

**System & Equipment Checkout Procedure**  
**Client Name**  
**Plant Location**

<b>Procedure Title: Boiler Feed Water System Flush</b>	<b>Page</b> 1 of 7	<b>Client Logo</b>
<b>Prepared By: Applied Performance Strategies</b>	<b>Approved By:</b>	
<b>Date: 01/11/08</b>	<b>Date:</b>	

**Purpose:**

Flush the Boiler Deaerator Tank and outlet piping  
Flush the Boiler Feed Water System piping to clean debris from the system.  
Inspect the Boiler Feed Water and Deaerator System for leaks.

**Initial Conditions:**

System turned over to company for checkout.  
Deaerator DA-955 is available for use and is empty.  
Package Boiler B-950 is not in operation.  
Boiler feed water pumps are operational and available to support flushing.

**Reference Documents:**

PID 900-001  
Applicable equipment technical manuals  
Equipment list  
Instrument index

**Required Equipment & Materials:**

Flushing hoses  
Basket strainers

**Comments:**

**Performed By:** Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Approved By:** Name: \_\_\_\_\_ Date: \_\_\_\_\_

<b>Procedure Title: Boiler Feed Water System Flush</b>	<b>Page</b> <b>2 of 7</b>	<b>Client Logo</b>
--	------------------------------	--------------------

<b>Procedure</b>	<b>✓</b>
<b>Prepare to Flush Boiler Feed Water System</b>	
1. Check that all system manual valves are positioned in accordance with Appendix B.	
2. Remove Deaerator LCV-955 and install a spool piece in its place.	
3. Install a temporary drain hose and strainer from the outlet of BFW Pump suction valve V-955-03 and route the hose to a Utility Area floor drain.	
4. Remove Boiler LCV-950 and install a spool piece in its place.	
5. Remove the strainer upstream of LCV-950 and install a spool piece in its place.	
6. Disconnect the two boiler feed water inlet flanges.	
<b>Flush Deaerator Tank DA-955</b>	
1. Open Process Water supply valve V-903-20 and fill the deaerator tank until water flows out of the overflow line and close the supply valve.	
2. When the deaerator tank is filled, open BFW Pump suction valve V-955-03 and flush the deaerator tank to a floor drain.	
3. Inspect the temporary strainer periodically during flushing and replace or clean as necessary.	
4. During draining, inspect the deaerator and associated piping and components for leaks. Document leaks and defects for correction.	
5. While the deaerator is draining, open V-955-02 for 5 minutes to flush the deaerator drain line and close the valve.	
6. Repeat steps 1 through 3 as necessary until the strainer does not trap particulate matter. The deaerator flush is complete.	
7. Close V-955-03 and remove the drain hose and strainer.	

<b>Procedure Title: Boiler Feed Water System Flush</b>	<b>Page</b> <b>3 of 7</b>	<b>Client Logo</b>
--	------------------------------	--------------------

<b>Procedure</b>	<input checked="" type="checkbox"/>
<b>Flush Boiler Feed Water Header</b>	
1. Open Process Water supply valve V-903-20 and refill the deaerator tank to the mid-point on the sightglass. Refill the deaerator tank as necessary during feed water header flushing.	
2. Check that the Y-strainer elements are installed in the suction lines to BFW Pump #1 and #2 to protect the pumps during flushing.	
3. Connect a drain hose and basket strainer to the flange at the feed water header inlet to the boiler and route the hose to a Utilities Area floor drain.	
4. Open Feed Water Supply Header to Boiler Block Valve V-952-07.	
5. Open BFP #1 (#2) suction valve V-955-03 (V-955-04).	
6. Check that the feed water header is flooded by observing water flowing from the drain hose.	
7. Start BFP #1 and check that water flows from the header drain hose.	
8. Throttle V-952-07 to maintain back pressure in the header and prevent feed pump runout.	
<p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Stop the boiler feed pump immediately if deaerator tank level decreases below the low level alarm point.</b></p>	
9. After flushing for 2-3 minutes, open V-952-01 (V-951-01) to obtain BFP #1 (BFP #2) discharge pressure indication.	
10. Continue flushing the header for at least 10 minutes and inspect the pump suction Y-strainer and basket strainer periodically during flushing. Replace or clean the strainers as necessary.	
11. During header flushing, inspect all feed water system piping and components for leaks. Document leaks and defects for correction.	
12. When no particulate matter is being trapped in the flushing strainers, stop BFP #1 (BFP #2) and immediately close V-952-07.	
13. Repeat steps 5 - 12 for BFP #2.	

<b>Procedure Title: Boiler Feed Water System Flush</b>	<b>Page</b> 4 of 7	<b>Client Logo</b>
--	-----------------------	--------------------

Procedure	✓
<b>Return to Normal</b>	
1. Open V-952-07 and V-955-02 and allow the deaerator tank and feed water header to completely drain by gravity.	
2. When the system is drained, close V-952-07 and V-955-02 and remove the temporary drain hose and strainer.	
3. Connect the feed water header piping to the boiler inlet.	
4. At the boiler feed pumps: a. Close V-951-02 b. Close V-952-02 c. Close V-955-03 d. Close V-955-04	
5. Install Deaerator LCV-955.	
6. Install Boiler LCV-950.	
7. At LCV-950: e. Open V-952-06 f. Open V-952-04 g. Close V-952-05	
8. Install the strainer upstream of LCV-950.	
9. At the water softener skid if the system is required for operation: h. Close V-903-24 i. Open V-903-23 j. Open V-958-01 k. Open V-958-03 if needed to supply system loads	
10. Open V-953-01	
11. Close V-955-01	

**Appendix A**  
**Boiler Feed Water System Flush and Leak Check**

Location	Inspection	✓	Comments
Deaerator Softened Water Supply Piping	Flush		
	Leak Check		
Deaerator Tank DA-955	Flush		
	Leak Check		
Deaerator Tank DA-955	Wash Tank Internals		
Boiler Feed Water Header	Flush		
	Leak Check		
BFP #1	Flush		
	Leak Check		
BFP #2	Flush		
	Leak Check		

**Appendix B**  
**Boiler Feed Water System Manual Valves & System Flush Initial Valve Lineup**

Valve No.	System Description	Valve Description	P&ID Reference	Valve Position	✓
	<b>Water Treatment Skid Valves</b>				
V-903-20	Process Water Supply to Water Treatment Skid	4" Ball Valve	900-001	CLOSED	
V-903-23	Water Softener Inlet	4" Ball Valve	900-001	CLOSED	
V-958-01	Water Softener Outlet	4" Ball Valve	900-001	CLOSED	
V-958-03	Water Softener Outlet Header Block	4" Ball Valve	900-001	CLOSED	
V-903-24	Water Treatment Skid Water Softener Bypass	4" Ball Valve	900-001	OPEN	
	<b>Boiler System Deaerator DA-955 Valves</b>				
V-955-01	Boiler System Deaerator Vent Valve	Gate Valve	900-001	OPEN	
V-953-01	Water Treatment Supply to Deaerator	1" Ball Valve	900-001	CLOSED	
V-955-02	Deaerator Drain Valve	Gate Valve	900-001	CLOSED	
	<b>Boiler Feed Water System Valves</b>				
V-955-03	BFW Pump No. 1 P-952 Suction Valve	4" Ball Valve	900-001	CLOSED	
V-952-01	BFW Pump No. 1 Discharge Pressure Gauge PI-952 Isolation Valve	Ball Valve	900-001	CLOSED	
V-952-02	BFW Pump No. 1 P-952 Discharge Valve	Ball Valve	900-001	OPEN	
V-955-04	BFW Pump No. 2 P-951 Suction Valve	4" Ball Valve	900-001	CLOSED	
V-951-01	BFW Pump No. 2 Discharge Pressure Gauge PI-951 Isolation Valve	Ball Valve	900-001	CLOSED	
V-951-02	BFW Pump No. 2 P-951 Discharge Valve	Ball Valve	900-001	OPEN	
V-952-03	BFW Pump Discharge Header Isolation Valve	2" Ball Valve	900-001	OPEN	

**Appendix B**  
**Boiler Feed Water System Manual Valves & System Flush Initial Valve Lineup**

<b>Valve No.</b>	<b>System Description</b>	<b>Valve Description</b>	<b>P&amp;ID Reference</b>	<b>Valve Position</b>	<b>✓</b>
V-952-04	Boiler Level Control Valve LCV-950 Inlet Valve	2" Ball Valve	900-001	OPEN	
V-952-06	Boiler Level Control Valve LCV-950 Outlet Valve	2" Ball Valve	900-001	OPEN	
V-952-05	Boiler Level Control Valve LCV-950 Bypass Valve	2" Ball Valve	900-001	OPEN	
V-952-07	Feed Water Supply Header to Boiler Block Valve	2" Ball Valve	900-001	CLOSED	