Thin Film Dryer Operation

Tank Farm Plant Operating Procedure  Effluent Treatment Facility

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

<table>
<thead>
<tr>
<th>CHANGE HISTORY (≤ LAST 5 REV-MODS)</th>
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<tbody>
<tr>
<td>Rev-Mod</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for operating the Thin Film Dryer (Dryer) system.

1.2 Scope

This procedure provides for startup, run, daily flush, weekly flush, shutdown from run, shutdown from stop, and layup, as well as for startup, operation, and shutdown of Dryer Steam Boiler (Boiler) (refer to Figure 1 – Dryer Mode Sequences).

2.0 INFORMATION

2.1 Terms and Definitions

- AOV – Air-Operated Valve
- CIWH – Condensate-Induced Water Hammer
- Boiler - Dryer Steam Boiler
- Dryer – Thin Film Dryer
- EDTA - Ethylenediaminetetraacetic Acid
- LCP - Local Control Panel
- SCFH - Standard Cubic Feet per Hour.
2.2 General Information

2.2.1 Level instrumentation blowdown, per Section 5.25, Boiler Blowdown After Shutting Down Boiler, should be performed immediately after each boiler shutdown, while the boiler remains pressurized.

2.2.2 When entries are made into the Dryer Room, a second person will provide support at the mimic board outside the Dryer Room, and coordinate the movement of conveyer systems. When mechanical systems are to be moved, the outside person must communicate with personnel inside the Dryer Room to stand clear of rollers and drums.

2.2.3 A portable two-way radio or other accepted means of summoning emergency assistance is required to be readily accessible at all times while inside the Storage Area/Dryer Room.

2.2.4 When switching from MANUAL to AUTO, control valve setpoints will take on the current process value (i.e., equal to output value) of the controller while the system is in MANUAL. After returning the controller to AUTO, it is necessary to re-enter the normal operating setpoint for AUTO operation.

2.2.5 If TT60J011, main jacket condensate temperature, is greater than or equal to 228°F, Dryer may be restarted by going to Section 5.17, Quick Restart of Hot Dryer.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

**WARNING** - CIWH can cause serious injury to personnel.

**WARNING** - Sodium EDTA may cause eye, skin, and respiratory tract irritation.

**WARNING** - Steam or water may escape from the docked drum when V157 (AOV60J157) is open, which may cause injury to personnel in the Dryer Room.

**WARNING** - Entering the drum room when the hopper isolation valve V155 (AOV60J155) is being operated and drum is not docked could result in personnel contamination if bridged powder unexpectedly breaks loose and falls into drum.

**WARNING** - Potential for hot or flashing samples exists even with sample cooler in operation, and may cause serious burns to the hands and face.

3.1.1 Dryer Room entry has the potential to expose workers to dust created by the Dryer Room process.

3.1.2 The Dryer Room is a congested area that contains overhead obstructions, which personnel could come in contact with while performing work inside the room.

3.1.3 Lock and tag protects personnel from the unexpected release of hazardous energy or materials. Under these circumstances, lock and tag is required in accordance with procedure DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.1.4 This procedure operates a steam boiler. Procedure user should be aware high-temperature and high-pressure steam is a potential safety hazard.
3.1 Personnel Safety (Cont.)

3.1.5 All work will be performed in accordance with DOE-0359, Hanford Site Electrical Safety Program.

3.1.6 Operation of Circuit Breakers, Electrical disconnect Switches, and Similar Switching Equipment shall be performed by a qualified person.

3.1.7 Component operation requires completion of an Electrical Risk Assessment (ERA).

3.1.8 When the clean and inspects are current on the electrical equipment (breaker, switchgear, disconnects, motor starters, etc.), the ERA for normal operating condition is applicable, for those workers interacting with electrical equipment.

3.1.8.1 Use safety glasses and leather gloves when manipulating electrical components per the normal ERA.

3.1.9 When the clean and inspects are delinquent, the ERA for non-normal operating condition is applicable, for those workers interacting with electrical equipment.

3.2 Equipment Safety

CAUTION - If spray condenser level exceeds 100%, water may overflow into the VOG System, damaging the VOG blower.

CAUTION - Solid carry over from the Dryer to the spray condenser can cause the 60J-P-3 distillate pump to fail.

CAUTION - Damage to motor windings may occur if not allowed to cool between restart attempts.

3.2.1 Boiler shutdown will cause Dryer shutdown. The Dryer must be shut down before shutting down the Boiler.

3.2.2 When performing boiler blowdowns during operation per Section 5.24, it is undesirable to cause boiler shutdown on boiler low level. Boiler low level is 1.75 inWC on LG65A010 or 22% on MCS graphic Steam.
3.3 Radiation and Contamination Control

3.3.1 RWP LE-001 will be utilized for entry into the Dryer Room.

3.3.2 Drum Handling Room entry is required for readings and lineup.

3.3.3 System layup requires spray condenser system and Dryer body manual draining. Liquid drained will contain entrained powder and is radioactive.

3.3.4 When disconnecting, breaching or opening systems or system components that currently contain or previously contained radioactive material, the following actions apply:
   - HPT coverage is required
   - Pre-job and post-job HPT surveys are required
   - Contamination controls shall be implemented in accordance with ETF-02-001, until radiological verifications have been performed.

3.4 Environmental Compliance

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

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:
- Hand-held, two-way radio
- 25 feet of 1-in. Tygon hose and 1-inch hose clamp
- 55-gallon drum for draining system
- Bucket or container for steam-boiler sample-line purging
- Protective apron
- Rubber gloves
- Chemical goggles
- Face shield
- Heat-resistant gloves (e.g., leather gloves)
- Sodium EDTA (MSDS/SDS #060663)
- MC-1 (MSDS/SDS #040428)
- MemChem MCT201 (MSDS/SDS #075499).

The following minimum PPE is required for Dryer Room entry:
- Coveralls
- Respirator
- Nitrile gloves.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- A-6007-595, Hanford Site Electrical Risk Assessment
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- ETF-65J-002, ETF Sampling and Packaging
- ETF-80C-001, Drum Handling System Operation
- TFC-OPS-OPER-C-17, Operating Logbooks.
4.3 Field Preparation

4.3.1 CONFIRM MCS has been placed in operation per ETF-55-001, Monitor and Control System Operation.

4.3.2 CONFIRM cooling water has been placed in operation per ETF-95C-001, Cooling Water System Operation.

4.3.3 CONFIRM Demineralized Water or Verification System is aligned and operating per ETF-95D-001, Demineralized Water System Operation, or ETF-60H-001, Verification System Operations, respectively.

4.3.4 CONFIRM Seal Water System is in operation per ETF-95B-001, Seal Water System Operation.

4.3.5 CONFIRM Vessel Off-Gas System is in operation per ETF-45D-001, Vessel Off-Gas System Operation.

4.3.6 CONFIRM Compressed Air System is in operation per ETF-01B-001, Compressed Air System Operations.

4.3.7 CONFIRM Sump Tank 1 is available per ETF-20B-001, Sump Tank/Pump System Operation.

4.3.8 CONFIRM one verification tank is in verifying mode per ETF-60H-001.

4.3.9 CONFIRM on group display 2 that LI60A012 surge tank level is less than 93%.

4.3.10 CONFIRM Concentrate Tank System is available as needed per ETF-60J-005, Concentrate Tank System Operation.

4.3.11 CONFIRM drum is docked at Dryer hopper per ETF-80C-001, or V155 (AOV60J155) is in the closed position.
5.0 PROCEDURE

Special Instructions

ONLY during initial startup of the TFD, Sections 5.1 through 5.4 must be performed in the order listed. During any other operating modes, Sections of this procedure may be performed in any logical order or out of sequence when instructed by SOM to accomplish necessary tasks.

All steps that require drums to be moved (e.g., positioning drums, docking and undocking drums, etc.) will be performed by the floor operator per ETF-80C-001.

Prior to making any entries into the Dryer Room confirm that HPT support is available and don PPE listed in Section 4.1.

Emergency Dryer SHUTDOWN can be selected from any mode.

SOM determines component lineup requirements.

At direction of SOM, any equipment identified in this procedure may be placed into MANUAL and setpoints/outputs adjusted to facilitate system operation, RECORD SOM directions in Shift Log book.

If 60JF1 is not operational, TFD operation may proceed with the following parameters: 60JF1 is placed in AUTO, SIC60J001 is placed in MANUAL with an output of 0, PCV033 (PIC60J033) must be in MANUAL set to 100% output, and PT60J033 must indicate a negative reading.

5.1 Valve Lineup Determination

5.1.1 (SOM) DETERMINE which valve lineup Checklists/Data sheets needs to be performed.

5.1.2 (SOM) IF valves are known to be in the required position and do not require verification, INITIAL/DATE AND DOCUMENT reason in the comments section of the Checklist/Data Sheet.

5.1.3 (SOM) IF valves are not in the required position because of an existing process (i.e., LOTO, Caution Tag, Work Package, Administrative Lock, Facility Tag or Status Seals), MARK N/A on the Checklist/Data Sheet AND INITIAL/DATE AND DOCUMENT reason in the comments section of the Checklist/Data Sheet.
5.2 System Startup Alignments

Special Instructions

The SOE will perform those steps identified as (SOE). Both the SOE and NCO will perform those steps identified as (NCO/SOE).

5.2.1 **DON** PPE per appropriate ERA listed in Section 3.1.

5.2.2 (NCO/SOE) **ENSURE** breaker lineup per Data Sheet 1 – Electrical Lineup.

5.2.3 (NCO/SOE) **ENSURE** Dryer valve lineup per Data Sheet 2 – Thin Film Dryer Initial Valve Lineup.

5.2.4 (SOE) **ENSURE** Boiler valve lineup per Data Sheet 3 – Steam Boiler Initial Valve Lineup.

5.2.5 **PLACE** the following AOVs in AUTO:

- V154 (AOV60J154), Concentrate Feed Isolation
- V155 (AOV60J155), Powder Hopper Isolation
- V156 (AOV60J156), Flush Water Inlet to Feed Line
- V157 (AOV60J157), Flush Water Inlet to Dryer
- V159 (AOV60J159), Dryer Vent Dump
- V160 (AOV60J160), Powder Hopper Drain
- V161 (AOV60J161), Drum Ventilation Isolation
- V273 (AOV60J273), 60J-P-3 Suction Isolation
- V274 (AOV60J274), Spray Condenser Drain Isolation.

5.2.6 (SOE) **ON** graphic Steam, **ENSURE** V001 (AOV65A001), boiler feed pump discharge valve, is in AUTO.

5.2.7 **ON** graphic CONC, **ENSURE** V60H040 (AOV60H040), verification water feed flush, is in AUTO.

**NOTE** - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.2.8 **ENSURE** V158 (AOV60J158), spray condenser fill isolation, CLOSED.

5.2.9 **ENSURE** the following equipment in AUTO:

- M1 (60JM1), Dryer Rotor
- P2 (60JP2), Dryer Feed Pump
- P3 (60JP3), Dryer Distillate Pump
- 60JF1, Dryer Vacuum Blower.
5.2 System Startup Alignments (Cont.)

5.2.10 IF 60JF1 is not operational, **PERFORM** the following:

- **5.2.10.1** **PLACE** 60JF1 in AUTO.
- **5.2.10.2** **PLACE** SIC60J001 is placed in MANUAL with an output of 0.
- **5.2.10.3** **PLACE** PCV033 (PIC60J033) in MANUAL set to 100% output.
- **5.2.10.4** **MONITOR** PT60J033 for a negative reading.

**NOTE** - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.2.11 **PLACE** the following controllers in AUTO **AND** **ENSURE** setpoint:

<table>
<thead>
<tr>
<th>Controller</th>
<th>Description</th>
<th>Graphic</th>
<th>Setpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCV033 (PIC60J033)</td>
<td>Vapor Pipe Pressure</td>
<td>Valve</td>
<td>-3 inWC</td>
</tr>
<tr>
<td>SIC60J001</td>
<td>Dryer Blower Speed Control</td>
<td>Graphic</td>
<td>100%</td>
</tr>
<tr>
<td>LCV036 (LIC60J036)</td>
<td>Spray Condenser Liquid Level</td>
<td>Valve</td>
<td>50%</td>
</tr>
</tbody>
</table>

5.2.12 **ENSURE** controller PCV032 (PIC60J032) is in MANUAL with 0% output.

5.2.13 **CHECK** the following local indicators:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Normal Operating Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>FI-95C058</td>
<td>Dryer coolers total cooling water return flow</td>
<td>&gt;50 gpm</td>
</tr>
<tr>
<td>FICV-60J042</td>
<td>Dryer double mechanical seal water inlet flow</td>
<td>1.0 to 1.2 gpm</td>
</tr>
<tr>
<td>PI-60J010</td>
<td>Dryer double mechanical seal water return pressure</td>
<td>15 to 30 psig</td>
</tr>
</tbody>
</table>
5.2 System Startup Alignments (Cont.)

5.2.14 IF FICV-60J042 indication is out of tolerance,

OR

IF PI-60J010 indication is out of tolerance, ADJUST seal water flow as follows:

5.2.14.1 CONFIRM 95B-055, back pressure adjustment, FULL OPEN.

5.2.14.2 ADJUST FICV-60J042 for indication of 1.1 (1.0 to 1.2) gpm,

OR

ADJUST as directed by SOM with concurrence of Engineering (minimum of 0.2 gpm).

5.2.14.3 RECORD as-left value and SOM direction in ETF Control Room Logbook.

5.2.14.4 ADJUST 95B-055 for indication of 15 to 30 psig on PI-60J010,

OR

ADJUST as directed by SOM with concurrence of Engineering (minimum of 2 psig).

5.2.14.5 RECORD as-left value and SOM direction in ETF Control Room Logbook.

5.2.14.6 REPEAT Steps 5.2.14.2 through 5.2.14.5 until both indications are within tolerance.

5.2.15 CHECK that a drum is docked at Dryer hopper.

5.2.15.1 IF a drum is not docked at Dryer hopper, REQUEST floor operator dock a drum at the Dryer hopper.

5.2.16 IF LT60J036, spray condenser level transmitter wet leg, needs to be filled, GO TO Section 5.16, LT60J036 Wet Leg Fill.

5.2.17 CHECK LT60J036, spray condenser level, indicates greater than 20%.
5.2 System Startup Alignments (Cont.)

5.2.18 IF LT60J036 indicates less than or equal to 20%, **FILL** spray condenser to 50% (45 to 55%) as follows:

5.2.18.1 **OPEN** V158 (AOV60J158) spray condenser fill.

5.2.18.2 **CHECK** LT60J036 indicates spray condenser liquid level increasing.

5.2.18.3 **WHEN** LT60J036 indicates level 50% (45 to 55%), **CLOSE** V158 (AOV60J158).
5.3 Steam Boiler Startup

**Special Instructions**

The SOE performs Section 5.3 except where noted as (NCO or CRO) performance at Steps 5.3.23, 5.3.32, 5.3.33, 5.3.34, 5.3.36, and 5.3.40.

SOE fills the boiler per Steps 5.3.1 through 5.3.11. Steps 5.3.1 through 5.3.3 are worked at the discretion of the SOE within the duration of performing Steps 5.3.1 through 5.3.11.

**NOTE** - If empty, Boiler 65A-B-1 will require several volumes of Condensate Tank TK-1 (65A TK 1) to fill. Feed Pump P1 (65A-P-1) is used for filling.

- Dryer boiler may be operated with 95D-E-01 OFF if directed by SOM.
- 95D-E-01 switch is ON when it is aligned to the I and OFF when it is aligned to the O. I and O indicators are located above the switch.

**Filling the Boiler**

5.3.1 **LOCALLY ENSURE** water heater 95D-E-1 ON/OFF switch is set to ON.

5.3.2 **LOCALLY ENSURE** Boiler control panel ON/OFF switch is set to ON and REMOTE.

5.3.3 **THROTTLE OPEN** (one turn) 60J-223, steam supply line trap bypass valve.

5.3.4 **ON** graphic Steam, **ENSURE** Condensate Tank demineralized or verification water feed valve V021 (AOV95D021) is in MANUAL.

5.3.5 **ON** graphic Steam, **ENSURE** Feed Pump P1 (65A-P-1) is in MANUAL.

**NOTE** - The process of filling the boiler and condenser tanks requires periodic monitoring of the boiler and condenser tank level during the entire process at a frequency to prevent overfilling.

5.3.6 **ENSURE** condenser tank level is maintained from 25% to 93% when manipulating system equipment per Step 5.3.8.

5.3.7 **MONITOR** the following as necessary to ensure overfilling does not occur:

- Condensate Tank TK-1 (65A-TK-1) level indicator LT65A001
- Dryer Boiler B-1 LT65A010.
5.3 Steam Boiler Startup (Cont.)

5.3.8 **OPERATE** the following equipment as needed to fill Dryer Boiler B-1 level to between 45% and 65%:
- Condensate Tank demineralized or verification water feed valve V021 AOV-95D-021
- Boiler feed pump discharge valve, AOV-65A-001
- Feed Pump P1, 65A-P-1.

5.3.9 **ON** graphic Steam, **CHECK** Dryer Boiler B-1 (65A-B-1) level indicator LT65A010.

5.3.10 **IF** LT65A010 (Dryer Boiler B-1) indicates greater than 65%, **PERFORM** the following:

5.3.10.1 **OPEN** Boiler level gauge LS65A013, manual drain valve 65A-046.

5.3.10.2 **WAIT** until LT65A010 (Dryer Boiler B-1) indicates 50% (45 to 65%) **AND** **CLOSE** 65A-046.

5.3.11 **IF** LT65A010 (Dryer Boiler B-1) indicates between 45% and 65%, **GO TO** Step 5.3.14.

**Special Instructions**

Steps 5.3.12 and 5.3.13 are performed concurrently.

5.3.12 **ON** graphic Steam, **SELECT** Feed Pump P1 (65A-P-1) to **START**.

5.3.13 **CONTINUOUSLY MONITOR** indicators LT65A001 (Condensate Tank TK-1) and LT65A010 (Dryer Boiler B-1):

5.3.13.1 **IF** LT65A001 (Condensate Tank TK-1) indication drops to 30% before LT65A010 (Dryer Boiler B-1) indication rises to 35%, **PERFORM** the following:

a. **ON** graphic Steam, **SELECT** P1 (65A-P-1) to **STOP**.

b. **REPEAT** Steps 5.3.8 through 5.3.13.

5.3.13.2 **WHEN** LT65A010 (Dryer Boiler B-1) indicates between 25% and 40%, **IMMEDIATELY SELECT** P1 (65A-P-1) to **STOP**.
5.3 Steam Boiler Startup (Cont.)

5.3.14 ON graphic Steam, SELECT P1 (65A-P-1) to AUTO.

5.3.15 ON graphic Steam, CHECK LT65A001 (Condensate Tank TK-1).

5.3.16 IF LT65A001 (Condensate Tank TK-1) indicates greater than 93%, PERFORM the following:

5.3.16.1 OPEN 65A-063, condensate Tank level gauge manual drain valve.

5.3.16.2 WAIT until LT65A001 indicates greater than or equal to 60% (60 to 93%), CLOSE 65A-063.

5.3.17 IF LT65A001 (Condensate Tank TK-1) is less than 60%, PERFORM the following:

5.3.17.1 ON graphic Steam, SELECT V021 (AOV95D021) to OPEN.

5.3.17.2 WHEN LT65A001 (Condensate Tank TK-1) indicates greater than or equal to 60% (60 to 93%), CLOSE V021 (AOV95D021).

5.3.18 ON graphic Steam, PLACE V021 (AOV95D021) valve to AUTO.

5.3.19 ON Alarm Summary, ENSURE the following alarms are CLEAR:
- Steam Boiler Feed Pump (65A-P1-A)
- Steam Boiler Level LO (LALX 65A010)
- Steam Condensate Tank Level LO (LAL 65A001)
- Steam Boiler Pressure HI (PAHX 65A011).

5.3.20 ON graphic Steam, ENSURE the following equipment is in AUTO:
- P1 (65A-P-1), Steam Boiler Feed Pump
- V021 (AOV95D021)
- Dryer Boiler B-1 (65A-B-1).

5.3.21 WHEN directed by SOM, CONFIRM V001 (AOV65A001) in MANUAL OPEN or AUTO.

5.3.22 ON group display 56, ENSURE setpoint is set at 145 psig and in AUTO on PIC65A011.

5.3.23 (CRO) ENSURE PCV032 (PIC60J032) is in MANUAL with 0% output.
5.3 Steam Boiler Startup (Cont.)

### WARNING
CIWH can cause serious injury to personnel.

5.3.24 **ANNOUNCE AND REPEAT** (once) the following on public address system:

“All personnel stand clear of Dryer steam lines while system heatup is in progress.”

5.3.25 **ON** graphic Steam, **SELECT** OPERATION.

5.3.26 **DURING** system heatup, **MONITOR** steam system for the following indications of CIWH:
- Any banging or knocking inside steam piping
- Any shaking or excess movement of steam piping.

5.3.27 **IF** at any time during heatup CIWH indications occur, **PERFORM** the following:

5.3.27.1 **DIRECT** all personnel to immediately leave the vicinity of the Dryer.

5.3.27.2 **VIA** MCS, **PLACE** Dryer Boiler in SHUTDOWN, **OR**

**LOCALLY PLACE** Boiler control panel ON/OFF switch to OFF.

5.3.27.3 **NOTIFY** SOM of possible CIWH.

5.3.28 **WHEN** steam can be heard condensing in TK-1 (65A-TK-1), dryer boiler condensate tank, **CLOSE** 60J-223, steam supply line trap bypass valve.
5.3 **Steam Boiler Startup (Cont.)**

5.3.29 **WAIT** for boiler pressure to remain stable (130 to 150 psig) for more than ten minutes, as indicated on graphic Steam or on local controller PC-65A-041.

5.3.30 **CHECK** trap 60J-224 using the thermal gun to verify proper trap operation.

- Allowable Inlet Temperature: 330 to 380°F
- Allowable Outlet Temperature: 170 to 260°F.

5.3.31 **IF** the trap is not working properly, **NOTIFY** SOM.

5.3.32 **(NCO) IF** lower bearing seal purge airflow adjustment is required (requires opening/closing ¼-in. Swagelock coupling), **CONFIRM** Maintenance support is available.

5.3.33 **(NCO) CHECK** the following local indicators:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Normal Operating Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>FICV-60J041</td>
<td>Purge airflow to Dryer lower bearing seal</td>
<td>2.0 to 3.0 scfh *</td>
</tr>
<tr>
<td>FICV-60J216</td>
<td>Hopper blow dry air flow</td>
<td>1.8 to 2.2 scfm *</td>
</tr>
<tr>
<td>PI-60J200</td>
<td>Dryer lower bearing seal purge air pressure</td>
<td>4.5 to 5.5 psig *</td>
</tr>
</tbody>
</table>

* Normal operating parameter may be waived with concurrence from the SOM and the Design Authority.
5.3 Steam Boiler Startup (Cont.)

Special Instructions

Flow rate may drop slightly after air purge line re-connection due to tight bearing seal. Flow will slowly increase as bearing seal wears.

If FICV-60J041 airflow cannot be brought into the required range, this requirement may be waived with the concurrence of the SOM and Design Authority.

If FICV-60J216 airflow cannot be brought into the required range, this requirement may be waived with concurrence from the SOM and Design Authority.

5.3.34 (NCO) IF PI-60J200 indication is out of tolerance, OR

IF FICV-60J041 indication is out of tolerance, ADJUST seal purge air pressure and flow as follows:

5.3.34.1 ADJUST air pressure regulator 60J-132 until PI-60J200 indicates 5.0 (4.5 to 5.5) psig.

5.3.34.2 ADJUST valve FICV-60J041 until FICV-60J041 indicates 2.0 to 3.0 scfh.

5.3.34.3 CHECK indications are within tolerance:
- PI-60J200 indicates 4.5 to 5.5 psig
- FICV-60J041 indicates 2.0 to 3.0 scfh.

5.3.35 OPEN the following valves (inside Dryer Room):
- 60J-109, Powder Hopper Steam Trap Strainer Blowdown
- 60J-108, Lower Jacket Steam Trap Strainer Blowdown
- 60J-118, Main Jacket Steam Trap Strainer Blowdown.

5.3.36 (CRO) OPEN PCV032 (PIC60J032), dryer jacket steam pressure control valve, to 50% in 10% increments.

5.3.37 WHEN TT60J011, main jacket temperature, reaches 228°F, SLOWLY CLOSE each of the following valves AND WAIT one minute between closings:
- 60J-109, Powder Hopper Steam Trap Strainer Blowdown
- 60J-108, Lower Jacket Steam Trap Strainer Blowdown
- 60J-118, Main Jacket Steam Trap Strainer Blowdown.
5.3 Steam Boiler Startup (Cont.)

5.3.38 **CHECK** the following traps from the temperature display panel outside Dryer Room:

<table>
<thead>
<tr>
<th>Traps</th>
<th>Instrument</th>
<th>Equipment ID</th>
<th>Allowable Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>60J-167</td>
<td>TI60J040</td>
<td>60J-167 Inlet</td>
<td>280 to 370 °F</td>
</tr>
<tr>
<td>60J-167</td>
<td>TI60J041</td>
<td>60J-167 Outlet</td>
<td>170 to 260 °F</td>
</tr>
<tr>
<td>60J-152</td>
<td>TI60J050</td>
<td>60J-152 Inlet</td>
<td>280 to 370 °F</td>
</tr>
<tr>
<td>60J-152</td>
<td>TI60J051</td>
<td>60J-152 Outlet</td>
<td>170 to 260 °F</td>
</tr>
<tr>
<td>60J-153</td>
<td>TI60J060</td>
<td>60J-153 Inlet</td>
<td>280 to 370 °F</td>
</tr>
<tr>
<td>60J-153</td>
<td>TI60J061</td>
<td>60J-153 Outlet</td>
<td>170 to 260 °F</td>
</tr>
</tbody>
</table>

5.3.39 **IF** the traps are not working properly, **NOTIFY** SOM.

5.3.40 (CRO) **IF** Dryer will not be started immediately, **SLOWLY ADJUST** (in 5% increments) PCV032 (PIC60J032) to 10% or as directed by SOM.

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

5.3.41 **ON** group display 56 or **ON** SOE Steam Screen, **CHECK** that PIC65A011 indicates 130 to 150 psig.

5.3.42 **WAIT** for Boiler pressure to remain stable (130 to 150 psig) for more than ten minutes.

5.3.43 **DURING** Boiler operations, **ON** group display 56, **MONITOR** (for 20 to 30 minutes) the following parameters:

<table>
<thead>
<tr>
<th>Equipment ID</th>
<th>Instrument</th>
<th>Setpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>65A-TK-1, Condensate Tank Pressure</td>
<td>PT65A003</td>
<td>≤ 5 psig</td>
</tr>
<tr>
<td>Boiler Feed Pump Current</td>
<td>IT65A004</td>
<td>≤ 4.0 amps</td>
</tr>
<tr>
<td>Boiler Water Level</td>
<td>LT65A010</td>
<td>≥ 40%</td>
</tr>
<tr>
<td>Boiler Pressure</td>
<td>PIC65A011</td>
<td>≤ 150 psig</td>
</tr>
</tbody>
</table>

5.3.44 **WHEN** boiler pressure reaches 130 to 150 psig, **ADJUST** valve 65A-065, boiler feed pump recirculation to setting 3 or 4.
5.4 Thin Film Dryer Startup

5.4.1 OPEN PCV032 (PIC60J032), dryer jacket steam pressure control valve, to 100% in 10% increments.

5.4.2 PLACE HS Drum Ready for Fill (HS80C400E) to ON.

5.4.3 PLACE Dryer in STARTUP.

5.4.4 CHECK lights ON:
- STARTUP
- HEATUP.

5.4.5 CHECK 60JF1, dryer vacuum blower, is in RUN.

5.4.6 CHECK V155 (AOV60J155), dryer hopper isolation, CLOSED.

5.4.7 WHEN the following parameters are met, CHECK Dryer STARTUP light is steady ON:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Instrument Tag</th>
<th>Display</th>
<th>Required Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder Hopper Temperature</td>
<td>TT60J018</td>
<td>Group Display 42 Graphic Dryer</td>
<td>Greater than or equal to 212°F</td>
</tr>
<tr>
<td>Dryer Steam Pressure</td>
<td>PIC60J032</td>
<td>Graphic Dryer</td>
<td>Greater than or equal to 140 psig</td>
</tr>
</tbody>
</table>

5.4.8 WHEN Dryer READY light is steady ON, CHECK Dryer rotor drive is running.

5.4.9 CHECK P3 (60J-P-3), dryer distillate pump, is in RUN.

5.4.10 CONFIRM V155 (AOV60J155), hopper isolation valve, is OPEN.

NOTE - Air pressure regulator 60J-234 controls hopper knocker 60J-228. Timer 60J-227 controls air pulse frequency. Installed spring size determines whether knocker will be in knock mode or vibrate mode.

5.4.11 IF hopper knocker 60J-228 is not to be used, SET 60J-234, regulator air pressure, at ZERO.

5.4.12 IF use of hopper knocker 60J-228 is desired, SLOWLY THROTTLE OPEN 60J-234, air pressure regulator, until knocking or vibration is established.
5.5 RUN Operation

5.5.1 CHECK READY light is steady ON.

5.5.2 SELECT RUN.

5.5.3 CHECK status of the following:
- RUN light: BLINKING
- READY light: OFF
- STARTUP light: OFF.

5.5.4 ON graphic CONC, CHECK the following:
- If Concentrate Tank A (CT A) is selected, Tank A READY light is steady ON and V058 (AOV60J058) OPEN.
- If Concentrate Tank B (CT B) is selected, Tank B READY light is steady ON and V053 (AOV60J053) OPEN.

5.5.5 CHECK V154 (AOV60J154), concentrate feed, is OPEN.

5.5.6 CHECK V159 (AOV60J159), dryer vent dump, is OPEN.

5.5.7 CHECK P-2 (60JP2), concentrate feed pump, is ON.

NOTE - V159 (AOV60J159) should close automatically after about one minute.

5.5.8 WHEN V159 (AOV60J159) closes, CHECK Dryer RUN light is steady ON.

5.5.9 RECORD time and drum PIN in the ETF Control Room Logbook.

NOTE - When distillate flow is steady from 0.4 to 0.8 gpm, Dryer is operating in steady state RUN.

5.5.10 ON graphic Dryer, CHECK FT60J035, distillate flow indicator, indicates STEADY 0.6 (0.4 to 0.8 gpm).

NOTE - Normal range of Dryer blower speed setting is 75 to 100%. A setting below 75% will not be allowed by the MCS in order to prevent damage to the blower motor from operating at too low a speed.
- If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.5.11 ON graphic Dryer, PLACE SIC60J001 in manual and ADJUST SIC60J001, dryer blower speed control, to maintain Dryer vapor pipe pressure at -3 inWC as indicated by PT60J033.
5.5 RUN Operation (Cont.)

5.5.12 **ON** graphic Dryer, **ADJUST** P2 (HIC60J057), concentrate feed pump, speed to maintain concentrate feed flow per process memo.

**NOTE** - Normal range of concentrate feed pump speed setting is 10 to 27%. A setting of 10% is the lower limit of the pump motor capability.

5.5.13 **IF** the feed rate is still excessive at a pump setting of 10%, **PLACE** P2 (HIC60J057) feed pump speed setting to ZERO.

5.5.14 **OPEN** (hourly) 60J-239, dryer blower outlet drain valve, or as required to drain condensate.

5.5.15 **IF** drain valve 60J-239 is opened, **CLOSE**.

5.5.16 **WHEN** Drum headspace temperature, TT60J020, indicates level of powder is at desired fill point (normally 200 to 225 °F),

**OR**

**WHEN** Drum Powder Level High alarm, LAHH-60J020, indicates level powder in drum is five inches from top of drum, **GO TO** Section 5.6, to initiate a new drum.

5.5.17 **IF** Drum Powder Level High indication and drum temperature indication are out of service, **OBSERVE** (at regular intervals) the level of powder in the filling drum to allow estimation of fill time.
5.6 Manual Initiation of New Drum

5.6.1 **CHECK** Dryer is in RUN.

**NOTE** - When manual drum change handswitch (VD435190) is selected, it simulates a high drum headspace temperature for one minute, then turns OFF.

- Increasing the feed flow rate during DAILY FLUSH provides for improved flushing of the Dryer feed line and upper end of the rotor and vessel.

5.6.2 **FROM** one of the following, **SELECT** VD435190 ON:

- Group display 450 (VD435190)
- Graphic Drum Handling (Manual Drum Change)
- Graphic Thin Film Dryer (Manual Drum Change).

5.6.3 **CHECK** DAILY FLUSH light comes ON within one minute.

**NOTE** - Daily flush and new drum process should run approximately 35 minutes (elapsed time indicator on graphic). DAILY FLUSH will continue indefinitely until handswitch Drum Ready for Fill (HS80C400E) is actuated.

5.6.4 **WHEN** V155 (AOV60J155) closes, **NOTIFY** floor operator **AND** REQUEST floor operator undock filled drum.

5.6.5 **WHEN** a new drum is docked to Dryer, **RECORD** time and drum PIN in the ETF Control Room Logbook.

5.6.6 **WHEN** ready to start filling drum, **SELECT** from one of the following:

- Group display 450 (HS80C400E)
- Graphic Thin Film Dryer (HS Drum Ready for Fill).

5.6.7 **CHECK** the following:

- DAILY FLUSH is OFF
- NEW DRUM light is ON
- Dryer returned to RUN.

5.6.8 **GO TO** Step 5.5.10.
5.7 Daily Flush from RUN

NOTE - DAILY FLUSH flushes Dryer feed line with distillate for approximately 35 minutes, then places Dryer in RUN.

5.7.1 CONFIRM RUN light is steady ON.

5.7.2 SELECT DAILY FLUSH.

5.7.3 CHECK DAILY FLUSH light blinks, then goes steady ON.

NOTE - Increasing the feed flow rate during DAILY FLUSH provides for improved flushing of the Dryer feed line and upper end of the rotor and vessel.

5.7.4 CHECK RUN light is ON.

5.7.5 WAIT approximately 35 minutes.

5.7.6 CHECK DAILY FLUSH light is OFF.

5.7.7 CHECK RUN light is ON.

5.7.8 GO TO Step 5.5.10.
5.8 Shutdown from RUN

Special Instructions

The SOE will perform those steps identified as (SOE).

5.8.1 CHECK Dryer is in RUN.

5.8.2 SELECT DAILY FLUSH.

5.8.3 CHECK DAILY FLUSH light blinks, then goes to steady ON.

NOTE - When operating in AUTO, the dryer vacuum blower, 60JF1, will stay in OPERATION when the Dryer is placed into SHUTDOWN.

5.8.4 WAIT 25 minutes, SELECT SHUTDOWN.

5.8.5 CHECK SHUTDOWN light is steady ON.

5.8.6 IF keeping Dryer hot during SHUTDOWN, PLACE PCV (PIC60J032) steam supply valve in MANUAL/10% OPEN

OR

OBTAIN SOM direction AND RECORD in ETF Control Room Logbook.

5.8.7 IF directed by SOM, PLACE rotor M1 (60JM1) in MANUAL/ON.
5.9 Shutdown from STOP

5.9.1 CHECK STOP light is steady ON.

5.9.2 SELECT SHUTDOWN.

5.9.3 CHECK STOP light is OFF.

5.9.4 CHECK SHUTDOWN light is steady ON.

5.9.5 IF it is desired to keep the Dryer hot during SHUTDOWN, PLACE PCV032 (PIC60J032), steam supply valve, in MANUAL/10% OPEN, or as directed by SOM.

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

5.9.6 IF directed by SOM, PLACE rotor M1 (60JM1) in MANUAL/ON.

5.10 Flush Dryer Vent Header

Special Instructions

Section 5.10 provides steps to flush the 8-inch vent header connecting the Dryer vessel to the spray condenser. Hot verification water will be added to the spray condenser until it overflows into the Dryer vessel. Rotor amps will be monitored to verify that the Dryer vessel does not completely fill during this procedural evolution.

Level in the spray condenser will exceed the range of level instrument LT60JJ036, so other indications, such as water entering the sight glasses, will be used to determine if the spray condenser is overflowing to the vent system.

5.10.1 CONFIRM rotor flush has been performed.

5.10.2 CONFIRM Dryer Boiler is in OPERATION.

5.10.3 TRANSFER Sump 1 down to minimum level per ETF-20B-001.

5.10.4 CONFIRM Dryer is in SHUTDOWN mode.

5.10.5 PLACE M1 (60JM1), dryer rotor, in MANUAL/ON.
5.10 **Flush Dryer Vent Header (Cont.)**

NOTE - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.10.6 **PLACE** the following equipment in MANUAL/OFF:
- 60JF1, Dryer Vacuum Blower
- P2 (60JP2), Dryer Feed Pump
- P3 (60JP3), Dryer Distillate Pump.

5.10.7 **PLACE** PCV032 (PIC60J032) in MANUAL AND SET to 10% output, or as directed by SOM.

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

5.10.8 **PLACE** the following controllers in MANUAL AND SET to 0% output:
- PCV033 (PIC60J033), Vapor Pipe Pressure Controller
- LCV036 (LIC60J036), Spray Condenser Liquid Level Controller.

5.10.9 **PLACE** the following AOVs in MANUAL/CLOSED:
- V274 (AOV60J274), Spray Condenser Drain Isolation
- V273 (AOV60J273), 60J-P-3 Suction Isolation
- V161 (AOV60J161), Drum Ventilation Isolation
- V159 (AOV60J159), Dryer Vent Dump
- V157 (AOV60J157), Flush Water Inlet to Dryer
- V155 (AOV60J155), Powder Hopper Isolation.

5.10.10 **PLACE** V160 (AOV60J160), powder hopper drain, in MANUAL/OPEN.

5.10.11 **CLOSE** the following MANUAL valves:
- 60J-141, Distillate Recirc Isolation
- 60J-155, Dryer Feed Inlet.

5.10.12 **OPEN** the following MANUAL valves:
- 60J-238, Dryer Blower Inlet Drain
- 60J-273, FG-60J005 Drain
- 60J-239, Dryer Blower Outlet Drain.
5.10 Flush Dryer Vent Header (Cont.)

5.10.13 REQUEST floor operator place empty drum, without lid, in drum fill position.

5.10.14 OPEN historian and trend for Sump 1 level AND MONITOR sump level.

5.10.15 FULLY OPEN 60J-122, verification water isolation.

5.10.16 FULLY OPEN 60J-193, hot water steam supply isolation.

5.10.17 PLACE V158 (AOV60J158), spray condenser fill, in MANUAL/OPEN.

5.10.18 LOCALLY THROTTLE 60J-122, verification water valve, until TI60J194 (local), hot water temperature, indicates 175 to 185°F.

5.10.19 MONITOR Sump 1 trend and historian to ensure water is drained into Sump 1.

5.10.20 MONITOR condensate receiver sight glasses near the Dryer vent blower for overflow of water from the spray condenser to the downstream vent piping.

5.10.21 IF liquid is observed draining into the sight glasses, CLOSE V158 (AOV60J158).

5.10.22 MONITOR IT60J056, M1 (60JM1) rotor amps.

5.10.23 IF IT60J056 exceeds 14 amps, CLOSE V158 (AOV60J158), spray condenser fill.

5.10.24 WHEN IT60J056 has dropped to approximately 10 amps, OPEN V158 (AOV60J158), spray condenser fill AND RESUME flushing.

5.10.25 CONTINUE flushing for 60 minutes, or as directed by SOM.

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

5.10.26 CLOSE V158 (AOV60J158), spray condenser fill.

5.10.27 CLOSE 60J-193, hot water steam supply isolation.

5.10.28 FULLY OPEN 60J-122, verification water isolation.
5.10 Flush Dryer Vent Header (Cont.)

5.10.29 **MONITOR** Sump 1 trend and historian to ensure water is drained into Sump 1 AND

VIA remote camera, **OBSERVE** Dryer hopper discharge into drain to ensure V155 (AOV60J155) is not leaking excessively.

5.10.30 **REQUEST** floor operator dock drum to Dryer.

5.10.31 **PLACE** V161 (AOV60J161), drum ventilation isolation valve, in MANUAL/OPEN.

5.10.32 **PLACE** V155 (AOV60J155), powder hopper isolation valve, in MANUAL/OPEN.

**NOTE** - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.10.33 **PLACE** the following equipment in AUTO:

- 60JF1, Dryer Vacuum Blower
- P2 (60JP2), Dryer Feed Pump
- P3 (60JP3), Dryer Distillate Pump
- M1 (60JM1), Dryer Rotor.

**NOTE** - PCV033 (PIC60J033) may be operated in MANUAL if directed by the SOM.

- If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.10.34 **PLACE** the following controllers in AUTO AND

**CHECK** setpoint:

- PCV033 (PIC60J033), Vapor Pipe Pressure Controller: -3 inWC
- LCV036 (LIC60JJ036), Spray Condenser Liquid Level Controller: 50%.

5.10.35 **PLACE** the following AOVs in AUTO:

- V274 (AOV60J274), Spray Condenser Drain Isolation
- V273 (AOV60J273), P3 (60JP3) Suction Isolation
- V161 (AOV60J161), Drum Ventilation Isolation
- V159 (AOV60J159), Dryer Vent Dump
- V157 (AOV60J157), Flush Water Inlet to Dryer
- V155 (AOV60J155), Powder Hopper Isolation.
5.10 Flush Dryer Vent Header (Cont.)

5.10.36 **OPEN** the following MANUAL valves:
- 60J-141, Distillate Recirc Isolation
- 60J-155, Dryer Feed Inlet.

5.10.37 **CLOSE** 60J-239, dryer blower outlet drain.

5.10.38 **FLUSH** spray condenser per Section 5.12, Flush and Draining of Spray Condenser/60J-P-3.
5.11 Rotor Flush

5.11.1 CONFIRM Dryer Boiler is in OPERATION.

5.11.2 TRANSFER Sump 1 down to minimum level per ETF-20B-001.

5.11.3 CONFIRM Dryer is in SHUTDOWN mode.

5.11.4 PLACE M1 (60JM1), dryer rotor, in MANUAL/ON.

5.11.5 LOWER LT60JJ036, spray condenser level, to approximately 20% as follows:

5.11.5.1 PLACE V274 (AOV60J274) to MANUAL.

5.11.5.2 OPEN V274 (AOV60J274) AND DRAIN level to approximately 20%.

5.11.5.3 CLOSE V274 (AOV60J274).

5.11.5.4 PLACE V273 (AOV60J273), pump suction for P3 (60JP3), in MANUAL/CLOSED.

5.11.6 REQUEST floor operator place empty drum, without lid, in drum fill position AND DOCK drum to Dryer.
5.11 Rotor Flush (Cont.)

NOTE - Hot or cold water can be used to flush Dryer, as directed by SOM.

5.11.7 IF Dryer is to be kept hot during rotor flush, PLACE PCV032 (PIC60J032), steam supply valve, in MANUAL AND REDUCE/RAISE to 10% OPEN, or as directed by SOM.

5.11.7.1 IF SOM direction provided, RECORD ETF Control Room Logbook.

5.11.8 OPEN historian and trend for the Sump 1 level AND MONITOR sump level.

5.11.9 PLACE V155 (AOV60J155) hopper isolation valve in MANUAL/OPEN, or as directed by SOM.

5.11.9.1 IF SOM direction provided, RECORD ETF Control Room Logbook.

5.11.10 PLACE V160 (AOV60J160) hopper drain valve in MANUAL/CLOSED, or as directed by SOM.

5.11.10.1 IF SOM direction provided, RECORD ETF Control Room Logbook.

5.11.11 IF directed by SOM, CYCLE V155 (AOV60J155) OPEN and CLOSED as required to remove solids above valve.

5.11.12 CLOSE 60J-155, dryer feed inlet valve.

5.11.13 FULLY OPEN 60J-122, verification water isolation valve.

5.11.14 FULLY OPEN 60J-193, hot water steam supply isolation valve.

5.11.15 PLACE V159 (AOV60J159) in MANUAL/OPEN.
5.11 Rotor Flush (Cont.)

Special Instructions

Sump 1 level historian and trend should be monitored continuously when flushing to determine if flush liquid is flowing into Sump 1.

To avoid overfilling the flush drum, dryer hopper V155 (AOV60J155) must be closely monitored for leaks. The flush drum can be pumped into Dryer Room sump drain as needed with a submersible pump.

**WARNING**

Steam or water may escape from the docked drum when V157 (AOV60J157) is open, which may cause injury to personnel in the Dryer Room.

NOTE - The flow rate of flush water into Dryer is about 8 - 10 gpm.
- An MCS interlock has been installed to prevent V157 (AOV60J157) from opening until V159 (AOV60J159) is fully open. This is to prevent blowout of rupture disk PSE60J123.

5.11.16 IF personnel are in the Dryer Room, NOTIFY them to enter the airlock prior to opening V157 (AOV60J157).

5.11.17 PLACE V157 (AOV60J157) in MANUAL/OPEN for ten to fifteen seconds, or as directed by SOM.

5.11.17.1 IF SOM direction provided, RECORD ETF Control Room Logbook.

5.11.18 MONITOR drum temperature on TT60J020 for increase.

5.11.19 PLACE V157 (AOV60J157) in MANUAL/OPEN for five seconds, or as directed by SOM AND

MONITOR drum temperature and rotor amps.

5.11.19.1 IF SOM direction provided, RECORD ETF Control Room Logbook.

5.11.20 CLOSE V155 (AOV60J155) AND

REQUEST floor operator lower flush drum.
5.11 Rotor Flush (Cont.)

5.11.21 PLACE V160 (AOV60J160) in MANUAL/OPEN.

5.11.22 VISUALLY OBSERVE flow into Sump 1 through viewing hatch as flushing is started as directed by SOM.

5.11.22.1 RECORD SOM directions in the ETF Control Room Logbook.

NOTE - 1% of level in Sump 1 is equal to about eleven gallons. Eight gallons is equal to about 0.7% of the level in Sump 1. If V155 (AOV60J155) is leaking, the amount of liquid going to Sump 1 is less than 0.7%.

5.11.23 PLACE V157 (AOV60J157) in MANUAL/OPEN for one minute, or as directed by SOM.

5.11.23.1 IF SOM direction provided, RECORD ETF Control Room Logbook.

5.11.24 LOCALLY THROTTLE 60J-122, verification valve water valve, until TI60J194 (local), hot water temperature, indicates 175 to 185°F.

5.11.25 MONITOR Sump 1 trend and historian to ensure water is drained into Sump 1.

NOTE - CRO may monitor leak rate via remote camera when camera is operating.

5.11.26 NOTIFY ETF Control Room of V155 (AOV60J155) leak rate.

5.11.27 IF expected rise in Sump 1 does not occur, PERFORM the following:

5.11.27.1 REQUEST floor operator dock flush drum.

5.11.27.2 CYCLE OPEN V155 (AOV60J155).

5.11.27.3 MONITOR TT60J020 (drum temp) for temperature increase.

5.11.27.4 CLOSE V155 (AOV60J155) AND REQUEST floor operator lower drum.

5.11.27.5 REPEAT Steps 5.11.23 through 5.11.26.

5.11.27.6 IF expected temperature rise does not occur, NOTIFY SOM to determine if Section 5.19, Flush Dryer Drain Line, needs performance.
5.11 Rotor Flush (Cont.)

5.11.28 IF V155 (AOV60J155) is leaking, MONITOR level in flush drum AND EMPTY flush drum into Dryer Room sump drain as directed by SOM.

5.11.28.1 RECORD SOM directions in the ETF Control Room Logbook.

NOTE - It usually takes one to five minutes to dilute any residual powder in drain line to Sump 1.

5.11.29 BEFORE initiating rotor fill, PLACE V157 (AOV60J157) in MANUAL/OPEN for time specified by SOM to flush drain line to Sump 1.

5.11.30 LOCALLY THROTTLE 60J-122, verification valve water valve, until TI60J194 (local), hot water temperature, indicates 175 to 185°F.

5.11.31 MONITOR Sump 1 trend and historian to ensure flush water is drained into Sump 1.

5.11.32 CLOSE V157 (AOV60J157).

5.11.33 CLOSE V160 (AOV60J160).

5.11.34 ADD water to Dryer vessel as follows:

5.11.34.1 OPEN V157 (AOV60J157).

5.11.34.2 IF needed, LOCALLY THROTTLE 60J-122, verification valve water valve, until TI60J194 (local), hot water temperature, indicates 175 to 185°F.

5.11.34.3 CLOSE V157 (AOV60J157) following a 20-minute addition or carryover to spray condenser is observed.

5.11.35 MONITOR V155 (AOV60J155) for leakage to flush drum AND EMPTY flush drum into Dryer Room sump drain as directed by SOM.

5.11.35.1 RECORD SOM directions in ETF Control Room Logbook.

5.11.36 MONITOR IT60J056, rotor amps, for expected increase (15 to 20 amps).

5.11.37 MONITOR spray condenser level AND EMPTY via V274 (AOV60J274).
5.11 Rotor Flush (Cont.)

5.11.38 MAINTAIN water in vessel an additional 20 minutes.

5.11.39 OPEN V160 (AOV60J160) to drain vessel to Sump 1.

5.11.40 MONITOR Sump 1 trend and historian to ensure water is drained into Sump 1 AND

VIA remote camera, OBSERVE Dryer hopper discharge into drum to ensure V155 (AOV60J155) is not leaking excessively.

NOTE - Sump 1 may also be observed through viewing hatch.

5.11.41 IF Sump 1 level has stopped increasing AND

IF Dryer rotor amps, as indicated by II60J056, are greater than 9.5 amps, PERFORM the following:

5.11.41.1 OPEN V157 (AOV60J157) for three minutes.

5.11.41.2 MONITOR Sump 1 level.

5.11.41.3 IF no rise in Sump 1 level, CYCLE V160 (AOV60J160) three times.

5.11.41.4 IF level in Sump 1 increases, OPEN V157 (AOV60J157) for three to five minutes until clean water is seen entering Sump 1.

5.11.41.5 WHEN Sump 1 level stops increasing, CLOSE V160 (AOV60J160).

5.11.41.6 IF Sump 1 level does not increase, NOTIFY SOM the Dryer drain line needs to be flushed.

5.11.42 WHEN Sump 1 level rise indicates flow to sump has ceased, REQUEST floor operator dock flush drum to Dryer.

Special Instructions

IT60J056, Dryer rotor amps, are generally less than 9 amps when Dryer vessel is empty.

5.11.43 PRIOR to opening V155 (AOV60J155), CHECK Dryer rotor amps to confirm they are below 9.5 amps.

5.11.43.1 IF IT60J056, Dryer rotor amps, are below 9.5 amps, OPEN V155 (AOV60J155).
5.11 Rotor Flush (Cont.)

 NOTE - Drum temperature should spike if sludge from Dryer falls into drum.

5.11.44 ON MCS, MONITOR drum temperature TT60J020.

5.11.45 OPEN V157 (AOV60J157) for approximately three to five seconds, THEN CLOSE.

5.11.46 WAIT one minute AND

REPEAT Step 5.11.45 one time.

5.11.47 REQUEST the floor operator to perform the following:

5.11.47.1 LOWER drum AND

NOTIFY ETF Control Room of any observations about drum contents.

NOTE - Steps 5.11.49 through 5.11.51 for flushing water through V155 (AOV60J155) to an undocked drum may be bypassed at direction of SOM.

5.11.48 IF directed by SOM, GO TO Step 5.11.52.

5.11.49 ENSURE V155 (AOV60J155) is OPEN.

5.11.50 PLACE V157 (AOV60J157) in MANUAL/OPEN for three to ten seconds (one to two gallons), or as directed by SOM.

5.11.50.1 IF SOM directions provided, RECORD in ETF Control Room Logbook.

5.11.51 MONITOR appearance of water exiting from Dryer hopper discharge AND

IF directed by SOM, REPEAT Step 5.11.50.

5.11.52 PLACE V157 (AOV60J157) in AUTO.

5.11.53 PLACE V155 (AOV60J155) in AUTO AND

CONFIRM CLOSED.
5.11 Rotor Flush (Cont.)

5.11.54  **TRANSFER** water in the flush drum into Dryer Room sump drain as directed by SOM.

5.11.54.1 **RECORD** SOM directions in ETF Control Room Logbook.

5.11.55  **PLACE** the following valves in AUTO:
- V159 (AOV60J159)
- V160 (AOV60J160).

5.11.56  **CLOSE** 60J-193, hot water steam supply isolation valve.

5.11.57  **FULLY OPEN** 60J-122, verification water isolation valve.

5.11.58  **OPEN** 60J-155, dryer feed inlet valve.

5.11.59  **FLUSH** spray condenser per Section 5.12.
5.12 Flush and Draining of Spray Condenser/60J-P-3

5.12.1 PLACE the following valves in MANUAL:
   • V273 (AOV60J273)
   • V274 (AOV60J274).

5.12.2 CLOSE V273 (AOV60J273).

NOTE - Sight glass FG-60J-001 in the Dryer Room can be used to observe the liquid being drained to see if there are solids in the distillate.

5.12.3 OPEN V274 (AOV60J274).

5.12.4 MONITOR condenser level.

5.12.5 WHEN the condenser level drops to 20%, ALLOW the draining to continue for five more minutes.

5.12.6 OPEN V158 (AOV60J158) for 30 to 45 seconds, THEN CLOSE.

5.12.7 WAIT three minutes AND
   REPEAT Step 5.12.6 two more times.

5.12.8 PLACE V274 (AOV60J274) in AUTO.

5.12.9 OPEN V273 (AOV60J273).

5.12.10 OPEN V158 (AOV60J158).

5.12.11 RAISE level at LT60JJ036 to 50%, THEN CLOSE V158 (AOV60J158).

5.12.12 PLACE V273 (AOV60J273) in AUTO.
5.13 Bridged Dryer/Quick Flush

**Special Instructions**

This section may be utilized for a bridged Dryer Condition or when the SOM and DA concur a Quick Flush is needed, based on other system parameters.

5.13.1 **CHECK** Dryer is not full of water.

5.13.2 **CONFIRM** Dryer is in SHUTDOWN mode.

5.13.3 **FULLY OPEN** valve 60J-122, verification water isolation valve.

5.13.4 **FULLY OPEN** 60J-193, hot water steam supply isolation valve.

5.13.5 **IF** Dryer is to be kept hot during quick flush, **PLACE** PCV032 (PIC60J032), steam supply valve, in MANUAL AND **REDUCE/RAISE** to 100% OPEN, or as directed by SOM.

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

5.13.6 **CHECK** that an empty drum, without lid, is in drum fill position and docked to Dryer.

5.13.6.1 **IF** empty drum, without lid, is not at drum fill position and docked, **REQUEST** floor operator position empty drum, without lid, in the fill position and dock it to the Dryer.

**NOTE** - Drum temperature should spike if sludge from Dryer falls into drum.

5.13.7 **ON** MCS, **MONITOR** drum temperature TT60J020.

5.13.8 **PLACE** V155 (AOV60J155), hopper isolation valve, in MANUAL/OPEN.

5.13.9 **PLACE** V160 (AOV60J160), hopper drain valve, in MANUAL/CLOSED.

5.13.10 **PLACE** V159 (AOV60J159), dryer vent dump valve, in MANUAL/OPEN.

5.13.11 **PLACE** V157 (AOV60J157), dryer water fill valve, in MANUAL.

5.13.12 **OPEN** V157 (AOV60J157) for 10 to 20 seconds to allow 2 to 4 gallons of water into drum.

5.13.13 **CLOSE** V157 (AOV60J157).

5.13.14 **CYCLE** V155 (AOV60155) CLOSED, THEN OPEN.
5.13 Bridged Dryer/Quick Flush (Cont.)


5.13.16  REQUEST floor operator perform the following:

5.13.16.1  LOWER drum AND

NOTIFY ETF Control Room of any observations about drum contents.

**WARNING**

Entering the drum room when the hopper isolation valve V155 (AOV60J155) is being operated and drum is not docked could result in personnel contamination if bridged powder unexpectedly breaks loose and falls into drum.

5.13.17  DO NOT ENTER drum room when the hopper isolation valve V155 (AOV60J155) is being operated and drum is not docked.

**Special Instructions**

Step 5.13.18 specifies that the hopper isolation valve V155 (AOV60J155) be opened. Since a full dryer body will contain about 200 gallons of water, it is critical to verify that the Dryer contains only a minimal amount of water (less than 5 gallons) before opening the valve. If the Dryer contains an excessive amount of water, it will overflow the drum onto the floor.

**CAUTION**

If spray condenser level exceeds 100%, water may overflow into the VOG System, damaging the VOG blower.

NOTE - Steps 5.13.19 through 5.13.21 are for flushing water through V155 (AOV60J155) to an undocked drum and may be bypassed at direction of SOM.

5.13.18  BEFORE opening V155 (AOV60J155), CONFIRM Dryer contains less than five gallons of water.

5.13.19  ENSURE V155 (AOV60J155) is OPEN.
5.13 Bridged Dryer/Quick Flush (Cont.)

5.13.20 PLACE V157 (AOV60J157) in MANUAL/OPEN for three to ten seconds (one to two gallons), or as directed by SOM.

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

5.13.21 MONITOR appearance of water exiting from Dryer hopper discharge AND IF directed by SOM, REPEAT Step 5.13.20.

5.13.22 PLACE V157 (AOV60J157) in AUTO.

5.13.23 PLACE V155 (AOV60J155) in AUTO AND CONFIRM CLOSED.

5.13.24 PLACE the following valves in AUTO:

- V159 (AOV60J159)
- V160 (AOV60J160).

5.13.25 CLOSE 60J-193, hot water steam supply isolation valve.

5.13.26 TRANSFER water in drum into Dryer Room sump drain as directed by SOM.
5.14 Locked Rotor/Bridged Dryer Flush

5.14.1 CONFIRM Dryer is in SHUTDOWN mode.

5.14.2 CONFIRM Boiler is in OPERATION.

5.14.3 IF it is desired to keep Dryer hot during SHUTDOWN, PLACE PCV032 (PIC60J032), steam supply valve, in MANUAL 10% OPEN.

5.14.4 LOWER LIC60J036, spray condenser level, to approximately 20%.

5.14.4.1 PLACE P3 (60JP3) to MANUAL/ON.

5.14.4.2 PLACE LCV036 (LIC60J036) in MANUAL with 100% output setting,

OR

PLACE in AUTO with a 20% setpoint.

5.14.5 SHUT DOWN P3 (60JP3) as follows:

5.14.5.1 PLACE P3 (60JP3) to MANUAL/OFF.

5.14.5.2 PLACE LCV036 (LIC60J036) in AUTO with a 50% setpoint.

5.14.5.3 PLACE V273 (AOV60J273), pump suction for P3 (60JP3), in MANUAL/CLOSED.

5.14.5.4 IF LT60JJ036 trends above 50% (anytime during quick flushes), DRAIN condenser tank by opening V274 (AOV60J274).

5.14.6 REQUEST floor operator perform the following:

5.14.6.1 PLACE empty drum, without lid, in the drum fill position AND DO NOT dock drum to Dryer.

5.14.7 ENSURE V155 (AOV60J155) is CLOSED.
5.14 Locked Rotor/Bridged Dryer Flush (Cont.)

5.14.8 IF directed by SOM, **LOCALLY ENSURE** V155 (AOV60J155) is actually closed as follows:

5.14.8.1 **ENTER** Dryer Room.

5.14.8.2 **LOOK** at the end of the drive shaft (drive shaft should be in horizontal position) **AND**

**CONFIRM** valve V155 (AOV60J155) is CLOSED.

5.14.8.3 **VISUALLY INSPECT** valve with long-handled mirror.

5.14.8.4 IF valve is not completely closed, **DOCK** drum prior to closing valve manually.

5.14.8.5 **USING** a wrench, **MANUALLY CLOSE** V155 (AOV60J155).

5.14.8.6 **EXIT** Dryer Room.

5.14.9 **PLACE** V159 (AOV60J159) in MANUAL/OPEN.

5.14.10 **CLOSE** 60J-155, dryer feed inlet valve.

5.14.11 **ENSURE** 60J-122, verification water valve, is FULLY OPEN.

5.14.12 **OPEN** 60J-193, hot water steam supply isolation valve.

**NOTE** - To prevent blowout of rupture disk PSE60J213, an MCS interlock has been installed to prevent V157 (AOV60J157) from being opened until V159 (AOV60J159) is fully open.

5.14.13 **PLACE** V157 (AOV60J157) in MANUAL/OPEN.

5.14.14 **LOCALLY THROTTLE** 60J-122, verification water valve, until TI60J194 (local), hot water temperature, indicates 175 to 185°F.

5.14.15 **OBSERVE** Dryer hopper flange for leakage using camera **AND**

**NOTIFY** CRO of abnormal observation.
5.14 Locked Rotor/Bridged Dryer Flush (Cont.)

CAUTION
Solid carry over from the Dryer to the spray condenser can cause the 60J-P-3 distillate pump to fail.
If spray condenser level exceeds 100%, water may overflow into the VOG System, damaging the VOG blower.

NOTE - Spray condenser level LT60J036 will indicate a 1 to 3% rise as water is initially added to the Dryer body due to temperature of Dryer and condensing of vapor. This rise is to be expected.

5.14.16 CLOSELY MONITOR LT60J036 for an abrupt increase in level (indicating full Dryer body), THEN IMMEDIATELY CLOSE V157 (AOV60J157).
5.14.17 CONFIRM V157 (AOV60J157) CLOSED.
5.14.18 ALLOW Dryer body to soak for approximately 20 minutes.
5.14.19 PLACE V160 (AOV60J160), dryer body drain valve, in MANUAL/OPEN AND
MONITOR LT-20B-001 Sump 1 for rise.
5.14.20 WAIT ten minutes or until LT-20B-001 levels OFF.
5.14.21 IF no level rise is observed, NOTIFY SOM to determine if Section 5.19 needs performance.
5.14.22 IF level rise was seen in Sump 1 and has leveled off, OPEN V157 (AOV60J157).
5.14.23 MONITOR LT-20B-001, Sump 1, for additional level rise.
5.14.24 ADD water to Sump 1 for five minutes, THEN CLOSE V157 (AOV60J157).

CAUTION
Damage to motor windings may occur if not allowed to cool between restart attempts.

5.14.25 IF rotor fails to start, WAIT 30 minutes between restart attempts to allow motor windings to cool.
5.14 Locked Rotor/Bridged Dryer Flush (Cont.)

5.14.26 PLACE M1 (60JM1), dryer motor, in MANUAL.

5.14.27 OBSERVE IT60J056, rotor amp meter, AND SIMULTANEOUSLY PLACE M1 (60JM1), dryer rotor, in START.

5.14.28 IF amp draws greater than or equal to 25 amps for more than five seconds, PLACE M1 (60JM1) to OFF AND NOTIFY SOM.

5.14.29 IF Dryer rotor amps are normal, PERFORM the following:

5.14.29.1 OPEN V155 (AOV60J155) in MANUAL.

5.14.29.2 OBSERVE residual flush material falling into drum.

Special Instructions

Further flushing may be directed by SOM. If Dryer batch is considered complete due to scheduled maintenance or other plant conditions, it may be necessary to perform Section 5.11 after clearing the Locked Rotor/Bridged condition.

5.14.30 PLACE the following AOVs in AUTO:
- V157 (AOV60J157)
- V155 (AOV60J155)
- V160 (AOV60J160).

5.14.31 CLOSE 60J-193, hot water steam supply isolation valve.


5.14.33 OPEN 60J-122, verification water valve.

5.14.34 PLACE V159 (AOV60J159) in AUTO.

5.14.35 IF directed by SOM, STOP M1 (60JM1), dryer rotor, AND PLACE in AUTO.

5.14.36 FLUSH spray condenser per Section 5.12.
5.15 System Layup

Special Instructions

The SOE will perform those steps identified as (SOE). The SOE and an electrician will perform step identified as (ELEC/SOE).

5.15.1 CONFIRM rotor flush has been performed.

5.15.2 CHECK SHUTDOWN light is steady ON.

5.15.3 CLOSE 60J-131, skid air supply isolation valve.

5.15.4 (SOE) CLOSE 60J-214, steam supply valve.

5.15.5 CLOSE the following verification water supply valves:
- 60J-147
- 60J-122
- 60H-116.

5.15.6 (SOE) WHEN temperature indicators TI60J014 and TI60J011 indicate within 5°F of room 139 ambient temperature, CLOSE the following valves:
- 60J-222, Steam Supply Line Condensate Return
- 60J-120, Main Jacket Condensate Return
- 60J-114, Lower Bearing Jacket Condensate Return
- 60J-115, Powder Hopper Coil Condensate Return.

5.15.7 CLOSE 60J-123, feed isolation valve.
5.15 **System Layup (Cont.)**

NOTE - Approximately 30 gallons will be drained from spray condenser, distillate cooler, and associated piping.

5.15.8 **DRAIN** the following per the subsequent steps:

- 60J-DE-1, Spray condenser
- 60J-CND-01, Distillate cooler and associated piping.

5.15.8.1 **PLACE** LCV036 (LIC60J036), spray condenser liquid level controller, in MANUAL.

5.15.8.2 **SET** LCV036 (LIC60J036) output to 100% (OPEN).

5.15.8.3 **ON** graphic Dryer, **MONITOR** FT60J035.

5.15.8.4 **PLACE** P3 (60JP3), distillate pump, in MANUAL AND **START** Pump P3 (60JP3).

5.15.8.5 **WHEN** FT60J035 indicates ZERO flow, **STOP** P3 (60JP3).

5.15.8.6 **PLACE** P3 (60JP3) in AUTO.

5.15.8.7 **PLACE** LCV036 (LIC60J036), spray condenser liquid level controller, in AUTO at 50% setpoint.

5.15.8.8 **PLACE** the following valves in MANUAL/OPEN:

- V273 (AOV60J273)
- V274 (AOV60J274).

5.15.8.9 **CLOSE** 60J-125, distillate to surge tank isolation.
5.15 System Layup (Cont.)

NOTE - Approximately three quarts will be drained from the Dryer body.

5.15.9 DRAIN Dryer body as follows:

5.15.9.1 PLACE V160 (AOV60J160), dryer body drain valve, in MANUAL/OPEN.

5.15.9.2 MONITOR Sump 1 (LT-20B-001) for an increase in level.

5.15.9.3 BEFORE opening V155 (AOV60J155), WAIT until the level in LT-20B-001 stops rising.

5.15.9.4 REQUEST floor operator position 55-gallon drum under discharge of V155 (AOV60J155), dryer hopper isolation valve.

5.15.9.5 PLACE V155 (AOV60J155) in MANUAL.

5.15.9.6 OPEN V155 (AOV60J155).

5.15.9.7 WHEN flow from hopper stops, REQUEST floor operator remove 55-gallon drum.

5.15.10 DON PPE per appropriate ERA listed in Section 3.1.

5.15.11 (ELEC/SOE) PLACE electrical breakers listed in Data Sheet 1 to OFF.
5.16 LT60J036 Wet Leg Fill

NOTE - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.16.1 CHECK PT60J033, vapor pipe pressure, indicates -2 to -6 inWC.

5.16.2 PLACE V160 (AOV60J160), dryer drain valve, in MANUAL, THEN OPEN.

5.16.3 CLOSE 60J-122, verification water isolation valve.

5.16.4 ENSURE the following distillate level transmitter isolation valves are OPEN:
   • 60J-271
   • 60J-272.

5.16.5 OPEN V158 (AOV60J158), verification water valve.

5.16.6 CONCURRENTLY PERFORM the following steps:

   5.16.6.1 MONITOR spray condenser level by knocking on tank.

   5.16.6.2 SLOWLY THROTTLE OPEN 60J-122, verification water valve, to add water to spray condenser 60J-DE-1.

   5.16.6.3 WHEN tank level reaches the 4-in. by 4-in. steel support beam, CLOSE 60J-122.

5.16.7 CLOSE V158 (AOV60J158), verification water valve.

5.16.8 CLOSE V160 (AOV60J160), dryer drain valve, THEN PLACE in AUTO.

5.16.9 CONFIRM LCV036 (LIC60J036) is in AUTO.

5.16.10 CONFIRM LCV036 (LIC60J036), spray condenser level, controller setpoint is at 50%.

5.16.11 PLACE P3 (60JP3), dryer distillate pump, in MANUAL/ON.

5.16.12 WHEN LT60J036, spray condenser level, has stabilized near the 50% setpoint, PLACE P3 (60JP3), dryer distillate pump, in AUTO.

5.16.13 RETURN TO Step 5.2.17.
5.17 Quick Restart of Hot Dryer

**Special Instructions**

All electrical lineups, valve lineups, and other prerequisites must be met to support a successful transition to the RUN mode.

The SOE will perform those steps identified as (SOE).

5.17.1 **CHECK** Dryer wall temperature TT60J011 is greater than or equal to 228°F.

5.17.2 **ENSURE** Dryer is in SHUTDOWN mode.

5.17.3 **MONITOR** dryer steam boiler pressure PT-65A011 to ensure PCV032 (PIC60J032) is not being opened too rapidly.

5.17.4 (SOE) **ON** group display Steam, **PLACE** setpoint at 145 psig, or as directed by SOM, on PIC65A011.

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

5.17.5 **PLACE** PCV032 (PIC60J032), steam supply valve, in MANUAL AND **OPEN** to 100% in 10% increments.

5.17.6 **PLACE** HS Drum Ready for Fill (HS80C400E) in ON.

5.17.7 **PLACE** Dryer in STARTUP mode.

5.17.8 **PLACE** Dryer in RUN mode.
5.18 Quick Restart of Dryer Boiler

Special Instructions

All electrical lineups, valve lineups, and other prerequisites must be met to support a successful transition to RUN mode.

The SOE will perform those steps identified as (SOE).

5.18.1 CHECK Dryer wall temperature TI60J-011 is greater than or equal to 228°F.

5.18.2 ENSURE Dryer is in SHUTDOWN mode.

5.18.3 (SOE) ON graphic Steam, ENSURE boiler water level LT65A010 is greater than 50% (50 to 65%).

5.18.4 (SOE) ON graphic Steam, ENSURE Condensate Tank water level LT65A001 is greater than 62%.

5.18.5 PLACE PCV032 (PIC60J032), steam supply valve, in MANUAL and 50% OPEN.

5.18.6 (SOE) ON group 56, PLACE setpoint at 145 psig, or as directed by SOM, on PIC65A011.

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

5.18.7 (SOE) ON graphic Steam, SELECT OPERATION.

5.18.8 (SOE) ON graphic Steam,

OR

ON local controller, PC-65A-041, WAIT for boiler pressure to remain stable (130 to 145 psig) for two minutes.

5.18.9 GO TO Section 5.17, Quick Restart of Hot Dryer.
5.19 Flush Dryer Drain Line

NOTE - If the Dryer will not drain following a rotor flush, Section 5.19 may be used in attempt to clear the drain line. This process uses distillate stored in the spray condenser and pressurized to about 45 psig by distillate pump 60J-P-3.

5.19.1 CONFIRM Dryer is in SHUTDOWN mode.

5.19.2 FLUSH drain line to Sump 1 as follows:

5.19.2.1 CHECK V160 (AOV60J160), dryer drain valve, is CLOSED.

5.19.2.2 CHECK 60J-257, dryer drain valve, is OPEN.

5.19.2.3 CONFIRM P3 (60JP3), distillate pump, is ON.

5.19.2.4 OPEN 60J-256, distillate injection valve, for ten seconds, THEN CLOSE.

5.19.2.5 MONITOR LT60J036 liquid level in the spray condenser.

NOTE - A spray condenser LT60J036 level change from 50% to 0% is equivalent to a liquid decrease of thirteen gallons.

5.19.2.6 IF the spray condenser level drops excessively, OPEN V158 (AOV60J158), verification water valve.

5.19.2.7 WHEN spray condenser level is 50% to 80%, CLOSE V158 (AOV60J158).

5.19.2.8 REPEAT Steps 5.19.2.4 through 5.19.2.7 two more times.
5.19  Flush Dryer Drain Line (Cont.)

5.19.3  **BACKFLUSH** drain line into the Dryer as follows:

**Special Instructions**

Any water that accumulates in the Dryer through the following backflushing of the drain line must eventually be removed.

5.19.3.1  **IF** water has accumulated in the Dryer, **DRAIN** to Sump 1 via V160 (AOV60J160) (normal route).

5.19.3.2  **IF** water is not drainable to Sump 1 via V160 (AOV60J160) (normal route), **PERFORM** Section 5.13, Bridged Dryer/Quick Flush, to dump to a drum via V155 (AOV60J155).

5.19.3.3  **OPEN** V160 (AOV60J160), dryer drain valve.

5.19.3.4  **CLOSE** 60J-257, dryer drain line valve.

5.19.3.5  **CONFIRM** distillate pump P3 (60JP3) is ON.

5.19.3.6  **OPEN** 60J-256, distillate injection valve, for ten seconds, **THEN CLOSE**.

5.19.3.7  **MONITOR** LT60J036 liquid level in the spray condenser.

**NOTE** - A spray condenser LT60J036 level change from 50% to 0% is equivalent to a liquid decrease of 13 gallons.

5.19.3.8  **IF** the spray condenser level drops excessively, **OPEN** V158 (AOV60J158), verification water valve.

5.19.3.9  **WHEN** the spray condenser level is 50 to 80%, **CLOSE** V158 (AOV60J158).

5.19.3.10  **REPEAT** Steps 5.19.3.6 through 5.19.3.9 two more times.

5.19.4  **OPEN** 60J-257, dryer drain valve.

5.19.5  **CLOSE** V160 (AOV60J160), dryer drain valve.
Thin Film Dryer Operation

5.20 Cool Down Dryer for Camera Inspection

NOTE - Steps may be performed concurrently, in any logical order as applicable.

_____ 5.20.1 CHECK Dryer is in RUN.

_____ 5.20.2 SELECT DAILY FLUSH.

_____ 5.20.3 CHECK DAILY FLUSH light blinks, then goes steady ON.

_____ 5.20.4 WAIT 30 minutes, THEN SELECT SHUTDOWN.

_____ 5.20.5 CHECK SHUTDOWN light is steady ON.

_____ 5.20.6 PERFORM Section 5.23, Boiler Shutdown.

_____ 5.20.7 LOWER drum from DOCKED position.

_____ 5.20.8 ON Dryer mezzanine, ISOLATE air to hopper knocker at valve 1B-065.

_____ 5.20.9 PLACE V159 (AOV60J159) in MANUAL/OPEN.

_____ 5.20.10 PLACE V155 (AOV60J155) in MANUAL/OPEN.

_____ 5.20.11 PLACE Dryer Blower 60JF1 in MANUAL/ON.

_____ 5.20.12 ROUTINELY throughout the cool down, ENSURE the following condensate receivers (VOG drain pots) are drained to Sump 1:

- 60J-236
- 60J-237.

_____ 5.20.13 MONITOR TT60J-019, dryer body temperature, for decrease.

_____ 5.20.14 MONITOR TT60J-018, dryer hopper temperature, for decrease.

_____ 5.20.15 IF temperatures do not show a decrease after fifteen minutes, NOTIFY SOM.

_____ 5.20.16 WHEN TT60J-019 is less than 150°F, NOTIFY SOM.

_____ 5.20.17 ON Dryer mezzanine, OPEN valve 1B-065, air to hopper knocker.

_____ 5.20.18 WHEN camera inspection is complete, GO TO appropriate section of procedure specified by process memo, or as directed by SOM.

5.20.18.1 RECORD SOM directions in ETF Control Room Logbook.
5.21 Reduce Boiler Steam Pressure

Special Instructions
Section 5.21 is performed only if a lower boiler steam pressure setpoint has been specified by the SOM or process memo.

The SOE performs Section 5.21.

5.21.1 (SOE) ON group 56, **PLACE** PIC65A011 in AUTO with a setpoint less than or equal to 145 psig.

5.21.2 (SOE) **ON** group display,

**OR**

**ON** graphic Steam, **CONFIRM** the boiler pressure drops and is controlled at approximately the new setpoint.

5.21.3 **RECORD** new setpoint in ETF Control Room Logbook.
5.22 **Steam Boiler Sampling**

**Special Instructions**
The SOE performs Section 5.22 except where noted as (NCO/SOE) performance at Step 5.22.11.

5.22.1 **CONFIRM** the following valves, for cooling water to boiler sample cooler, are OPEN:
- 65A-048, Inlet
- 65A-102, Outlet.

**WARNING**
Potential for hot or flashing samples exist even with sample cooler in operation, and may cause serious burns to the hands and face.

5.22.2 **DON** the following PPE:
- Thermal gloves (e.g., leather gloves)
- Apron
- Face shield.

5.22.3 **PLACE** boiler sample cooler outlet hose into a bucket.

5.22.4 **SLOWLY OPEN** 65A-049, boiler sample cooler outlet valve.
5.22 Steam Boiler Sampling (Cont.)

**Special Instructions**

To avoid Boiler SHUTDOWN, Boiler water level must be monitored.

5.22.5 **DURING** performance of Steps 5.22.6 and 5.22.7, **MONITOR** Boiler water level.

5.22.5.1 **IF** necessary to avoid Boiler SHUTDOWN, **CLOSE** 65A-049, boiler sample cooler outlet valve **AND**

**AFTER** boiler water level stabilizes, **SLOWLY REOPEN** 65A-049.

5.22.6 **PURGE** at least $\frac{1}{2}$ gallon of boiler water into bucket.

5.22.7 **COLLECT** boiler sample in 1000-ml Nalgene sample bottle per ETF-65J-002.

5.22.8 **CLOSE** 65A-049, boiler sample cooler outlet valve.

5.22.9 **DISPOSE** of sample purge water in sump tank system.

5.22.10 **TRANSPORT** sample to sample prep room in accordance with ETF-65J-002.

5.22.11 *(NCO/SOE)* **NOTIFY** Dryer Boiler DA that Boiler sample has been taken.
5.23 Boiler Shutdown

Special Instructions

Dryer must be shut down before Boiler is shut down.

The SOE will perform those steps identified as (SOE).

5.23.1 IF Dryer is operating, SHUT DOWN Dryer per Section 5.8.

5.23.2 (SOE) PLACE water heater 95D-E-01 ON/OFF switch to OFF.

5.23.3 (SOE) ON graphic Steam, SELECT SHUTDOWN,

OR

PLACE Boiler ON/OFF LCP switch to OFF.

5.23.4 (SOE) IF Boiler was shutdown locally on Boiler ON/OFF LCP, THEN ON graphic Steam, SELECT SHUTDOWN.

5.23.5 PROCEED to Section 5.25, Boiler Blowdown After Shutting Down Boiler.
5.24 Boiler Blowdown with Boiler in OPERATION

Special Instructions

Boiler blowdown is used to remove sludge and solids and improve boiler water chemistry and should be performed after every startup and shutdown, and weekly during periods of continuous operation.

When performing Boiler blowdown and/or Level Column blowdown during OPERATION, maintain boiler level at four inches (local gauge) to prevent boiler low-level trip.

The SOE performs Section 5.24.

5.24.1 BLOW DOWN the Boiler and Level Column as follows:

5.24.1.1 OPEN 65A-059, boiler blowdown tank cooling water outlet valve.

5.24.1.2 WHEN Boiler Feed Pump P1 (65A-P-1) stops, SLIGHTLY CRACK OPEN 65A-045, level column drain valve.

5.24.1.3 MONITOR LG-65A010 (local boiler level indicator) AND WHEN LG-65A010 level drops to approximately 4.5 inches, CLOSE 65A-045.

5.24.1.4 ALLOW Boiler Feed Pump P1 (65A-P-1) to start.

5.24.1.5 WAIT for the following:
- Boiler Feed Pump P1 (65A-P-1) to stop
- AOV65A001 to CLOSE.

5.24.1.6 WHEN Boiler Feed Pump P1 (65A-P-1) stops, SLOWLY CRACK OPEN 65A-062, blowdown tank drain valve, until slight flow noise is heard.

5.24.1.7 WAIT five seconds, THEN CLOSE 65A-062.

5.24.1.8 REPEAT Steps 5.24.1.2 through 5.24.1.7 three times.

5.24.1.9 WHEN blowdown tank temperature TI65A107 indicates less than 100°F, CLOSE 65A-059, boiler blowdown tank cooling water outlet valve.
5.25 Boiler Blowdown After Shutting Down Boiler

**Special Instructions**

Boiler blowdown is used to remove sludge and solids and improve boiler water chemistry and should be performed after every startup and shutdown, and weekly during periods of continuous operation.

The SOE performs Section 5.25.

5.25.1 **ENSURE** Boiler is shut down per Section 5.23.

5.25.2 **OPEN** 65A-059, boiler blowdown tank cooling water outlet valve.

5.25.2.1 **SLOWLY THROTTLE OPEN** 65A-062, blowdown tank drain valve.

5.25.2.2 **IF** blowdown tank temperature increases to 180°F, as indicated by TI-65A-107, **CLOSE** 65A-062.

5.25.2.3 **WHEN** blowdown has continued for 55 to 65 seconds, **CLOSE** 65A-062.

5.25.2.4 **WHEN** blowdown tank temperature TI65A107 indicates less than 100°F, **CLOSE** 65A-059, boiler blowdown tank cooling water outlet valve.
5.25  Boiler Blowdown After Shutting Down Boiler (Cont.)

5.25.3  PERFORM the following for each drain valve in table below:

5.25.3.1  OPEN valve.

5.25.3.2  WAIT for alarms listed below to be received.

5.25.3.3  IF alarm is not received within five minutes, RECORD discrepancy in ETF Control Room Logbook AND NOTIFY Engineering of discrepancy.

5.25.3.4  CLOSE valve.

NOTE - LCU06/V61566 STEAM BOILER LEVEL LO (LALX-65A010) is an information only display and will not normally appear on the MCS Alarm summary. The MCS Alarm Summary filter must be checked to include level 4 displays in order to have this show on the alarm screen.

<table>
<thead>
<tr>
<th>Valve Number</th>
<th>Description</th>
<th>Alarm MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>65A-045</td>
<td>Local boiler level gauge LG-65A010 drain</td>
<td>LCU06/V61566 STEAM BOILER LEVEL LO (LALX-65A010)</td>
</tr>
<tr>
<td>65A-046</td>
<td>Local boiler Level Switch LS-65A013 drain</td>
<td>LCU06/LAL65A013 STEAM BOILER WATER LEVEL LOW SWITCH</td>
</tr>
<tr>
<td>65A-063</td>
<td>Local Condensate Tank Level Gauge LS-65A001 drain</td>
<td>LCU06/V61562 STEAM CONDENSATE TK LEVEL LO (LAL-65A001)</td>
</tr>
</tbody>
</table>

NOTE - Step 5.25.4 prevents feedwater from gravity-filling Boiler as Boiler cools down and depressurizes.

5.25.4  CLOSE 65A-057, boiler feedwater inlet valve.

5.25.5  ENSURE Boiler LCP ON/OFF switch is OFF.

5.25.6  ON graphic Steam, SELECT SHUTDOWN.
5.26 Long-Term Wet Layup of Boiler

Special Instructions

The SOE performs Section 5.26.

5.26.1 INSTALL lock and tag per DOE-0336 to prevent Boiler operation.

5.26.2 CONFIRM Boiler has cooled to ambient temperatures.

5.26.3 REQUEST Maintenance remove coupling/vacuum relief valve PSV65A023 from top of pigtail on the north side of the Boiler.

5.26.4 REQUEST Maintenance install hose or Tygon tube to end of pigtail on north side of Boiler.

5.26.5 ROUTE hose or Tygon tube to bucket or other suitable container.

5.26.6 REMOVE lock and tag from Boiler.

5.26.7 DON PPE per appropriate ERA listed in Section 3.1.

5.26.8 ALIGN Boiler valves and breakers per Section 5.1.

NOTE - Boiler B-1 (65A-B-1) will require several volumes of Condensate Tank TK1 (65A-TK-1 to fill). Feed Pump P1 (65A-P-1) is used for filling.

5.26.9 ON graphic Steam, PLACE Condensate Tank demineralized or verification water feed valve V021 (AOV95D021) to MANUAL.

5.26.10 ON graphic Steam, PLACE Feed Pump P1 (65A-P-1) to MANUAL.

5.26.11 LOCALLY PLACE water heater 95D-E-1 ON/OFF switch to OFF.

5.26.12 LOCALLY PLACE Boiler control panel ON/OFF switch to ON.

5.26.13 ON graphic Steam, CHECK Condensate Tank TK1 (65A-TK-1 to fill) level indicator LT65A001.

5.26.14 IF LT65A001 indicates greater than 90%, GO TO Step 5.26.17.

5.26.15 IF LT65A001, is 90% or less, ON graphic Steam, SELECT V021 (AOV95D021) to OPEN.

5.26.16 WHEN LT65A001 indicates greater than or equal to 90%, CLOSE V021 (AOV95D021).
5.26 Long-Term Wet Layup of Boiler (Cont.)

5.26.17 CONCURRENTLY PERFORM the following steps:

5.26.17.1 ON graphic Steam, SELECT Feed Pump P1 (65A-P-1) to START.

5.26.17.2 CONTINUOUSLY MONITOR indicator LT65A001 (Condensate Tank).

5.26.18 IF LT65A001 indicator drops to 30% before water enters Tygon tube or hose, PERFORM the following:

5.26.18.1 ON graphic Steam, SELECT P1 (65A-P-1) to STOP.


5.26.19 WHEN water enters Tygon tube or hose, IMMEDIATELY SELECT P1 (65A-P-1) to STOP.

5.26.20 LOCALLY PLACE Boiler control panel ON/OFF switch to OFF.

5.26.21 REINSTALL lock and tag on Boiler per DOE-0336.

5.26.22 REQUEST Maintenance remove hose or Tygon tube and reinstall coupling/vacuum relief valve PSV65A023 at pigtail on north side of Boiler.

5.26.23 DISPOSE of any liquid in bucket/container in sump tank system.

5.26.24 REMOVE lock and tag on Boiler per DOE-0336.

5.26.25 DON PPE per appropriate ERA listed in Section 3.1.

5.26.26 ENSURE MSWGR-1 (65A-B-1) dryer breaker is OPEN.
5.27 Manual Daily Flush

5.27.1 CONFIRM Dryer Boiler is in OPERATION.

5.27.2 CONFIRM Dryer is in SHUTDOWN.

5.27.3 ENSURE the following valves, for seal water to rotor mechanical seals, are OPEN:
   - 60J-128
   - 60J-179.

5.27.4 PLACE M1 (60JM1), dryer rotor, in MANUAL/ON.

5.27.5 REQUEST floor operator perform the following:
   5.27.5.1 PLACE empty drum, without lid, in the drum fill position AND DO NOT dock to Dryer.

5.27.6 SLOWLY INCREASE steam supply through PCV032 (PIC60J032) to 100% OPEN, or as directed by SOM.
   5.27.6.1 IF SOM direction provided, RECORD in ETF Control Room Logbook.

5.27.7 ENSURE 60J-123, feed isolation to dryer, is OPEN.

5.27.8 PLACE the following AOVs in MANUAL/CLOSED:
   - V154 (AOV60J154), Concentrate Feed Isolation
   - V155 (AOV60J155), Hopper Isolation
   - V159 (AOV60J159), Dryer Vent Valve
   - V160 (AOV60J160), Powder Hopper Drain.

5.27.9 PLACE LCV036 (LIC60J036) in MANUAL and 0% OUTPUT (CLOSED).

5.27.10 PLACE V156 (AOV60J156), flush water inlet to feed line isolation valve, in MANUAL/OPEN.

5.27.11 ENSURE V273 (AOV60J273), P3 (60JP3) suction isolation valve, is in AUTO/OPEN.
5.27 Manual Daily Flush (Cont.)

5.27.12 FILL spray condenser to 75% as follows:

5.27.12.1 PLACE V158 (AOV60J158) in MANUAL/OPEN AND MONITOR LT60JJ036 for level change.

5.27.12.2 CLOSE V158 (AOV60J158).

NOTE - PCV033 (PIC60J033) may be operated in MANUAL if directed by the SOM.

5.27.13 ENSURE PCV033 (PIC60J033), vapor pipe pressure, is in AUTO with a 3-inWC setpoint

OR

IF directed by the SOM place PCV033 (PIC60J033) in MANUAL.

NOTE - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.27.14 PLACE 60JF1, dryer vacuum blower, to MANUAL/START.

5.27.15 PLACE P3 (60JP3), dryer distillate pump, to MANUAL/START.

NOTE - P2 (HIC60J057) speed setting may be adjusted during recirculation process when directed by SOM.

5.27.16 ENSURE P2 speed controller HIC60J057 is in AUTO with a setting of 25.

5.27.17 PLACE P2 (60JP2) in MANUAL/START.

5.27.18 DURING MANUAL daily flush, MONITOR spray condenser level.

5.27.19 WHEN level drops below 50%, FILL spray condenser to 75% as follows:

5.27.19.1 PLACE V158 (AOV60J158) in MANUAL/OPEN AND MONITOR LT60JJ036 for level change.

5.27.19.2 CLOSE V158 (AOV60J158).

5.27.20 CONTINUE MANUAL daily flush for length of time specified by process memo, or as directed by SOM.

5.27.20.1 IF SOM direction provided, RECORD in ETF Control Room Logbook.
5.27 Manual Daily Flush (Cont.)

NOTE - If 60JF1 is not operational, refer to Section 5.0 Special Instructions.

5.27.21 WHEN flush is complete, RETURN the following to their AUTO conditions:
  • AOVs
  • Pumps.

5.27.22 PLACE LCV036 (LIC60J036) to AUTO with 50% setpoint.

5.27.23 PLACE V160 (AOV60J160) in MANUAL/OPEN.

5.27.24 AFTER three to five minutes, PLACE V160 (AOV60J160) in AUTO.
5.28 Cleaning of Spray Condenser

5.28.1 CONFIRM Dryer is in SHUTDOWN.

5.28.2 CONFIRM spray condenser has been drained and flushed per Section 5.12.

5.28.3 DRAIN spray condenser as follows:

5.28.3.1 PLACE P3 (60JP3), dryer distillate pump, to MANUAL/OFF.

5.28.3.2 PLACE the following AOVs in MANUAL:
- V273 (AOV60J273)
- V274 (AOV60J274).

5.28.3.3 CLOSE V273 (AOV60J273).

5.28.3.4 OPEN V274 (AOV60J274).

5.28.3.5 MONITOR condenser level.

5.28.3.6 WHEN the condenser level drops to 20%, ALLOW the draining to continue for five more minutes.

5.28.3.7 CLOSE V274 (AOV60J274).

5.28.4 PLACE LCV036 (LIC60J036) in MANUAL at 0% OUTPUT/CLOSED.
5.28 Cleaning of Spray Condenser (Cont.)

**WARNING**

Sodium EDTA may cause eye, skin, and respiratory tract irritation.

5.28.5 PRIOR to working with chemicals, CONFIRM safety shower and eye wash are operational.

5.28.6 DON the following PPE:
- Protective apron
- Rubber gloves
- Chemical goggles.

NOTE - Hot sanitary water from the sample prep room may be used for making up the one gallon of cleaning solution. More than one gallon of water may be required depending on the amount of chemicals specified to be added per the process memo.

5.28.7 SLOWLY MIX amount of Sodium EDTA, MC-1, or MemChem MCT201 specified by process memo in one gallon of hot water.

5.28.8 ENSURE chemicals are fully dissolved.

5.28.9 REMOVE lid from chemical addition funnel on top of valve 60J-270 on the piping to the spray condenser level transmitter, LT60JJ036.

5.28.10 OPEN valve 60J-270.

5.28.11 ADD one gallon of water to spray condenser.

5.28.12 ADD chemical solution to spray condenser.

5.28.13 ADD at least one gallon of water to flush funnel and tubing.

5.28.14 CLOSE 60J-270.

5.28.15 INSTALL lid on chemical addition funnel.

5.28.16 PLACE V274 (AOV60J274) in AUTO.

5.28.17 OPEN the following AOVs:
- V273 (AOV60J273)
- V159 (AOV60J159).
5.28 Cleaning of Spray Condenser (Cont.)

5.28.18 OPEN V158 (AOV60J158) AND
RAISE level at LT60J036 to 50%.

5.28.19 CLOSE V158 (AOV60J158).

5.28.20 CLOSE V159 (AOV60J159).

5.28.21 PLACE V273 (AOV60J273) in AUTO.

5.28.22 PLACE V156 (AOV60J156), flush water inlet to feed line isolation valve, in MANUAL/CLOSED.

5.28.23 PLACE P3 (60JP3), dryer distillate pump, to MANUAL/START.

5.28.24 DURING recirculation of the chemical solution, MONITOR spray condenser level.

5.28.25 WHEN level drops below 45%, FILL the spray condenser to 50% as follows:

5.28.25.1 PLACE V159 (AOV60J159) in MANUAL/OPEN.

5.28.25.2 PLACE V158 (AOV60J158) in MANUAL/OPEN AND
MONITOR LT60J036 for level change.

5.28.25.3 CLOSE V158 (AOV60J158).

5.28.25.4 CLOSE V159 (AOV60J159).

5.28.26 CONTINUE recirculation of chemical solution for length of time specified by process memo, or as directed by SOM.

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

5.28.27 AT completion of cleaning, RETURN the following to their AUTO conditions:
- AOVs
- Pump.

5.28.28 PLACE LCV036 (LIC60J036) in AUTO with 50% setpoint.
5.29 Cleaning of Blower Off-Gas Demister, 60J-DE-02

5.29.1 CONFIRM Dryer is in SHUTDOWN.

5.29.2 CONFIRM 60JF1, dryer blower, is in MANUAL/OFF.

5.29.3 PLACE PCV033 (PIC60J033) in MANUAL/CLOSED.

5.29.4 CLOSE 60J-121.

5.29.5 CLOSE 60J-239.

**WARNING**

Sodium EDTA may cause eye, skin, and respiratory tract irritation.

NOTE - Water or EDTA solution may be used to flush the demister.
- Hot sanitary water from the sample prep room may be used for flushing and making up the EDTA solution.
- Water or EDTA solution may be flushed with the drain valves open so the solution flows straight through to the drains or with the drain valves closed and the demister soaked for a period of time to be determined by the SOM.

5.29.6 CONFIRM safety shower and eye wash operational prior to working with chemicals.

5.29.7 IF flushing/soaking with EDTA, DON the following PPE:
- Protective apron
- Rubber gloves
- Chemical goggles.

5.29.8 IF EDTA solution is to be used for flushing/soaking, MIX approximately 0.1 lb. (45 grams) of EDTA for every gallon of water.

5.29.9 REMOVE plug from flush port just above valve 60J-275.

5.29.10 OPEN 60J-275.
5.29 Cleaning of Blower Off-Gas Demister, 60J-DE-02 (Cont.)

5.29.11 IF performing a demister flush, PERFORM the following:

5.29.11.1 OPEN 60J-238.

5.29.11.2 OPEN 60J-273.

5.29.11.3 SLOWLY ADD hot water or EDTA solution to demister via flush port.

5.29.11.4 CONTINUE adding hot water or EDTA solution until solution drains freely from demister.

5.29.11.5 CLOSE 60J-275.

5.29.11.6 REPLACE plug on flush port above valve 60J-275.

5.29.12 IF performing a demister soak, PERFORM the following:

5.29.12.1 CLOSE 60J-238.

5.29.12.2 CLOSE 60J-273.

5.29.12.3 SLOWLY ADD hot water or EDTA solution to demister via flush port.

5.29.12.4 CONTINUE adding hot water or EDTA solution until solution fills the demister.

5.29.12.5 CLOSE 60J-275.

5.29.12.6 ALLOW demister to soak for period of time specified by SOM.

5.29.12.7 OPEN 60J-275.

5.29.12.8 OPEN 60J-238.

5.29.12.9 OPEN 60J-273.

5.29.12.10 WAIT while demister fully drains.

5.29.12.11 CLOSE 60J-275.

5.29.12.12 REPLACE plug on flush port above valve 60J-275.

5.29.13 OPEN 60J-121.
Thin Film Dryer Operation

5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel

NOTE - A work package will be used to install the blind flange.

5.30.1 CONFIRM blind flange has been installed on bottom of Dryer below V155 (AOV60J155).

5.30.2 CONFIRM Dryer is in SHUTDOWN.

5.30.3 CONFIRM rotor, M1 (60JM1), is in MANUAL/OFF.

5.30.4 CONFIRM FICV-60J042, dryer double mechanical seal water inlet flow, indicates 1.0 to 1.2 gpm, or as directed by SOM.

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

5.30.5 ENSURE Dryer Boiler is in OPERATION or SHUTDOWN as specified by process memo, or as directed by SOM.

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

5.30.6 PLACE PCV032 (PIC60J032), steam supply valve, in MANUAL AND SET to 10%, or as directed by SOM.

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

5.30.7 PLACE P3 (60JP3) in MANUAL/OFF.

5.30.8 LOWER LT60JJ036, spray condenser level, to approximately 10% as follows:

5.30.8.1 PLACE V273 (AOV60J273), pump suction for 60J-P-3, in MANUAL/CLOSED.

5.30.8.2 PLACE LCV036 (LIC60J036) in MANUAL/CLOSED.

5.30.8.3 PLACE V274 (AOV60J274) to MANUAL.

5.30.8.4 OPEN V274 (AOV60J274) AND DRAIN level to approximately 10%.

5.30.8.5 CLOSE V274 (AOV60J274).
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

5.30.9 CLOSE 60J-155, dryer feed inlet valve.

5.30.10 PLACE V155 (AOV60J155), hopper isolation valve, in MANUAL/CLOSED.

5.30.11 PLACE V159 (AOV60J159), dryer vent dump valve, in MANUAL/OPEN.

NOTE - Flush drum may be used to support the drum fill head assembly.

5.30.12 REQUEST floor operator place empty drum in drum fill position with lift table in the DOWN position.

5.30.13 VIA remote camera, MONITOR blind flange below V155 (AOV60J155) for leakage.

5.30.14 REMOVE flushed liquids from drum with submersible pump into Dryer Room sump drain as directed by SOM.

5.30.14.1 RECORD SOM directions in ETF Control Room Logbook.

5.30.15 FLUSH Dryer and rotor as follows:

5.30.15.1 PLACE M1 (60JM1) to MANUAL/ON.

5.30.15.2 PLACE V160 (AOV60J160) in MANUAL/OPEN.

5.30.15.3 PLACE V157 (AOV60J157) in MANUAL/OPEN.

5.30.15.4 VIA remote camera, MONITOR blind flange below V155 (AOV60J155) for leakage.

5.30.15.5 WAIT 20 minutes, or as directed by SOM.

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

5.30.15.6 PLACE V157 (AOV60J157) to MANUAL/CLOSED.

5.30.15.7 PLACE V159 (AOV60J159) in MANUAL/CLOSED.

5.30.16 WHEN Dryer has fully drained, PLACE V160 (AOV60J160) in MANUAL/CLOSED.

5.30.17 PLACE M1 (60JM1) to MANUAL/OFF.
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

5.30.18 DRAIN AND FLUSH the spray condenser per Section 5.12.

5.30.19 IF seal water from rotor mechanical seal is leaking by the seal into the Dryer, CLOSE 60J-128 to isolate seal water to rotor mechanical seal.

5.30.20 STAGE the following on floor on north side adjacent to the Dryer entry air lock:
- Chemical addition tank and transfer pump
- 100-foot extension cord and
- Hoses.

Special Instructions

The one-inch green chemical hose normally used for SWRT EDTA cleaning will be used to connect the outlet of the flexible impeller pump to the Dryer video inspection port. The green chemical hose is located in the north end RMA.

The 100-foot extension cord will be needed to supply power to the flexible impeller pump from the electrical outlet near the concentrate tanks. The extension cord is located on the cart in the maintenance hot shop.

The end of the green chemical hose with valve B-005 will be connected to the Dryer video inspection port. A work package will be used to install a temporary camlock connection to the Dryer video inspection port.

5.30.21 CONNECT green chemical hose to outlet of the flexible impeller pump.

5.30.22 CONNECT opposite end of green chemical hose with valve B-005 to the camlock connector on the video inspection port on top of Dryer.

5.30.23 OPEN valve B-005 on the green chemical hose.

5.30.24 CONNECT power cord of the waste transfer pump to 100-foot extension cord.

5.30.25 CONNECT extension cord to electrical outlet near concentrate tanks.

5.30.26 CONNECT power cord of the chemical addition tank agitator to the closest available 120-volt power outlet.

NOTE - 250 gallons in the chemical mix tank will result in a level about 6 inches from the top of the tank.

5.30.27 ADD about 250 gallons of sanitary water to chemical addition tank.
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

5.30.28 **START** chemical addition tank agitator.

**WARNING**

Sodium EDTA may cause eye, skin, and respiratory tract irritation.

5.30.29 **CONFIRM** safety shower and eye wash operational prior to working with chemicals.

5.30.30 **DON** the following PPE:
- Rubber gloves
- Chemical goggles
- Protective apron.

**NOTE** - 200 lb. of Sodium EDTA in 250 gallons of water is about 5% concentration.

5.30.31 **SLOWLY ADD** 200 lb. of Sodium EDTA to the chemical addition tank.

5.30.32 **AGITATE** chemical addition tank contents for ten minutes or until all solids have dissolved.

5.30.33 **OPEN** valve V-1 on discharge of chemical tank.

5.30.34 **STOP** chemical addition tank agitator.

5.30.35 **VIA** remote camera, **MONITOR** blind flange below AOV60J155 for leakage.

5.30.36 **IF** flush drum needs to be drained, **USE** submersible pump to drain liquid into Dryer Room sump drain.

5.30.37 **OPEN** bypass valve on waste transfer pump head until fluid is seen entering the transfer line.

5.30.38 **WHEN** fluid is seen at the pump in the hose, **CLOSE** pump bypass valve on waste transfer pump head.

5.30.39 **TURN** switch on outlet to ON.
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

5.30.40 IF the pump does not start, TURN switch on outlet to OFF AND PERFORM the following:

5.30.40.1 PLACE waste transfer pump to the opposite direction setting to reverse flow.

5.30.40.2 QUICKLY TURN pump ON and OFF.

5.30.40.3 RETURN to Step 5.30.39.

5.30.41 PLACE waste transfer pump to either “1” or “2” depending on which direction the pump is to pump.

5.30.42 WHEN level increases per LT60J036, OR

WHEN chemical tank is empty, PLACE waste transfer switch to “0.”

5.30.43 IF there is no level change detected in the spray condenser as indicated by LT60J036, ADD about 50 gallons of sanitary water to the chemical tank AND

RETURN TO Step 5.30.39.

NOTE - Step 5.30.44 only applies when the Dryer Boiler is in OPERATION.

5.30.44 IF the Dryer Boiler is in OPERATION AND

WHEN TT60J018, hopper temperature, reaches 200°F, PLACE PCV032 (PIC60J032) in MANUAL and 5% output, or per SOM direction.

5.30.44.1 IF SOM direction provided, RECORD in ETF Control Room Logbook.
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

NOTE - “Bumping” the Dryer rotor will aid in loosening the solids on the rotor.

5.30.45 **ONCE** every eight hours, **BUMP** the Dryer rotor as follows:

5.30.45.1 **ENSURE** 60J-128, seal water to rotor mechanical seal, is **OPEN**.

5.30.45.2 **PLACE** M1 (60JM1) to **MANUAL/ON** for five seconds.

5.30.45.3 **PLACE** M1 (60JM1) to **MANUAL/OFF**.

5.30.45.4 **PLACE** V157 (AOV60J157), flush water inlet to dryer, in **MANUAL/OPEN**.

5.30.45.5 **WHEN** level increases in spray condenser as indicated by LT60J036, **PLACE** V157 (AOV60J157) in **MANUAL/CLOSED**.

5.30.45.6 **IF** seal water from rotor mechanical seal is leaking by the seal into the Dryer, **CLOSE** 60J-128 to isolate seal water to rotor mechanical seal.

5.30.46 **ALLOW** the Dryer to soak for 24 hours, or per SOM direction.

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

5.30.47 **OPEN** historian and trend for Sump 1 level **AND** **MONITOR** sump level.

5.30.48 **PLACE** V160 (AOV60J160) in **MANUAL/OPEN**.

5.30.49 **ADD** enough sanitary water to chemical addition tank to rinse it thoroughly.

5.30.50 **TURN** switch on outlet to **ON**.

5.30.51 **PLACE** waste transfer pump to either “1” or “2” depending on which direction the pump is to pump.

5.30.52 **WHILE** flushing pump system to flush bypass line, **ROTATE** pump bypass valve several times from **OPEN** to **CLOSE**.

5.30.53 **WHEN** flush is finished, **LEAVE** bypass valve **CLOSED**.

5.30.54 **WHEN** chemical tank is empty, **PLACE** waste transfer switch to “0.”
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

5.30.55 **TURN** switch on outlet to OFF.

5.30.56 **CLOSE** valve V-1 on chemical addition tank discharge line.

5.30.57 **CLOSE** valve B-005 on the green chemical hose.

5.30.58 **VIA** remote camera, **MONITOR** blind flange below V155 (AOV60J155) for leakage.

5.30.59 **IF** flush drum needs to be drained, **USE** submersible pump to drain liquid into Dryer Room sump drain at any time prior to resuming Dryer operation.

5.30.60 **FLUSH** Dryer and rotor as follows:

5.30.60.1 **ENSURE** 60J-128, seal water to rotor mechanical seal, is OPEN.

5.30.60.2 **PLACE** M1 (60JM1) to MANUAL/ON.

5.30.60.3 **PLACE** V160 (AOV60J160) in MANUAL/OPEN.

5.30.60.4 **PLACE** V157 (AOV60J157) in MANUAL/OPEN.

5.30.60.5 **VIA** remote camera, **MONITOR** blind flange below V155 (AOV60J155) for leakage.

5.30.60.6 **WAIT** 20 minutes, or as directed by SOM.

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

5.30.60.7 **PLACE** V157 (AOV60J157) to MANUAL/CLOSED.

5.30.60.8 **PLACE** V159 (AOV60J159) in MANUAL/CLOSED.

5.30.61 **WHEN** Dryer has fully drained, **PLACE** V160 (AOV60J160) in MANUAL/CLOSED.

**NOTE** - Draining of liquid from the piping spool above the blind flange will be addressed in the work package that installed the blind flange.

5.30.62 **PLACE** M1 (60JM1) in MANUAL/OFF.

5.30.63 **IF** seal water from rotor mechanical seal is leaking by the seal into the Dryer, **CLOSE** 60J-128 to isolate seal water to rotor mechanical seal.
5.30 EDTA Cleaning of Thin Film Dryer Rotor and Vessel (Cont.)

5.30.64 DRAIN AND FLUSH the spray condenser per Section 5.12.

5.30.65 DISCONNECT waste transfer pump from the electrical outlet.

5.30.66 DISCONNECT the hoses from Dryer video inspection port AND LOWER hoses to floor.

5.30.67 SLOWLY OPEN B-005 AND DRAIN green chemical hose into catch container.

5.30.68 DISCONNECT hoses from waste transfer pump and chemical addition tank.

5.30.69 DRAIN hoses into a catch container.

5.30.70 OPEN valve V-1 on chemical addition tank AND DRAIN residual contents of tank into catch container.

5.30.71 DISPOSE of residual liquid into Sump 1.

5.30.72 CLOSE valve V-1 on chemical addition tank.

5.30.73 PLACE camlock caps as follows:
- On both the inlet and outlet of waste transfer pump
- On the outlet of the chemical addition tank.

5.30.74 STORE pump and hoses in RMA.

5.30.75 STORE extension cord on cart in maintenance hot shop.

5.30.76 STORE chemical addition tank as directed by SOM.

5.30.76.1 RECORD SOM directions in ETF Control Room Logbook.
5.31 Perform LSL-65A-013 Functional Check and Boiler Leak Test

Special Instructions

The SOE performs Section 5.31 except where noted as (CRO) performance at Steps 5.31.4 and 5.31.5.

NOTE - If empty, Boiler B-1 (65A-B-1) will require several volumes of Condensate Tank TK-1 (65A TK 1) to fill. Feed Pump P1 (65A-P-1) is used for filling.

5.31.1 ALIGN valves per Data Sheet 3 – Steam Boiler Initial Valve Lineup.

5.31.2 OPEN the following valves:
   - 60J-214 Boiler Steam Supply Isolation
   - 60J-220 Steam Trap 60J-224 Inlet
   - 60J-222 Steam Trap 60J-224 Outlet.

5.31.3 THROTTLE OPEN (one turn) 60J-223, steam supply line trap bypass valve.

5.31.4 OPEN 60J-102, steam supply isolation valve.

5.31.5 CLOSE 60J-193, steam supply isolation valve.

5.31.6 ENSURE Boiler REMOTE/LOCAL switch is to REMOTE.

5.31.7 LOCALLY PLACE Boiler control panel ON/OFF switch to ON.

5.31.8 ON graphic Steam, PLACE Condensate Tank demineralized or verification water feed valve V021 (AOV95D021) to MANUAL.

5.31.9 ON graphic Steam, PLACE Feed Pump P1 (65A-P-1) to MANUAL.

5.31.10 ON graphic Steam, CHECK Condensate Tank TK-1 (65A-TK-1) level indicator LT65A001.

5.31.11 IF LT65A001 (Condensate Tank TK-1) indicates greater than 62%, GO TO Step 5.31.14.

5.31.12 IF LT65A001 (Condensate Tank TK-1) is 62% or less, ON graphic Steam, SELECT V021 (AOV95D021) to OPEN.

5.31.13 WHEN LT65A001 (Condensate Tank TK-1) indicates greater than or equal to 62%, CLOSE V021 (AOV95D021).

5.31.14 ON graphic Steam, CHECK Boiler B-1 (65A-B-1) level indicator LT65A010.
5.31 Perform LSL-65A-013 Functional Check and Boiler Leak Test (Cont.)

Special Instructions

Steps 5.31.15 through 5.31.17 are performed concurrently.

5.31.15 ON graphic Steam, SELECT Feed Pump P1 (65A-P-1) to START.

5.31.16 ON graphic Steam, SELECT V021 (AOV95D021) to OPEN.

5.31.17 CONTINUOUSLY MONITOR indicators LT65A001 and LT65A010:

5.31.17.1 IF LT65A001 (Condensate Tank TK-1) indication drops to 30% before LT65A010 (Dryer Boiler B-1) indication rises to 35%, PERFORM the following:

a. ON graphic Steam, SELECT P1 (65A-P-1) to STOP.

b. WHEN LT65A001 (Condensate Tank TK-1) rises to 65%, SELECT P1 (65A-P-1) to START.

5.31.17.2 WHEN LSL-65A-013 Contacts indicate CLOSED (LAL65A013 = 0), IMMEDIATELY SELECT P1 (65A-P-1) to STOP.

5.31.17.3 ON graphic Steam, SELECT Feed Pump P1 (65A-P-1) to STOP.

5.31.17.4 ON graphic Steam, SELECT V021 to CLOSE.

5.31.18 OPEN the following valves to drain Boiler:

- 65A-058, Boiler Drain
- 65A-201, Condensate Tank Drain.

5.31.19 WHEN LSL-65A-013 contacts indicate OPEN (LAL65A013 = 1), CLOSE the following valves:

- 65A-058, Boiler Drain
- 65A-201, Condensate Tank Drain.

5.31.20 ON graphic Steam, CHECK Condensate Tank TK -1 (65A-TK-1) level indicator LT65A001.

5.31.21 IF LT65A001 (Condensate Tank TK-1) indicates greater than 62%, GO TO Step 5.31.24.

5.31.22 IF LT65A001 (Condensate Tank TK-1) is 62% or less, ON graphic Steam, SELECT V021 (AOV95D021) to OPEN.
5.31 Perform LSL-65A-013 Functional Check and Boiler Leak Test (Cont.)

5.31.23 WHEN LT65A001 (Condensate Tank TK-1) indicates greater than or equal to 62%, CLOSE V021 (AOV95D021).

5.31.24 ON graphic Steam, CHECK Boiler B-1 (65A-B-1) level indicator LT65A010.

Special Instructions

Steps 5.31.25 and 5.31.27 are performed concurrently.

5.31.25 ON graphic Steam, SELECT Feed Pump P1 (65A-P-1) to START.

5.31.26 ON graphic Steam, SELECT V021 to OPEN.

5.31.27 CONTINUOUSLY MONITOR indicators LT65A001 (Condensate Tank TK-1) and LT65A010:

5.31.27.1 IF LT65A001 (Condensate Tank TK-1) indication drops to 30% before LT65A010 (Dryer Boiler B-1) indication rises to 35%, PERFORM the following:
   a. ON graphic Steam, SELECT P1 (65A-P-1) to STOP.
   b. WHEN LT65A001 (Condensate Tank TK-1) rises to 65%, SELECT P1 (65A-P-1) to START.

5.31.27.2 WHEN LT65A010 (Dryer Boiler B-1) indicates 40%, IMMEDIATELY SELECT P1 (65A-P-1) to STOP.

5.31.27.3 ON graphic Steam, SELECT V021 (AOV95D021) to CLOSE.

5.31.28 ON graphic Steam, SELECT P1 (65A-P-1) to AUTO.

5.31.29 ON graphic Steam, CHECK LT65A001 (Condensate Tank TK-1).

5.31.30 IF LT65A001 (Condensate Tank TK-1) indicates greater than 65%, PERFORM the following:

5.31.30.1 OPEN Condensate Tank level gauge manual drain valve 65A-063.

5.31.30.2 WAIT until LT65A001 (Condensate Tank TK-1) indicates 60% (55 to 65%), THEN CLOSE 65A-063.

5.31.31 IF LT65A001 (Condensate Tank TK-1) is less than or equal to 62%, ON graphic Steam, SELECT V021 (AOV95D021) to OPEN.
Thin Film Dryer Operation

5.31 Perform LSL-65A-013 Functional Check and Boiler Leak Test (Cont.)

5.31.32 WHEN LT65A001 (Condensate Tank TK-1) indicates greater than or equal to 62%, CLOSE V021 (AOV95D021).

5.31.33 ON graphic Steam, PLACE V021 (AOV95D021) valve to AUTO.

5.31.34 ON Alarm Summary, CONFIRM the following alarms are CLEAR:
- Steam Boiler Feed Pump (65A-P1-A)
- Steam Boiler Level LO (LALX 65A010)
- Steam Condensate Tank Level LO (LAL 65A001)
- Steam Boiler Pressure HI (PAHX 65A011).

5.31.35 ON graphic Steam, CONFIRM the following equipment is in AUTO:
- P1 (65A-P-1), Steam Boiler Feed Pump
- V021 (AOV95D021)
- B-1 (65A-B-1), Dryer Boiler.

5.31.36 WHEN directed by SOM, PLACE V001 (AOV65A001) in MANUAL OPEN or AUTO.

5.31.37 ON group display 56, ENSURE PIC65A011 meets the following conditions:
- Setpoint at 145 psig
- In AUTO.

5.31.38 ENSURE PCV032 (PIC60J032) is in MANUAL with 0% output.

WARNING
CIWH can cause serious injury to personnel.

5.31.39 ANNOUNCE AND REPEAT (once) the following on public address system:
“All personnel stand clear of Dryer steam lines while system heatup is in progress.”

5.31.40 ON graphic Steam, SELECT OPERATION.
5.31 Perform LSL-65A-013 Functional Check and Boiler Leak Test (Cont.)

5.31.41 **MONITOR** steam system for the following indications of CIWH during system heatup:
- Any banging or knocking inside steam piping
- Any shaking or excess movement of steam piping.

5.31.42 **IF** at any time during heatup CIWH indications occur, **PERFORM** the following:

5.31.42.1 **DIRECT** all personnel to immediately leave the vicinity of the Dryer.

5.31.42.2 **VIA** MCS, **PLACE** Dryer Boiler in SHUTDOWN.

5.31.42.3 **NOTIFY** SOM of possible CIWH.

5.31.43 **WHEN** steam can be heard condensing in TK-1 (65A-TK-1), dryer boiler condensate tank, **CLOSE** 60J-223, steam supply line trap bypass valve.

**NOTE** - Opening valve 65A-065 will increase the boiler feed pump run time. Opening the valve excessively will prevent the feed pump from filling the Boiler, resulting in a low level trip.

5.31.44 **ON** group display Steam, **PLACE** setpoint at 145 psig on PIC65A011.

5.31.45 **WHEN** boiler pressure reaches 135 to 145 psig, **ADJUST** valve 65A-065, boiler feed pump recirculation, to achieve a boiler feed pump run time of about one and a half to two minutes.

5.31.46 **WAIT** for boiler pressure to remain stable (135 to 145 psig) for more than ten minutes, as indicated on graphic Steam.

5.31.47 **USE** the thermal gun **AND**

**CHECK** trap 60J-224 to verify proper trap operation.
- Allowable Inlet Temperature: 330 to 360°F
- Allowable Outlet Temperature: 180 to 260°F.

5.31.48 **IF** the trap is not working properly, **NOTIFY** SOM.

5.31.49 **WHEN** leak test is completed, **ON** graphic Steam, **SELECT** SHUTDOWN.

5.31.50 **IF** directed by SOM, **GO TO** Section 5.24, Boiler Blowdown with Boiler in OPERATION.
5.32 Records

5.32.1 **PERFORM** the following for records identified within this procedure.

5.32.1.1 **RECORD** the number of times the record was generated in applicable column,

    **OR**

5.32.1.2 **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><strong>Data Sheets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheet 1 – Electrical Lineup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheet 2 – Thin Film Dryer Initial Valve Lineup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheet 3 – Steam Boiler Initial Valve Lineup</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FWS/OE/Shift Manager</strong></td>
<td><strong>SEND</strong> the completed records to the Central Shift Office for records retention.</td>
<td></td>
</tr>
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</table>

_________________________/_________________________/_________
Signature Print (First and Last) Date

Shift manager / OE

The record custodian identified in the Company-Level Record Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Thin Film Dryer Operation

Data Sheet 1 – Electrical Lineup

<table>
<thead>
<tr>
<th>Panel Number</th>
<th>Breaker Name</th>
<th>Required Position</th>
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<td><strong>ROTATING EQUIPMENT</strong></td>
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<tr>
<td>MCC-2</td>
<td>Concentrate Feed Pump 60J-P-2</td>
<td>ON</td>
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<tr>
<td>MCC-2</td>
<td>Distillate Pump 60J-P-3</td>
<td>ON</td>
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<tr>
<td>MCC-2</td>
<td>Vacuum Blower (Vent Blower) 60J-F-1</td>
<td>ON</td>
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<tr>
<td>MCC-2</td>
<td>Rotor Drive Motor 60J-M-1</td>
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<tr>
<td>(Locally) (2)</td>
<td>Boiler Control Panel ON/OFF Switch</td>
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<tr>
<td>MSWGR-1 (65A-B-1) (2)</td>
<td>Thin Film Dryer Boiler</td>
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<tr>
<td>MCC-3 (65A-P-1) (2)</td>
<td>Boiler Feed Pump</td>
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<tr>
<td>DP-2 Ckt 22 (4)</td>
<td>Boiler Feed Preheater</td>
<td>ON</td>
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<td><strong>INSTRUMENTATION</strong></td>
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<tr>
<td>DP-3</td>
<td>Circuit 4, IDP-3</td>
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<tr>
<td>60J-227</td>
<td>Knocker Timer (1)</td>
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</tbody>
</table>

Special Instructions
(1) In Dryer Room. (2) Performed by SOE.

COMMENTS:

_________________________________________/  ____________________________  /  ____________________________  /   ____________________________
Signature                                    Print (First & Last)        Initials                      Date
NCO/SOE

_________________________________________/  ____________________________  /  ____________________________  /   ____________________________
Signature                                    Print (First & Last)        Initials                      Date
NCO/SOE

_________________________________________/  ____________________________  /  ____________________________  /   ____________________________
Signature                                    Print (First & Last)        Initials                      Date
SOM Completion Review
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<tr>
<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
<th>Initials</th>
<th>Date</th>
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<tbody>
<tr>
<td>60J-131</td>
<td>Skid Instrument Air (IA) Isolation</td>
<td>OPEN</td>
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<tr>
<td>60J-134</td>
<td>Hopper Blow Dry Air Supply (1)</td>
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<tr>
<td>60J-133</td>
<td>Air Press Indicator PI-60J200 Root (1)</td>
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<tr>
<td>60J-172</td>
<td>Air Press Indicator PI-60J200 Test Connection (1)</td>
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<tr>
<td>60J-221</td>
<td>Air Supply Blow Down (1)</td>
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<tr>
<td>60J-215</td>
<td>Air Sup to Lower Bearing Seal Purge (1)</td>
<td>OPEN</td>
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<tr>
<td>60J-226</td>
<td>Air Supply Blow Down (1)</td>
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**INSTRUMENT AIR**

**LOWER BEARING GREASE PORTS**

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<th>Valve</th>
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<tr>
<td>60J-195</td>
<td>Lower Bearing Grease Port Inlet</td>
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<tr>
<td>60J-196</td>
<td>Lower Bearing Grease Port Inlet Vent</td>
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<tr>
<td>60J-197</td>
<td>Lower Bearing Grease Port Outlet</td>
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</table>

**BOILER STEAM HEADER (HIGH PRESSURE STEAM)**

<table>
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<th>Valve</th>
<th>Description</th>
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<tbody>
<tr>
<td>60J-214</td>
<td>Boiler Steam Supply Isolation</td>
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<tr>
<td>60J-223</td>
<td>Steam Trap 60J-224 Bypass</td>
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<tr>
<td>60J-220</td>
<td>Steam Trap 60J-224 Inlet</td>
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<tr>
<td>60J-222</td>
<td>Steam Trap 60J-224 Outlet</td>
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**DRYER DRAIN**

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<th>Valve</th>
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<th>Required Position</th>
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<tbody>
<tr>
<td>60J-257</td>
<td>Dryer Drain Valve (2)</td>
<td>OPEN</td>
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</table>

**Special Instructions**

(1) In Dryer Room. (2) Performed by SOE.

(Continued on Next Sheet)
# Thin Film Dryer Operation

## Data Sheet 2 – Thin Film Dryer Initial Valve Lineup (Cont.)

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
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<tbody>
<tr>
<td>60J-170</td>
<td>PI-60J004 Test Connection</td>
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<tr>
<td>60J-171</td>
<td>PT-60J032 Test Connection</td>
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<td>60J-263</td>
<td>PI-60J004 Isolation Valve</td>
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<tr>
<td>60J-264</td>
<td>PT-60J032 Isolation Valve</td>
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<tr>
<td>60J-103</td>
<td>Supply Isolation</td>
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### DRYER BODY STEAM HEADER

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<th>Valve</th>
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<tbody>
<tr>
<td>60J-170</td>
<td>Steam Trap 60J-167 Bypass (1)</td>
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<tr>
<td>60J-117</td>
<td>Steam Trap 60J-167 Inlet (1)</td>
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<tr>
<td>60J-120</td>
<td>Steam Trap 60J-167 Outlet (1)</td>
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<tr>
<td>60J-118</td>
<td>Steam Trap 60J-167 Strainer Blowdown (1)</td>
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### MAIN JACKET STEAM

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<tbody>
<tr>
<td>60J-111</td>
<td>Steam Trap 60J-152 Bypass (1)</td>
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<td>60J-105</td>
<td>Steam Trap 60J-152 Inlet (1)</td>
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<tr>
<td>60J-114</td>
<td>Steam Trap 60J-152 Outlet (1)</td>
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<tr>
<td>60J-108</td>
<td>Steam Trap 60J-152 Strainer Blowdown (1)</td>
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### LOWER BEARING JACKET STEAM

<table>
<thead>
<tr>
<th>Valve</th>
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<th>Initials</th>
<th>Date</th>
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<tbody>
<tr>
<td>60J-116</td>
<td>Steam Supply Isolation (1)</td>
<td>OPEN</td>
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<tr>
<td>60J-112</td>
<td>Steam Trap 60J-153 Bypass (1)</td>
<td>CLOSED</td>
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<tr>
<td>60J-106</td>
<td>Steam Trap 60J-153 Inlet (1)</td>
<td>OPEN</td>
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<tr>
<td>60J-115</td>
<td>Steam Trap 60J-153 Outlet (1)</td>
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<tr>
<td>60J-109</td>
<td>Steam Trap 60J-153 Strainer Blowdown (1)</td>
<td>CLOSED</td>
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### POWDER HOPPER TRACE STEAM

<table>
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<tr>
<th>Valve</th>
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<td>60J-170</td>
<td>Steam Supply Isolation (1)</td>
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<tr>
<td>60J-112</td>
<td>Steam Trap 60J-153 Bypass (1)</td>
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<td>60J-106</td>
<td>Steam Trap 60J-153 Inlet (1)</td>
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<tr>
<td>60J-115</td>
<td>Steam Trap 60J-153 Outlet (1)</td>
<td>OPEN</td>
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<tr>
<td>60J-109</td>
<td>Steam Trap 60J-153 Strainer Blowdown (1)</td>
<td>CLOSED</td>
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**Special Instructions**

- (1) In Dryer Room.
- (2) Performed by SOE.

(Continued on Next Sheet)
## Thin Film Dryer Operation

### Data Sheet 2 – Thin Film Dryer Initial Valve Lineup (Cont.)

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
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<tbody>
<tr>
<td><strong>HOT WATER MIXING VALVE STEAM</strong></td>
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<td>60J-102</td>
<td>Steam Supply Isolation</td>
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<td>60J-193</td>
<td>Steam Supply Isolation</td>
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<tr>
<td><strong>VERIFICATION WATER</strong></td>
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<tr>
<td>60J-147</td>
<td>Verification Water to Hot Water Mixing Valve -</td>
<td>OPEN</td>
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<td></td>
<td>Isolation Valve</td>
<td></td>
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<td>60J-122</td>
<td>Verification Water Feed Flush Isolation</td>
<td>OPEN</td>
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<td>60H-116</td>
<td>Verification Water to TFD Flush Water Isolation</td>
<td>OPEN</td>
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<td><strong>SEAL WATER TO ROTOR DRIVE DOUBLE MECHANICAL SEALS</strong></td>
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<td>60J-129</td>
<td>PI-60J010 Root Valve</td>
<td>OPEN</td>
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<td>60J-137</td>
<td>PI-60J010 Test Connection</td>
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<td>60J-128</td>
<td>Seal Water Inlet Isolation</td>
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<td>60J-179</td>
<td>Seal Water Outlet Isolation</td>
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<td><strong>CONCENTRATE FEED</strong></td>
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<td>60J-143</td>
<td>PI-60J005 Test Connection</td>
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<td>60J-262</td>
<td>PI-60J005 Isolation Valve</td>
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<td>60J-247</td>
<td>PI-60J210 Isolation</td>
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<td>60J-123</td>
<td>Dryer Feed Preheater Inlet Isolation</td>
<td>OPEN</td>
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<td><strong>DRYER VAPOR</strong></td>
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<td>60J-144</td>
<td>PT-60J033 Isolation</td>
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<td>60J-138</td>
<td>PT-60J033 Test Connection</td>
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<tr>
<td>60J-155</td>
<td>Dryer Feed Inlet Valve</td>
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<tr>
<td>60J-162</td>
<td>LI-60J-164 Isolation Valve</td>
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<td>60J-163</td>
<td>LI-60J-164 Vent Valve</td>
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(Continued on Next Sheet)
### Thin Film Dryer Operation

#### Data Sheet 2 – Thin Film Dryer Initial Valve Lineup (Cont.)

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
<th>Initials</th>
<th>Date</th>
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<tbody>
<tr>
<td>60J-173</td>
<td>Drum Ventilation Flush</td>
<td>CLOSED</td>
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<tr>
<td>60J-121</td>
<td>PI-60J048 Isolation</td>
<td>OPEN</td>
<td></td>
<td></td>
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<tr>
<td>60J-139</td>
<td>PI-60J048 Test Connection</td>
<td>CLOSED</td>
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<tr>
<td>45D-027</td>
<td>Vessel Off-Gas Isolation</td>
<td>OPEN</td>
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<tr>
<td>60J-273</td>
<td>FG-60J005 Drain</td>
<td>OPEN</td>
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<tr>
<td>60J-274</td>
<td>Mist Separator (60J-DE-02) Drain</td>
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<tr>
<td>60J-275</td>
<td>Mist Separator (60J-DE-02) Flush Connection</td>
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<tr>
<td>60J-239</td>
<td>Dryer Blower Outlet Drain Valve</td>
<td>CLOSED</td>
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<tr>
<td>60J-238</td>
<td>Dryer Blower Inlet Drain Valve</td>
<td>OPEN</td>
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#### VESSEL VENTILATION

#### COOLING WATER

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
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<tbody>
<tr>
<td>60J-127</td>
<td>Dryer System Outlet Isolation</td>
<td>OPEN</td>
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<tr>
<td>60J-146</td>
<td>Dryer System Inlet Isolation</td>
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<tr>
<td>60J-188</td>
<td>Vent Cooler Inlet Isolation</td>
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(Continued on Next Sheet)
### Thin Film Dryer Operation

#### Data Sheet 2 – Thin Film Dryer Initial Valve Lineup (Cont.)

<table>
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<tr>
<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
<th>Initials</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>V-FT-60J-035A</td>
<td>FT-60J035 Upstream Press Tap Isol</td>
<td>OPEN</td>
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<td>V-FT-60J-035B</td>
<td>FT-60J035 Downstream Press Tap Isol</td>
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<td>20B-065</td>
<td>Hose Connection Isolation to Sump 1 Collection Header</td>
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<tr>
<td>60J-135</td>
<td>Spray Condenser Outlet (1)</td>
<td>OPEN</td>
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<td>60J-205</td>
<td>Spray Condenser System Drain (1)</td>
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<tr>
<td>60J-192</td>
<td>Distillate Pump Discharge (1)</td>
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<td>60J-125</td>
<td>Distillate to Surge Tank Isolation</td>
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<td>60J-145</td>
<td>PI-60J007 Isolation (1)</td>
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<td>Distillate Flush for Dryer Drain (1)</td>
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<td>60J-141</td>
<td>Distillate Recirc Isolation</td>
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<tr>
<td>60J-270</td>
<td>Chem Add to Spray condenser</td>
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<tr>
<td>60J-271</td>
<td>Distillate Level Transmitter Isolation, Top</td>
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<td>60J-272</td>
<td>Distillate Level Transmitter Isolation, Bottom</td>
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</table>

#### Special Instructions

(1) In Dryer Room.

#### COMMENTS:

---

Signature / Print (First & Last) / Initials / Date

NCO/SOE

Signature / Print (First & Last) / Initials / Date

NCO/SOE

Signature / Print (First & Last) / Initials / Date

SOM Completion Review
## Thin Film Dryer Operation

### Data Sheet 3 – Steam Boiler Initial Valve Lineup

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
<th>Initials</th>
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<tbody>
<tr>
<td>65A-012</td>
<td>Condensate Tank Pressure Indicator Root</td>
<td>OPEN</td>
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<tr>
<td>65A-038</td>
<td>Vent Condenser Vessel Continuous Vent 2nd Off</td>
<td>OPEN</td>
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<tr>
<td>65A-045</td>
<td>Level Gauge Drain</td>
<td>CLOSED</td>
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<td>65A-046</td>
<td>Boiler Level Switch Drain</td>
<td>CLOSED</td>
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<td>65A-047</td>
<td>Boiler Sampler Isolation</td>
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<td>65A-048</td>
<td>Sample Cooler Cooling Water Return Valve</td>
<td>OPEN</td>
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<td>65A-049</td>
<td>Boiler Sample</td>
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<td>65A-052</td>
<td>Boiler Instrument Vent</td>
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<td>65A-053</td>
<td>Pressure Transmitter Isolation</td>
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<td>65A-054</td>
<td>Pressure Controller Isolation</td>
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<td>65A-055</td>
<td>Pressure Gauge Isolation</td>
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<td>65A-057</td>
<td>Boiler Feed Water Inlet</td>
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<td>65A-058</td>
<td>Boiler Drain</td>
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<td>65A-059</td>
<td>Boiler Blowdown Tank Cooling Water Outlet</td>
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<tr>
<td>65A-060</td>
<td>Boiler Blowdown Tank Cooling Water Inlet</td>
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<td>65A-062</td>
<td>Blowdown Tank Drain</td>
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<td>65A-063</td>
<td>Condensate Tank Level Gauge Drain</td>
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<tr>
<td>65A-065</td>
<td>Boiler Feed Pump Recirculation</td>
<td>4 Divisions Open (0.4 Turns)</td>
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<td>65A-066</td>
<td>Condensate Tank Chemical Addition</td>
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<tr>
<td>65A-067</td>
<td>Dryer Boiler Condensate Tank Inlet Valve</td>
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<tr>
<td>65A-068</td>
<td>Bypass Valve</td>
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<td>65A-069</td>
<td>Condensate Tank Instrument Vent</td>
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(Continued on Next Sheet)
### Thin Film Dryer Operation

#### Data Sheet 3 – Steam Boiler Initial Valve Lineup (Cont.)

<table>
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<th>Valve</th>
<th>Description</th>
<th>Required Position</th>
<th>Initials</th>
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<tbody>
<tr>
<td>65A-070</td>
<td>Condensate Tank Temperature Controller Root</td>
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<tr>
<td>65A-072</td>
<td>Vent Condenser Inlet Valve</td>
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<tr>
<td>65A-073</td>
<td>Vent Condenser Outlet Valve</td>
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<tr>
<td>65A-074</td>
<td>Vent Condenser Vessel Continuous Vent 1st Off</td>
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<tr>
<td>65A-076</td>
<td>Condensate Tank Outlet</td>
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<tr>
<td>65A-077</td>
<td>PIT-65A002 Blr Fd Pmp Disch Press Trans Isol</td>
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<td>Condensate Tank Drain</td>
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<td>65A-102</td>
<td>Sample Cooler Cooling Water Supply Valve</td>
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<td>65A-201</td>
<td>Condensate Tank Drain</td>
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<td>95C-036</td>
<td>Cooling Water Inlet Valve</td>
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<td>95C-037</td>
<td>Cooling Water Return Valve</td>
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<td>95D-011</td>
<td>Demineralized or Verification Water Supply to Condensate Tank</td>
<td>Normally ¼ turn open, or as directed by SOM (1)</td>
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<td>95D-113</td>
<td>Water Heater 95D-E-1 Inlet Iso.</td>
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<tr>
<td>95D-114</td>
<td>Water Heater 95D-E-1 Outlet Iso.</td>
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</table>

**Special Instructions**

(1) SOM direction must be recorded in the ETF Control Room Logbook.

**COMMENTS:**

[Blank space for comments]

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Signature: ___________________________ / Print (First & Last): ___________________________ / Initials: ___________________________ / Date: ___________________________  
SOE: ___________________________ / Print (First & Last): ___________________________ / Initials: ___________________________ / Date: ___________________________  
Signature: ___________________________ / Print (First & Last): ___________________________ / Initials: ___________________________ / Date: ___________________________  
SOE: ___________________________ / Print (First & Last): ___________________________ / Initials: ___________________________ / Date: ___________________________  
Signature: ___________________________ / Print (First & Last): ___________________________ / Initials: ___________________________ / Date: ___________________________  
SOM Completion Review

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**Type**: REFERENCE  
**Document No.**: ETF-60J-001  
**Rev/Mod**: A-16  
**Release Date**: 01/14/2019  
**Page**: 96 of 97
**Thin Film Dryer Operation**

**Figure 1 – Dryer Mode Sequences**

- Manual Removal of Weekly Flush Residual Water
- Manual Weekly Flush
- Shutdown
- System Startup
- LT-60J036WetLegFill
- Run
- Manual Initiation of New Drum
- Daily Flush from Run
- Run with Drum Handling in Manual
- Stop
- Shutdown from Run
- Shutdown from Stop
- Locked Rotor 60J-M-1 Restart Attempt
- Quick Restart
- System Layup