

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 2
MAINTENANCE PROCEDURE NO. 2-0910053
REVISION 4

2

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1.0 TITLE:

12 MONTH TEST OF AUTOMATIC LOAD SEQUENCE RELAYS

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group _____ June 3, 1983

Approved by C. M. Wethy Plant Manager _____ June 14, 1983

Revision 4 Reviewed by FRG _____ 12-11-85 & 5-20 1986

Approved by J. H. Barrow Plant Manager _____ 6-17 1986

3.0 PURPOSE:

This procedure provides guidelines for periodic testing of Automatic Load Sequencing Relays.

4.0 PRECAUTIONS AND LIMITS:

- 4.1 Read entire procedure prior to commencing Section 9.0.
- 4.2 Exercise care as some points may be energized.
- 4.3 Notify NPS/NWE prior to commencing this procedure. This test will give annunciation in Control Room.
- 4.4 Remove jumpers/replace O.L. heaters before going to the next piece of equipment.
- 4.5 Timer calibration check must be done with the timer in same position as it is installed (horizontal or vertical).

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DATE	_____	
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DOCN	2-0910053	
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5.0 RELATED SYSTEM STATUS:

None

6.0 REFERENCES:

6.1 Tech Spec 3/4.8.1

6.2 Surveillance Requirement 4.8.1.1.2.d

6.3 FUSAR, Chapter 8, Table 8.3-2

7.0 RECORDS REQUIRED:

7.1 Completed sections of this procedure, signed and dated, shall be retained in the plant files.

7.2 All data sheets noted in this procedure shall be maintained with their applicable sections unless otherwise specified.

8.0 MATERIALS AND EQUIPMENT REQUIRED:

8.1 Hand tools

8.2 Jumpers

8.3 Multi-Amp SST-2 Timer or equivalent

8.4 SPST switch connected to two test leads with alligator clips at the ends

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9.0 DETAILED PROCEDURE:

NOTE

Relay timing tolerance is + 1 second. Calibration check must be done with relay in same position as mounted.

9.1 Annual Inspection of Diesel Load Sequence Relays

1. 2A3/2B3 4160 Switchgear

- A. Connect the start leads of the timer to the switchgear test switches at terminal 5 and 5T. Turn the left timer switch to dry contacts (N.C.) position.
- B. Connect the stop leads of the timer, across the center white light, and turn right timer switch to "AC/DC Power Applied".
- C. Turn timer power switch "ON", push reset button, select seconds on Sec/Hz switch and select accuracy range to .01 seconds.
- D. Turn start latch to "ON" and stop latch to "ON" positions.

/R4

NOTE

To start test, place switchgear test switch for load under test into "Relay" position. Remove all jumpers prior to going to next piece of equipment.

- E. 2A3: Perform steps 9.1.1.a through 9.1.1.d on each piece of listed equipment and record test results.

<u>EQUIPMENT</u>	<u>CWD</u>	<u>TEST SWITCH</u>	<u>TIME</u>		<u>JUMPERS REMOVED</u>	<u>INITIAL/DATE</u>
			<u>SET</u>	<u>ACTUAL</u>		
2A LPSI	251	CS2	3 Sec.	_____	_____	/
2A Containment Spray	287	CS3	12 Sec.	_____	_____	/
2A Component Cooling Water	201	CS6	6 Sec.	_____	_____	/
2A Intake Cooling Water	832	CS7	9 Sec.	_____	_____	/
2A Aux. Feedwater	629	CS12	30 Sec.	_____	_____	/



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9.0 DETAILED PROCEDURE: (continued)

9.1 (continued)

1. (continued)

F. 2B3: Perform steps 9.1.1.a through 9.1.1.d on each piece of listed equipment and record test results.

<u>EQUIPMENT</u>	<u>CWD</u>	<u>TEST SWITCH</u>	<u>TIME</u>		<u>JUMPERS REMOVED</u>	<u>INITIAL/DATE</u>
			<u>SET</u>	<u>ACTUAL</u>		
2B Component Cooling Water	205	CS4	6 Sec.	_____	_____	_____ / _____
2B LPSI	252	CS6	3 Sec.	_____	_____	_____ / _____
2B Containment Spray	290	CS7	12 Sec.	_____	_____	_____ / _____
2B Intake Cooling Water	833	CS10	9 Sec.	_____	_____	_____ / _____
2B Aux. Feedwater	630	CS12	30 Sec.	_____	_____	_____ / _____

2. 2AB 4160 SWGR

A. Connect timer "Start" leads to terminal 5 and 5T on SWGR test switch and timer "Stop" leads to terminal TL1 & 6 on test light. Place SWGR test switch in "Relay Test" position to start timing sequence.

/R4

B. 2AB: Perform step 9.1.2.a on each listed piece of equipment and record test results.

2C Intake Cooling	834	CS3	9 Sec.	_____	_____	_____
2C Component Cooling	289	CS2	6 Sec.	_____	_____	_____

NOTE

General Multi-Amp Timer Operation.

1. Connect start leads of timer to connections specified.
2. Turn left timer switch to "AC/DC Applied".
3. Connect the "Stop" leads of timer to connections specified.
4. Turn right timer switch to applicable selection.
5. Turn timer power switch "ON" and push reset button.
6. Select seconds on Sec/Hz switch and select accuracy range to .01 seconds.
7. Turn start latch and stop latch switch to "ON".

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9.0 DETAILED PROCEDURE: (continued)

9.1 (continued)

3. 480V LC/MCC

NOTE 1

Exercise caution when performing test as equipment may be energized.

NOTE 2

Make connections at terminal boards wherever possible (consult CWD's).

INITIAL	DATE	EQUIPMENT	NORMAL OPERATION	CWD	TIME			CONNECTION POINTS	JUMPERS REMOVED
					SET	AS FOUND	AS LEFT		
		2HVS-1A	Running	285	3 Sec.		Jumper 27/TDPU 1-2 contact. Lift wire to relay coil (Term 11) and connect test switch. Connect timer. START across relay coil STOP across any terminal other than 1-2.		
		2HVS-1C		304	3 Sec.				
		2HVS-1B		286	3 Sec.				
		2HVS-1D		305	3 Sec.				
			Standby				If the fan is not running, lift wire to relay coil, Term 11, and connect switch. Lift terminal 2 of contact 1-2. Hook up timer. START across coil. STOP across terminal 1-2		
		2HVE-6A	Running or Standby	513	6 Sec.		For the 2L/TDPU relay, follow procedure as outlined for 27/TDPU above.		
		2HVE-6B		516	6 Sec.				
		2HVS-5A	Running	476	18 Sec.		For the 2L/TDPU relay, proceed as in 27/TDPU above.		
		2HVS-5B		477	18 Sec.				
		2RV-3	Running	1169	21 Sec.		For the 2L/TDPU relay, proceed as in 27/TDPU above.		
		2RV-4		1163	21 Sec.				
		2RV-1	Running	1219	21 Sec.		For 2L/TDPU relay, proceed as in 27/TDPU above.		
		2RV-2		1220	21 Sec.				
		2HVE-41A	Running or Standby	1162	21 Sec.		For 2L/TDPU relay, proceed as in 27/TDPU above.		
		2HVE-41B		1163	21 Sec.				
		B.A. Heat Trace Transf. 2A	On	146	27 Sec.		For 2/TDPU relay, proceed as in 27/TDPU above.		
		B.A. Heat Trace Transf. 2B	On	147	27 Sec.				
		2A Batt. Chgr.	On	1001	27 Sec.		Jumper TB-5 2-3. Lift Term 12 wire of relay 2/TDPU and install test switch from relay coil to lifted lead. Connect timer. START across 11 and 12 of relay. STOP across 2 and 1. Power relay using the test switch.		
		2B Batt. Chgr.		1002	27 Sec.				
		2AB Batt. Chgr.		1003	27 Sec.				



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9.0 DETAILED PROCEDURE: (continued)

9.1 (continued)

3. 480V LC/MCC (continued)

INITIAL	DATE	EQUIPMENT	NORMAL OPERATION	CWD	TIME			CONNECTION POINTS	JUMPERS REMOVED
					SET	AS FOUND	AS LEFT		
		ICW	Running	832 833	9 Sec.			Perform 9.1.1.A through D	
		ICW	Standby	834	9 Sec.			Perform 9.1.2.A	
		2AA Batt.Chgr.	Running	1801	27 Sec.			Jumper TB5-2 to 3. Lift Term 12 wire and install test switch from relay coil to lifted lead. Connect timer, START across relay 2/TDPU coil, STOP contact 1-2. Power relay using test switch.	
		2BB Batt.Chgr.		1801	27 Sec.				
		2A Chgr. Pump	Running or Standby	177	300 Sec.			Lift Term 11 wire at relay 2L/TDPU. Lift one wire at terminals for contacts 1-2 of 2L/TDPU. Connect test switch at terminal for lifted Term. 11 wire and a positive feed. Connect timer START across 2L coil and STOP across terminal 1-2. Power the relay using the test switch.	
		2B Chgr. Pump		178	300 Sec.				
		2C Chgr. Pump		179	300 Sec.				
		2A BA Makeup	Running	174	300 Sec.			Jumper terminal 1-2 of relay 2/174TDPU. Lift Term 11 wire on relay coil terminal. Hook up test switch between wire and terminal 11 for 120V AC power. Connect timer START across relay coil. STOP across any terminal other than 1-2.	
		2B BA Makeup	Standby	175	300 Sec.			Omit jumper at 1-2 and proceed as in 2A other steps.	

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9.0 DETAILED PROCEDURE: (continued)

9.1 (continued)

3. 480V LC/MCC (continued)

INITIAL	DATE	EQUIPMENT	NORMAL OPERATION	CWD	TIME			CONNECTION POINTS	JUMPERS REMOVED
					SET	AS FOUND	AS LEFT		
		2HVA/ACC-3A	Standby	492	24 Sec.			Have the NPS place unit to be worked on on standby. Lift Term 11 wire of 2L/TDPU relay. Lift one wire from terminals for contact 1-2. Connect test switch between wire lifted from Term 11, and Term 11 to power relay. Connect timer START Term 11 to Term 12, STOP across 1-2 contact of 2L relay	
		2HVA/ACC-3B		494	24 Sec.				
		2HVE-11	Running or Standby	468	38 Sec.			Omit if fan is on standby. Jumper 2L/TDPU 1-2. Lift Term 11 wire and connect test switch. Hook up timer, START Term 11 to Term 12, STOP across a spare contact.	
		2HVE-12		468	38 Sec.				
		2HVE-13A	Standby	490	24 Sec.			Lift wire to Term 11 of 2L/TDPU relay. Lift wire to 2 of contact 1-2. Connect test switch between wire from Term 11 relay. Hook up timer START Term 11 to Term 12 STOP across contact 1-2.	
		2HVE-13B		491	24 Sec.				
		2HVE-9A	Standby	503	24 Sec.			Lift wire to Term 11 of 2L/TDPU relay. Lift wire to 2 of contact 1-2. Connect test switch between Term 11 lifted wire and relay. Hook up timer START Term 11 to Term 12, STOP across contact 1-2.	
		2HVE-9B		504	24 Sec.				
		2HVS-4A	Running	505	24 Sec.			Jumper contacts 1-2 of relay 2L/TDPU. Lift wire to terminal 12 on 2L/TDPU. Connect test switch between Term 12 wire and terminal. Hook up timer, START Term 11 to Term 12, STOP across any convenient spare contact.	
		2HVS-4B		506	24 Sec.				



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9.0 DETAILED PROCEDURE: (continued)

9.1 (continued)

3. 480V LC/MCC (continued)

INITIAL	DATE	EQUIPMENT	NORMAL OPERATION	CWD	TIME			CONNECTION POINTS	JUMPERS REMOVED
					SET	AS FOUND	AS LEFT		
*		2A D/G F.O. Trans. Pump	Standby	1126	3 Sec.		With pump not running, lift wire L1 to relay coil and connect test switch from L1 to TBC-9 (in excitation cubicle). Lift Terminal 5 of contact 1-5. Hook up timer. Start across coil. Stop across contact 1-5.	/R4	
*		2B D/G F.O. Trans. Pump		1136	3 Sec.			/R4	
		2HVS-2A	Running	522	18 Sec.		Jumper 2L1/TDPU 1-5 contact. Lift wire to relay coil and connect test switch. Connect timer. START across relay coil. STOP across any terminal other than 1-5.		
		2HVS-2B	Running	523	18 Sec.				
		2HVE-3A	Running	524	18 Sec.				
		2HVE-3B	Running	525	18 Sec.				
			Standby				If the fan is not running, lift wire to relay coil and connect switch. Lift terminal 5 of contact 1-5. Hook up timer. START across coil. STOP across terminal 1-5.		

* NOTE

These items have been added to satisfy safeguards test requirements.

/R4

NOTE

If it is more convenient, make hookups at terminal boards provided the same result is obtained.

NOTES

1. Containment cooling fans are not to be cycled. If timer is out of spec, obtain clearance, retime or repair relay. Tech. Spec. 72 hours. Timers must be calibrated (checked) in the same position as mounted.
2. Equipment on MCCs - If timer is out of specs, obtain clearance, remove O.L. heaters, reset/repair relay, test without O.L. heaters. When complete, restore O.L. heaters. Timers must be calibrated (checked) in the same position as mounted.

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9.0 DETAILED PROCEDURE: (continued)

9.1 (continued)

3. 480V LC/MCC (continued)

NOTES (continued)

3. 2L relay for 2A and 2B charging pumps are in RTGB-205. All connections are made at the RTGB. 2C charging pump 2L relay is in wiring box N5 at switchgear.

Completed by _____ Date _____

Verified by _____ Date _____

Electrical Supervisor _____ Sat _____ Date _____

Unsat _____

Comments: _____

