW, and Boil-off rate FI-EC1-2.

[8.3] MONITOR the following as Evaporator Level changes:
- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.


NOTE - Low level alarm limit is 23,500 gallons.

[9] IF Evaporator Level is in AUTO Mode (i.e., FIC-CA1-1 EVAP FEED FLOW is in AUTO mode with its Cascade CLOSED), ENSURE controller setpoint is above low level alarm limit.

NOTE - DI-CA1-1 (G10, F2, current trend #1) and DI-CA1-2 (G10, F2, current trend #1) should have very similar readings. A large difference between either of the two pairs could indicate instrument problems such as a plugged dip tube.

[10] CHECK the following readings:
- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10
Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG) Setpoint: 23,500 gallons

Immediate Actions (Cont.):

[11] IF DI-CA1-1 and DI-CA1-2 Density readings differ by greater than 0.10, CHECK the following to determine if there are any plugged Dip Tubes:

- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
- WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
- WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD
- Dip Tube Plugging Chart.

[11.1] CHECK DI-CA1-1 and DI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

[11.2] CHECK WFI-CA1-1 and WFI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

<table>
<thead>
<tr>
<th>MCS Point</th>
<th>Number of Plugging Dip Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1D</td>
</tr>
<tr>
<td>Line Number</td>
<td>I-CA1-4-M31</td>
</tr>
<tr>
<td>WFI-CA1-1 (uncorrected)</td>
<td>Increase</td>
</tr>
<tr>
<td>WFI-CA1-2 (uncorrected)</td>
<td>No Change</td>
</tr>
<tr>
<td>DI-CA1-1</td>
<td>Decrease</td>
</tr>
<tr>
<td>DI-CA1-2</td>
<td>No Change</td>
</tr>
</tbody>
</table>


[12.1] ENSURE the following have unaffected points selected for control:

- SELECT DI (G10/11, F2) SPG SELECTOR FOR LEVL CONTROL
- SELECT WF (G10/8, F2) WF SELECTOR FOR LEVL CONTROL.

[12.2] NOTIFY Shift Manager maintenance may be required on affected Dip Tube.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: Calculated (WF ÷ SpG)  Setpoint: 23,500 gallons

YELLOW

LIC-CA1-2

(Continued)

Immediate Actions (Cont.):

[13] CHECK the following points are in status indicated to assure Evaporator is not inadvertently draining.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT-DUMP BOTTOMS DUMP VALVES</td>
<td>G12/14, F8</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-2 SLURRY FLUSH VALVES</td>
<td>G15/11, G47/0, F9</td>
<td>BLOCK</td>
</tr>
<tr>
<td>HV-CA1-1</td>
<td>G301/8, F0</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

[14] NOTIFY Shift Manager of all conditions.

Probable Causes:

1. Low level in CA1.
2. Plugged Dip Tube.

References:

Drawings:   H-2-98988, Zones D-6 and E-3, H-2-98989, Zone F-5, H-2-98999, Zones D-5 and E-8
Documents: TF-AOP-EVAP-009, Response to Process Upset
           OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A

Panel: N/A

Source: WFSH-CA11  Setpoint: 110 inches WG

Alarm Class: Plant Stability

Alarm Description: EVAP CA1-1 WT FACTOR HIGH (F2); Evaporator Weight Factor as read on WFSH-CA11 is above High Alarm setpoint.

Automatic Actions:
1. Shuts down P-AW-102, EVAPORATOR FEED PUMP.
2. Closes HV-CA1-1, EVAPORATOR FEED VALVE.

Immediate Actions:
[1] IF Evaporator is SHUT DOWN, GO TO Step [9].
[2] ENSURE P-AW-102 (G301/7, F0) FEED PUMP status is set to MANUAL mode and OFF status.
[3] ENSURE HV-CA1-1 (G301/8, F0) EVAP FEED VALVE is in MANUAL mode and CLOSED status with INTERLOK.

NOTE - DI-CA1-1 (G10, F2, current trend #1) and DI-CA1-2 (G10, F2, current trend #1) should have very similar readings. A large difference between either of the two pairs could indicate instrument problems such as a plugged dip tube.

[4] CHECK the following readings:
- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY.

[5] IF DI-CA1-1 and DI-CA1-2 Density readings differ by greater than 0.10, CHECK the following to determine if there are any plugged Dip Tubes:
- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
- WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
- WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD
- Dip Tube Plugging Chart.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator
Graphic: 10   Alarm #: N/A
Panel: N/A   Setpoint: 110 inches WG
Source: WFSH-CA11   (Continued)

Immediate Actions (Cont.):

[5.1] **CHECK** DI-CA1-1 and DI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

[5.2] **CHECK** WFI-CA1-1 and WFI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

<table>
<thead>
<tr>
<th>Dip Tube Plugging Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MCS Point</strong></td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>WFI-CA1-1 (uncorrected)</td>
</tr>
<tr>
<td>WFI-CA1-2 (uncorrected)</td>
</tr>
<tr>
<td>DI-CA1-1</td>
</tr>
<tr>
<td>DI-CA1-2</td>
</tr>
</tbody>
</table>

[6] **IF** evidence in Steps [5] to [5.2] shows a Dip Tube is plugging, **PERFORM** the following:

[6.1] **ENSURE** the following have unaffected points selected for control:
- SELECT DI (G10/11, F2) SPG SELECTOR FOR LEVL CONTROL
- SELECT WF (G10/8, F2) WF SELECTOR FOR LEVL CONTROL.

[6.2] **NOTIFY** Shift Manager maintenance may be required on affected Dip Tube.

NOTE - If evidence shows 1D dip tube is plugged, WFSH-CA11 will not clear and feed cannot be restarted regardless of which LIC is selected.

[7] **IF** 1D dip tube appears to be plugged and WFSH-CA11 cannot be cleared, **PLACE** Evaporator in Recirculation without Vacuum per TO-600-060.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator

**Graphic:** 10  **Alarm #:** N/A

**Panel:** N/A  **Setpoint:** 110 inches WG

**Source:** WFSH-CA11  **Type:** REFERENCE

---

**Immediate Actions (Cont.):**

[8] IF current trend Display #1 does NOT indicate instrument problems with DI-CA1-1 or DI-CA1-2, PERFORM the following:

[8.1] USING one of the following for Evaporator Level Control, OPERATE Evaporator without feed until Evaporator Level reads 23,500 to 25,000 gallons.
- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROLR
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROLR.

[8.2] AFTER Evaporator Level is within normal range, SET HV-CA1-1 (G301/8, F0) EVAP FEED VALVE to MANUAL mode and CF-OPEN status.

[8.3] SET P-AW-102 (G301/7, F0) to MANUAL mode and CF-ON status.

[8.4] GO TO Step [10].

[9] IF Evaporator is SHUT DOWN, ENSURE the following points are in status indicated.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQI-RW-1 BOTTOMS FLUSH TOTALIZR</td>
<td>(G15, F10)</td>
<td>Not increasing</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>(G301/8, F0)</td>
<td>CLOSED</td>
</tr>
<tr>
<td>HV-PDSPRY DE-ENTRN PADSPLRAY VALVES</td>
<td>(G10/4, F3)</td>
<td>OFF</td>
</tr>
<tr>
<td>FIC-CA1-6 UPPER DE-ENTRN SPRAY FLOW</td>
<td>(G10/5, F3)</td>
<td>MANUAL mode, Output = 100</td>
</tr>
</tbody>
</table>

[10] NOTIFY Shift Manager of all conditions.

---

**Probable Causes:**

1. Evaporator volume is high.
2. Plugged dip tube.

---

**References:**

- **Drawings:** H-2-98988, H-2-99085, Sheets 4 and 10, H-2-99949, Sheet 37
- **Documents:** TO-600-060, Shut Down 242-A Evaporator System
  OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator

**Graphic:** 10  
**Alarm #:** N/A

**Panel:** N/A  
**Source:** WFSH-CA12  
**Setpoint:** 110 inches WG

**Alarm Class:** Plant Stability  
**Alarm Description:** EVAP CA1-2 WT FACTOR HIGH (F2); Evaporator Weight Factor as read on WFSH-CA12 is above High Alarm setpoint.

**Automatic Actions:**

1. Shuts down P-AW-102, EVAPORATOR FEED PUMP.
2. Closes HV-CA1-1, EVAPORATOR FEED VALVE.

**Immediate Actions:**

[1] **IF** Evaporator is SHUT DOWN, **GO TO** Step [9].

[2] **ENSURE** P-AW-102 (G301/7, F0) FEED PUMP is in MANUAL mode and CF-OFF status.

[3] **ENSURE** HV-CA1-1 (G301/8, F0) EVAP FEED VALVE is in MANUAL mode and CLOSED status with INTERLOK.

**NOTE** - DI-CA1-1 (G10, F2, current trend #1) and DI-CA1-2 (G10, F2, current trend #1) should have very similar readings. A large difference between either of the two pairs could indicate instrument problems such as a plugged dip tube.

[4] **CHECK** the following readings:

- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY.

[5] **IF** DI-CA1-1 and DI-CA1-2 Density readings differ by greater than 0.10, **CHECK** the following to determine if there are any plugged Dip Tubes:

- DI-CA1-1 (G10, F2, current trend #1) EVAP CA1-1 DENSITY
- DI-CA1-2 (G10, F2, current trend #1) EVAP CA1-2 DENSITY
- WFI-CA1-1 (F2) EVAP CA1-1 WF NOT CORRECTD
- WFI-CA1-2 (F2) EVAP CA1-2 WF NOT CORRECTD
- Dip Tube Plugging Chart.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: WFSH-CA12  Setpoint: 110 inches WG

Immediate Actions (Cont.):

[5.1] CHECK DI-CA1-1 and DI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

[5.2] CHECK WFI-CA1-1 and WFI-CA1-2 current trend #1 traces and Dip Tube Plugging Chart to determine if there are any plugged Dip Tubes.

<table>
<thead>
<tr>
<th>Dip Tube Plugging Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS Point</td>
</tr>
<tr>
<td>Line Number</td>
</tr>
<tr>
<td>WFI-CA1-1 (uncorrected)</td>
</tr>
<tr>
<td>WFI-CA1-2 (uncorrected)</td>
</tr>
<tr>
<td>DI-CA1-1</td>
</tr>
<tr>
<td>DI-CA1-2</td>
</tr>
</tbody>
</table>

[6] IF evidence in Steps [5] to [5.2] shows a Dip Tube is plugging, PERFORM the following:

[6.1] ENSURE the following have unaffected points selected for control:
- SELECT DI (G10/11, F2) SPG SELECTOR FOR LEVL CONTROL
- SELECT WF (G10/8, F2) WF SELECTOR FOR LEVL CONTROL.

[6.2] NOTIFY Shift Manager maintenance may be required on affected Dip Tube.

NOTE - If evidence shows 1F dip is plugged, WFSH-CA12 will not clear and feed cannot be restarted regardless of which LIC is selected.

[7] IF 1F dip tube appears to be plugged and WFSH-CA12 cannot be cleared, PLACE Evaporator in Recirculation without Vacuum per TO-600-060.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: WFSH-CA12  Setpoint: 110 inches WG

(Continued)

[8] IF current trend Display #1 does not indicate instrument problems with DI-CA1-1 or DI-CA1-2, PERFORM the following:

[8.1] USING one of the following for Evaporator Level Control, OPERATE Evaporator without feed until Evaporator Level reads 23,500 to 25,000 gallons.
- LIC-CA1-1 (G10/9, F2) EVAP CA1-1 LEVEL CONTROL
- LIC-CA1-2 (G10/10, F2) EVAP CA1-2 LEVEL CONTROL.

[8.2] AFTER Evaporator Level is within normal range, SET HV-CA1-1 (G301/8, F0) EVAP FEED VALVE to MANUAL mode and CF-OPEN status.

[8.3] SET P-AW-102 (G301/7, F0) to MANUAL mode and CF-ON status.

[8.4] GO TO Step [10].

[9] IF Evaporator is SHUT DOWN, ENSURE the following points are in status indicated.

<table>
<thead>
<tr>
<th>EPN</th>
<th>MCS Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQI-RW-1 BOTTOMS FLUSH TOTALIZR</td>
<td>(G15, F10)</td>
<td>Not increasing</td>
</tr>
<tr>
<td>HV-CA1-1 EVAP FEED VALVE</td>
<td>(G301/8, F0)</td>
<td>CLOSED</td>
</tr>
<tr>
<td>HV-PDSPRY DE-ENTRN PADSPRAY VALVES</td>
<td>(G10/4, F3)</td>
<td>STOPPED</td>
</tr>
<tr>
<td>FIC-CA1-6 UPPER DE-ENTRN SPRAY FLOW</td>
<td>(G10/5, F3)</td>
<td>MANUAL mode, Output =100</td>
</tr>
</tbody>
</table>

[10] NOTIFY Shift Manager of all conditions.

Probable Causes:
1. Evaporator volume is high.
2. Plugged dip tube.

References:
Drawings:  H-2-98988, H-2-99085, Sheets 4 and 10, H-2-99949, Sheet 37
Documents:  TO-600-060, Shut Down 242-A Evaporator System
            OSD-T-151-00012, Operating Specifications for the 242-A Evaporator.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A

Source: FIT-CA1-6  Setpoint: 1.0 gpm

Alarm Class: Plant Stability
Alarm Description: UPPER DE-ENTRN SPRAY FLOW (LOW) (F3); Flow through Upper De-Entrainer Sprays is below Low Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

[1] IF FIC-CA1-6 UPPER DE-ENTRN SPRAY FLOW (G10/5, F3) is isolated, PERFORM the following:

[1.1] ADJUST Valve 5-96 to restore flow to a range of 1.6 to 2.6 gpm.

[1.2] IF Valve 5-96 is fully opened and flow cannot be established, CHECK the following points:
- PDI-FH3-1 (G10, F4) F-H-3 RW STRAINER DELTA P (Alarm #23)
- PDI-FH1-1 (G10, F4) F-H-1 RW FILTER DELTA P (Alarm #24)

[2] CHECK FIC-CA1-6 (G10/5, F3) UPPER DE-ENTRN SPRAY FLOW setpoint and flow value.

[3] IF FIC-CA1-6 output equals 0% and flow value is below setpoint, CHECK the following points:
- PDI-FH3-1 (G10, F4) F-H-3 RW STRAINER DELTA P (Alarm #23)
- PDI-FH1-1 (G10, F4) F-H-1 RW FILTER DELTA P (Alarm #24)

[4] IF any of the following points are in ALARM status for high ΔP, RESPOND per their Alarm Response in this procedure:
- PDI-FH3-1
- PDI-FH2-1
- PDI-FH1-1.

(Continued on Next Page)
Facility: 242-A Evaporator

Graphic: 10 Alarm #: N/A
Panel: N/A
Source: FIT-CA1-6 Setpoint: 1.0 gpm

Immediate Actions (Cont.):

[5] IF FIC-CA1-6 output is greater than 0%, LOWER FIC-CA1-6 output until flow value is above alarm setpoint or until FIC-CA1-6 output equals 0% by performing the following:
[5.1] SET FIC-CA1-6 (G10/5, F3) to MANUAL mode AND.
SELECT an OUTPUT % less than the current OUTPUT %.

[5.2] MONITOR FIC-CA1-6 flow value.
[5.3] IF FIC-CA1-6 flow value does not exceed alarm setpoint, GO TO Step [5.1].
[5.4] AFTER FIC-CA1-6 flow value exceeds alarm setpoint and Low Flow Alarm is clear, SET FIC-CA1-6 to AUTO.
[5.5] CONFIRM that FIC-CA1-6 status changes to AUTO mode.
[5.6] IF FIC-CA1-6 is 0% and flow value is below setpoint, NOTIFY Shift Manager of a possible plugged nozzle or that FIT-CA1-6 may need to be replaced.

[6] NOTIFY Shift Manager of all findings and actions.

Probable Causes:

1. Problem with filtered raw water system.
2. Problem with instrumentation.

References:

Drawings: H-2-99003
Documents: None.
Facility: 242-A Evaporator

Graphic: 10  
Alarm #: N/A

Panel: N/A

Source: PDT-CA1-1  
Setpoint: 3.5 inches WG

Alarm Class: Plant Stability
Alarm Description: EVAP LOWER DE-ENTRN DELTA-P (HIGH) (F3); The ΔP across lower Evaporator De-Entrainment pad is above High Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

1. CHECK PDI-CA1-1 (G10, F3, current trend #3) reading for increasing ΔP trend.
2. NOTIFY Shift Manager of all findings.

NOTE - PDI-CA1-1 De-entrainer Pad High alarm setpoint is 3.5 inches WG.

3. CHECK FIC-CA1-6 UPPER DE ENTRN SPRAY FLOW (G10/5, F3) as it cycles through all four nozzles for plugged spray nozzles.
4. INCREASE anti-foam rate to 0.1 gpm per TO-660-141 or as directed by campaign process memo or Shift Manger.
5. REDUCE steam flow to decrease boil-off rate per TO-600-060 or as directed by Shift Manager.
6. IF the Upper De-Entrainer pad sprays are not in service, PLACE the Upper De-Entrainer pad sprays in service per TO-600-030.
7. IF the Upper De-Entrainer pad sprays are in service, REQUEST the Backside Operator OPEN Lower De-Entrainer pad spray isolation valves 5-71 and 5-76, located on the fifth level of the Condenser Room.

NOTE - If PC-106 is not on line, starting pad sprays will affect pressure and flow to PB-1/PB-2 seals. Starting sprays slowly will lessen this impact. Monitoring of current trends 8 and 47 will provide signs of impact.

8. START HIC-CA114 LOWER DE ENTRN TOP SPRAY.
   [8.1] SELECT “HIC-CA114” (G10/6, F3).
   [8.2] PRESS “OUTPUT” in slow increments of 10 to start the lower De-Entrainer top sprays.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 3.5 inches WG

Immediate Actions (Cont.):

[9] START HIC-CA115 LOWER DE ENTRN BOTTOM SPRAY.
[9.1] SELECT “HIC-CA115” (G10/7, F3).
[9.2] PRESS “OUTPUT” in slow increments of 10 to start the lower De-Entrainer bottom sprays.
[9.3] MONITOR PDI-CA1-1 EVAP LOWER DE ENTRN DELTAP (G10, F3).

[10] MONITOR PDI-CA1-1 (G10, F3) EVAP LOWER DE ENTRN DELTAP.

[11] AFTER PDI-CA1-1 ΔP reads less than 2 inches WG, SHUT DOWN lower de-entrainer pad sprays, unless otherwise directed by Shift Manager.
[11.1] SELECT “HIC-CA114 (G10/6, F3) LOWER DE ENTRN TOP SPRAY”.
[11.2] SET “OUTPUT,” “0,” and “ENTER” to shut off the lower de entrainer top sprays.
[11.3] SELECT “HIC-CA115 (G10/7, F3) LOWER DE ENTRN BOTTOM SPRAY”.
[11.4] SET “OUTPUT,” “0,” and “ENTER” to shut off the lower De-Entrainer bottom sprays.
[11.5] REQUEST the Backside Operator CLOSE valves 5-71 and 5-76, located on the fifth level of the Condenser Room.

[12] IF PDI-CA1-1 ΔP does not decrease to less than 2 inches WG,
    OR

IF the High ΔP reoccurs, PERFORM the following:
[12.1] ENSURE anti foam chemicals are being properly injected per TO-660-141, “Inject Anti Foam Chemicals into the 242-A Vapor/Liquid Separator C-A-1”.
[12.2] INCREASE anti foam concentration (decrease dilution) to 7% or 10% per TO-660-141 or as directed by Shift Manager.

[13] IF anti foam chemical injection does not prevent the high ΔP from occurring, NOTIFY the Shift Manager the De-Entrainer pads require flushing.

(Continued on Next Page)
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A
Source: PDT-CA1-1  Setpoint: 3.5 inches WG

Probable Causes:
1. Lower De-Entrainment Pad clogged.
2. Instrument malfunction.

References:
Drawings: H-2-98988, Zone E-6
Documents: TO-660-141, Inject Anti Foam Chemicals into the 242-A Vapor/Liquid Separator C-A-1
TO-600-030, Start Up 242-A Evaporator System
TO-600-060, Shut Down 242-A Evaporator System.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A  Setpoint: 3.5 inches WG

Source: PDT-CA2-1  Plant Stability

Alarm Description: EVAP UPPER DE-ENTRN DELTA-P (HIGH) (G10, F3); ΔP across upper Evaporator De-Entrainment pad is above High Alarm setpoint.

Automatic Actions: None

Immediate Actions:

[1] CHECK current trend Display #3 PDI-CA1-2 for increasing ΔP trend.
[2] NOTIFY Shift Manager of all findings.

NOTE - PDI-CA1-2 De-Entrainer pad high ΔP alarm setpoint is 3.5 inches WG.

[3] CHECK PDI-CA1-1 (G10, F3) EVAP LOWER DE ENTRN DELTAP.
[5] IF PDI-CA1-1 reads less than 2 inches WG, NOTIFY the Shift Manager the upper De-Entrainers require troubleshooting.

Probable Causes:

1. De-Entrainer clogged.
2. Instrument malfunction.

References:

Drawings: H-2-98988, Zone E-6
Documents: None.
### Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

**Facility:** 242-A Evaporator  
**Graphic:** 10  
**Panel:** N/A  
**Source:** PDT-FH3-1  
**Setpoint:** Greater than 5 psi

#### Alarm Description:
F-H-3 RW STRAINER DELTA P (HIGH) (F4); ΔP across Raw Water Strainer F-H-3 is above High Alarm setpoint.

#### Automatic Actions:
None

#### Immediate Actions:
- **NOTE** - High ΔP indicates filter requires cleaning and it could reduce filtered raw water flow and pressure sufficiently to shut down pumps PB-1 and PB-2.
- [1] **SWITCH** strainers AND **CLEAN** F-H-3 per TO-600-180.

#### Probable Causes:
2. Instrument malfunction.

#### References:
- **Drawings:** H-2-99003, H-2-99949, Sheets 9 and 10
- **Documents:** TO-600-180, Changing Raw Water Filters FH-1 and FH-2, and Cleaning In-line Strainer FH-3.
Respond to C-A-1 Graphic #10 Alarms at the 242-A Evaporator

Facility: 242-A Evaporator

Graphic: 10  Alarm #: N/A
Panel: N/A

Source: PDT-FH1-1  Setpoint: 15 psid

Alarm Class: Plant Stability
Alarm Description: F-H-1 RW FILTER DELTA P (HIGH) (F4); ΔP across Raw Water Strainer F-H-1 is above High Alarm setpoint.

Automatic Actions:
None

Immediate Actions:

NOTE - High ΔP indicates filter requires cleaning, and it could reduce filtered raw water flow and pressure sufficiently to shut down pumps PB-1 and PB-2.

[1] SWITCH filter banks AND
CHANGE F-H-1 filters per TO-600-180.

Probable Causes:
1. Raw Water Filters in F-H-1 requires changing.
2. Instrument malfunction.

References:
Drawings: H-2-99003, Zone B-7
Documents: TO-600-180, Changing Raw Water Filters FH-1 and FH-2, and Cleaning In-line Strainer FH-3.
Facility: 242-A Evaporator

Graphic: 10  
Alarm #: N/A

Panel: N/A

Source: PDT-FH2-1  
Setpoint: Greater than 15 psi

Alarm Class: Plant Stability

Alarm Description: F-H-2 RW FILTER DELTA P (HI) (F4); ΔP across Raw Water Strainer F-H-2 is above High Alarm setpoint.

Automatic Actions: None

Immediate Actions:

NOTE - High ΔP indicates filter requires cleaning, and it could reduce filtered raw water flow and pressure sufficiently to shut down pumps PB-1 and PB-2.

[1] SWITCH filter banks AND
CHANGE F-H-2 filters per TO-600-180.

Probable Causes:

1. Raw Water Filters in F-H-2 requires changing.
2. Instrument malfunction.

References:

Drawings: H-2-99003, H-2-99949, Sheets 9 and 10
Documents: TO-600-180, Changing Raw Water Filters FH-1 and FH-2, and Cleaning In-line Strainer FH-3.