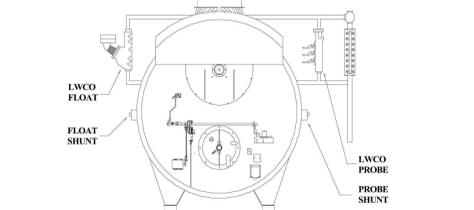


**Checklist for Low Water Alarm and Cutoffs on Boiler (LWA/LWCO/ALWCO)**

Item	Make	Float / Probe	Correct Installation
LWA			
LWCO			
ALWCO			

\*Independent shunt switches should be installed for each LWCO



- IN PERFORMING TEST NEVER LET WATER LEVEL LEAVE SIGHT GLASS!!!
- Drain sight glass without draining alarm column and quickly close drain valve. Water level should quickly rise in sight glass indicating good communication with tank.
- With boiler in manual at low fire, close the feedwater valve to generate a slow drain. You may "crack" the blowdown valve but do not exceed a drain rate of 1 inch per minute. Use water level in sight glass to observe alarm point. The alarm should sound first.
- Continue to drain until the primary cutoff activates.
- If shunt exists verify that it ONLY isolates the LWCO.
- Jumper or shunt the primary cutoff, restart the boiler, and set up drain as described above.
- Continue the drain until the secondary cutoff activates.

Result	Y/N	Water Level
Did the LWA work correctly? Record Level.		
Did the Primary cutoff work correctly? Record Level.		
Did the secondary cutoff work correctly?		
Was the alarm point above the primary and secondary cutoff point?		
Overall, did alarm and 2 low water cutoffs work correctly?		

Comment:

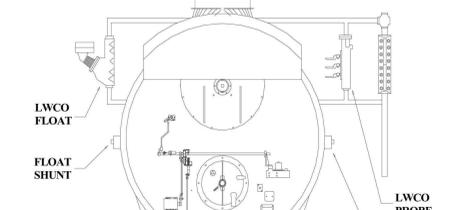
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**Checklist for High Water Alarm on Boiler (HWAB)**

Item	Make	Float / Probe	Correct Installation
HWA			

\*Sight glass water level should be 1" or more below top of sight glass at alarm.



- Drain sight glass without draining alarm column and quickly close drain valve. Water level should quickly rise in sight glass indicating good communication with tank.
- With boiler off, open the bypass feedwater valve to fill the boiler. Use water level in sight glass to observe alarm point. The alarm should sound before water level leaves sight glass. DO NOT ALLOW WATER LEVEL TO LEAVE SIGHT GLASS
- Close the bypass on feedwater line

Result	Y/N	Water Level
Did the alarm work correctly?		
What was the water level in sight glass at alarm point?		

Comment:

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**Checklist for Recycle and Non-Recycle Boiler Steam Pressure Limit Switches (RBSPLS & NRBSPLS)**

Item	Make	Range (psig)	Switch Setpoint	Normal Steam Pressure (psig)	Lowest SVB Setpoint (psig)	Correct Setpoint Y / N
RBSPLS						
NRBSPLS						

\*RBSPLS setpoint should be 10 psig or more of normal steam pressure.  
\*NRBSPLS setpoint should be 5 psig or more of the RBSPLS setpoint & 5 psig or more less than the lowest SVB setpoint.

- Never exceed the boiler MAWP during this test.
- Place boiler in minimum fire and manually close the steam supply valves from the boiler.
- Raise the steam pressure slowly by firing the boiler.
- Raise until RBSPLS activates – record activation pressure in table below.
- Jumper the recycle switch out of the circuit.
- Fire boiler and raise the steam pressure slowly.
- Raise until NRBSPLS activates – record activation pressure in table below.

Result	Y/N	Pressure
Did the RBSPLS work correctly? Record Pressure.		
Did the NRBSPLS work properly? Record Pressure.		

Comment:

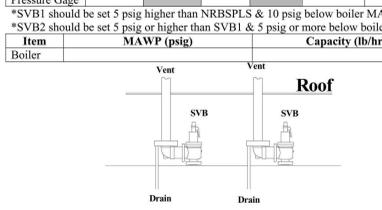
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**Checklist for Steam Safety Valves on Boiler (SVB)**

Item	Make	Capacity (lb/hr)	Range	SVB Setpoint	Normal Steam Pressure	Correct Installation / Capacity
SVB 1						
SVB 2						
SVB 3						

\*SVB1 should be set 5 psig higher than NRBSPLS & 10 psig below boiler MAWP.  
\*SVB2 should be set 5 psig or higher than SVB1 & 5 psig or more below boiler MAWP.



- NEVER ALLOW BOILER PRESSURE TO EXCEED MAWP
- With boiler off, jumper recycle and non-recycle steam pressure switches.
- Close the steam supply valves from the boiler and test the drains on the safety valve drip pan ells by pouring water into them and noting that water flows freely. Unstop drains before proceeding.
- Raise the steam pressure slowly by firing the boiler at low fire.
- Note the pressure that the first & second safety valve opened. (may require increasing firing rate).
- Place boiler in high fire and determine if steam pressure rises with both SVB open.
- Shut boiler off and note the pressure that the safety valves close.

Result	Y/N	Lift (P)	Reseat (P)
Did the first SVB work correctly? Record Pressure.			
Did the second SVB work correctly? Record Pressure.			
Did the third SVB work correctly? Record Pressure.			
Maximum pressure observed during accumulation test?			
Is SVB vent plumbing adequate?			

\*Max lift pressure of 3% higher than rated lift pressure. Blowdown should be less than the greater of 2 psig or 2% of the set pressure, and shall not exceed 6% of set pressure.  
\*Maximum accumulation pressure seen should not exceed 110% of highest SVB setpoint and never exceed boiler rated pressure.

Comment:

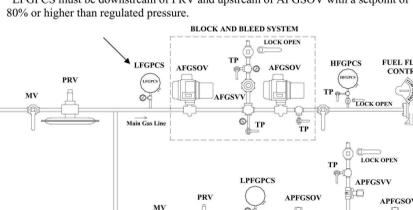
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**Checklist for Low Fuel Gas Pressure Cutoff Switch (LFGPCS)**

Item	Make	Range (inw/psig)	Switch Setpoint (inw/psig)	Regulated Pressure (inw/psig)	Correct Location Y / N
LFGPCS					

\*LFGPCS must be downstream of PRV and upstream of AFGSOV with a setpoint of 80% or higher than regulated pressure.



- In low fire, throttle upstream fuel valve slowly until switch trips the boiler offline due to low fuel pressure but NO LOWER THAN 80% OF REGULATED PRESSURE

Result	Y/N	Pressure
Did the switch work correctly? Record pressure.		
Is switch trip point 80% or more of regulated pressure?		

Comment:

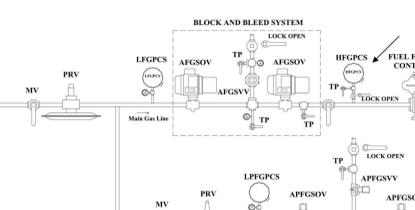
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**Checklist for High Fuel Gas Pressure Cutoff Switch (HFGPCS)**

Item	Make	Range (inw/psig)	Switch Setpoint (inw/psig)	Regulated Pressure (inw/psig)	Correct Location Y / N
HFGPCS					

\*HFGPCS must be downstream of PRV and upstream of flow control with a setpoint of less than 120% of regulated pressure.



- With boiler in low fire close lockable manual valve isolating the HFGPCS.
- Open test port between lockable manual valve and HFGPCS and pressurize with compressed air or nitrogen.
- Slowly raise pressure until switch trips boiler offline due to high test gas pressure, BUT NO HIGHER THAN 120% OF REGULATED PRESSURE.

Result	Y/N	Switch Trip Point
Did the switch work correctly?		
Are manual test valves and test port valves in place as shown?		
What was the switch trip point?		
Is switch trip point 120% or less of regulated pressure?		

Comment:

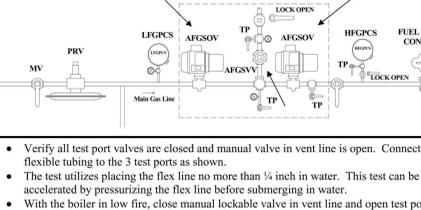
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**Checklist for Automatic Fuel Gas Shutoff Valves and Solenoid Vent Valve Seat Leakage (AFGSOV & AFGSVV) – Main Gas Line**

Item	Make	Range (inw/psig)	Correct Installation	Y/N
AFGSOV				
AFGSVV				

\*Maximum allowable leak rate is zero bubbles in 2 minutes.



- Verify all test port valves are closed and manual valve in vent line is open. Connect flexible tubing to the 3 test ports as shown.
- The test utilizes placing the flex line no more than 1/4 inch in water. This test can be accelerated by pressurizing the flex line before submerging in water.
- With the boiler in low fire, close manual lockable valve in vent line and open test port valve in vent line. Verify that no bubbles appear.
- Provide regulated gas pressure (or more) before upstream AFGSOV and between AFGSOVs.
- Using the two test ports in the main gas line and the test port in the vent line, open the test port valves and observe water for sign of bubbles for 2 minutes.
- If no bubbles appear, the respective valve is not leaking.
- Open and lock manual vent valve and shut boiler off and verify that the pressure between AFGSOV is atmospheric.

Result	Y/N
Did upstream AFGSOV leak?	
Did downstream AFGSOV leak?	
Did AFGSVV leak?	
Did AFGSVV open with boiler off	

Comment:

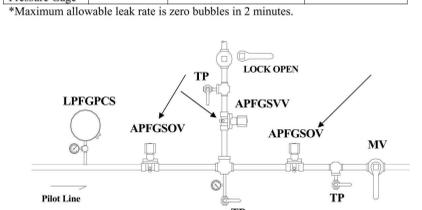
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**Checklist for Automatic Pilot Fuel Gas Shutoff Valves and Automatic Pilot Fuel Gas Solenoid Vent Valve Seat Leakage (APFGSOV & APFGSVV) – Pilot Line**

Item	Make	Range (inw/PSIG)	Correct Installation	Y/N
APFGSOV				
APFGSVV				

\*Maximum allowable leak rate is zero bubbles in 2 minutes.



- Verify all test port valves are closed and manual valve in vent line is open. Connect flexible tubing to the 3 test ports as shown.
- The test utilizes placing the flex line no more than 1/4 inch in water. This test can be accelerated by pressurizing the flex line before submerging in water.
- With the boiler in low fire, close manual lockable valve in vent line and open test port valve in vent line. Verify that no bubbles appear.
- Provide regulated gas pressure (or more) before upstream APFGSOV and between APFGSOVs.
- Using the two test ports in the main gas line and the test port in the vent line, open the test port valves and observe water for sign of bubbles for 2 minutes.
- If no bubbles appear, the respective valve is not leaking.
- Open and lock manual vent valve and shut boiler off and verify that the pressure between APFGSOV is atmospheric.

Result	Y/N
Did upstream APFGSOV leak?	
Did downstream APFGSOV leak?	
Did APFGSVV leak?	
Did APFGSVV open with boiler off	

Comment:

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**Checklist for Proof of Closure on Automatic Fuel Shutoff Valves (POC-AFGSOV) – Natural Gas**

Item	Make
POC-AFGSOV	

\*Switch should open with a very slight opening of the valve.  
\*Switches should be wired in series.

- Close manual fuel valve downstream of AFGSOV. Perform the following test on each AFGSOV separately.
- Remove cover on both automatic shut off valves to provide access to two wires connected across proof of closure switch. Can also access wires in appropriate junction box. Disconnect both leads from switch going to control circuit.
- Temporarily connect the two wires that were disconnected from the POC switch in order to electrically bypass the switch.
- Start boiler and verify that switch opens with a very slight opening of the valve by measuring resistance across switch.
- Shut boiler down and disconnect two wires going to control circuit. Try to start boiler and verify that the boiler does not allow ignition sequence to begin.
- Repeat procedure for switch on 2nd valve.

Result	Y/N
Is POC present in both valves?	
Did either valve being open allow the boiler to fire?	
Did both switches open with very slight opening of valve?	

Comment:

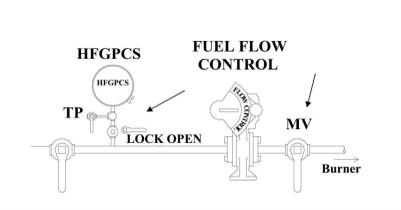
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**Checklist for Flame Scanner-for main flame out (FSMFO)**

Item	Make	Model	UV or IR	Self-Checking Y/N	Correct Scanner Y/N
Flame Scanner					

\*Maximum allowable timing is 4 sec.  
\*Only a UV- Self checking scanner is allowed. If scanner is IR, system must be replaced.



- Close the lockable manual valve between the fuel line and the HFGPCS.
- Quickly close the manual valve in fuel line before burner.
- Observe the time required for the flame scanner to close the automatic fuel safety shutoff valves. (Valves should close within 3 to 4 seconds from the time the flame goes out in the firebox).

Result	Y/N	Time (seconds)
Did the scanner work correctly?		
Time to close fuel valves?		

Comment:

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100% DESIGN APPROVED FOR CONSTRUCTION

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Approved: Project Director		Location <b>BAY PINES, FLORIDA</b>		Drawing Number <b>MP506</b>		Date MAY 15, 2017		Checked JSN		Drawn RWD		45 OF 78	