Functional Test

Project:_____

FT-_____   FIN TUBE RADIATOR FT _____

(There are _____ fin tubes in this project and _____ will be tested.)

Related Tests: Boilers, Interlocked TU-_____

1. Participants

<u>Party</u>   <u>Participation</u>

Party filling out this form and witnessing testing _____

Date of test _____

2. Prerequisite Checklist

a. The following have been started up and startup reports and prefunctional checklists submitted and approved ready for functional testing: TU's _____.

b. __ Boilers have successfully completed functional testing.

c. __ All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final setpoints, schedules, debugging, loop tuning and sensor calibrations complete.

_____   _____

Controls Contractor Signature or Verbal   Date

d. __ All A/E punchlist items for this equipment corrected.

e. __ Safeties and operating ranges reviewed.

f. __ Test requirements and sequences of operation attached.

g. __ Schedules and setpoints attached.

h. __ Have all energy savings control strategies, setpoints and schedules been incorporated that this equipment and control system are capable of? If not, list recommendations below.

i. __ **BAS Program Review.** Review the BAS software control program(s) for this equipment. Parameters, setpoints and logic sequences appear to follow the specified written sequences.

j. __ Record of All Values for Current Setpoints (SP), Control Parameters, Limits, Delays, Lockouts, Schedules, Etc. Changed to Accommodate Testing:

3. Sensor Calibration Checks.
Check the sensors listed below for calibration and adequate location. This is a sampling check of calibrations done during prefunctional checklisting. Test the packaged controls and BAS readings.

---NONE--

4. Device Calibration Checks.
Check the actuators or devices listed below for calibration.

"In calibration" means observing a readout in the BAS and going to the actuator or controlled device and verifying that the BAS reading is correct. For items out of calibration or adjustment, fix now <u>if easy</u>, via an offset in the BAS, or a mechanical fix.

<u>Notes:</u>

Heating coil valve (HCV): Set pumps to normal mode. *Procedure 1.* Command valve to a few intermediate positions. Verify that reading in BAS reasonably correspond to the actual positions. For heating coil valves (NO): *Procedure 2a.* Set heating setpoint 20°F above room temperature. Verify BAS reading says 100% open. Visually verify valve is fully open. *2b.* Remove control air or electricity from the valve and verify that the valve stem and actuator position do not change. *Procedure 3.* Restore to normal. Set heating setpoint to 20°F below room temperature. Observe the valve close. *4.* For pneumatic actuators, by override in the EMS, increase pressure to valve by 3psi (do not exceed actuator rating). Verify valve stem & actuator position does not change. Restore to normal.

Device or Actuator & Location	Procedure / State	BAS Value	Site Observation	Corrections	Pass Y/N
Heating coil valve (HCV) position or command and stroke	1. Intermediate positions				
	2a. Full open				
	2b. Remove power or air (full open)				
	3. Closed				
	4. Increase pressure (close)				

5. Verification of Misc. Prefunctional Checks.

Misc. site checks of the prefunctional checklist and startup reports completed successfully.   Pass? Y / N _____
__ Unit mounted securely.   __ Valves and unit accessible for servicing.

Notes:

6. Functional Testing Record

Proced. No. & Spec. Seq. ID[1]	Req ID No.[2]	Test Procedure[3] (including special conditions)	Expected and Actual Response[4] [Write ACTUAL response in brackets or circle]	Pass Y/N & Note #
1		General Sequencing. a. With boilers in normal mode and ON, increase space setpoint 20Fof TU- _____ (interlocked to the fin tube). If OSAT is not > 40F, overwrite it to be > 40F. Overwrite space temp to be 3F below main setpoint (cooling) _____F and observe in BAS that there is heating deck flow and cooling flow goes to minimum. Observe that the fin tube or radiant panels remain OFF. b. Change the space temp. to be 5F below main setpoint (cooling) _____F and observe the radiant panels or fin tubes remain OFF. c. Change the OSAT to be < 40F. Observe that the radiant panels or fin tubes start heating. Return all parameters to normal.	a. TU goes into heating mode. Fin tube HCV's remain closed. b. TU remains in heating mode. Fin tube HCV's remain closed. c. TU remains in heating mode. Fin tube HCV's open.	
2		Lower space setpoint to 20F below space temperature of TU-_____.	TU goes into cooling mode. Fin tube heating valve closes equally with TU heating command (TU HCV or dual duct heating damper).	
3		Valve Leakage Test. After 1 hour or more with fin tube heating valve closed, verify that no hot water is leaking through valve by feeling fin tube 3 feet from valve.	Tube should be near room temperature.	
4		Trend Logs. NONE		
5				
6	--	**Return all changed control parameters and conditions to their pre-test values**[5]	**Check off in Section 2 above when completed**	

Record Foot Notes
[1]Sequences of operation specified in Contract Documents (attached).
[2]Mode or function ID being tested, per testing requirements section of the project Specifications.
[3]Step-by-step procedures for manual testing, trend logging or data-logger monitoring.
[4]Include tolerances for a passing condition.
[5]Record any permanently changed parameter values and submit to Owner.

-- END OF TEST --

Notes: