U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-352/84-54

Docket No. 50-352

License No. CPPR-106 Priority -- Category B

Licensee: Philadelphia Electric Company

2301 Market Street

Philadelphia, Pennsylvania 19101

Facility Name: Limerick Generating Station, Unit 1

Inspection At: Limerick, Pennsylvania

Inspection Conducted: September 17 - October 5, 1984

Inspectors: J E Briggs 11/26/84
L. Briggs, Lead Reactor Engineer date

C Petrone for 11/26/84
S. Kucharski, Reactor Engineer date

Approved by: C. Petrone for 11/26/84
L. H. Bettenhausen, Chief, Test Programs Section, Engineering Programs Branch date

Inspection Summary:

Inspection on September 17 - October 5, 1984 (Report No. 50-352/84-54)

Areas Inspected: Routine, onsite, unannounced inspection by two region-based inspectors (139 hours) of follow-up of previously identified items, preoperational test witnessing, preoperational test procedure results evaluation, QA/QC interface and plant tours.

Results: No violations identified.

DETAILS

1. Persons Contacted

*J. Corcoran, E&R Quality Assurance Branch Head
*J. Ehm, Startup Scheduler
*C. Endriss, Regulatory Engineer
*G. Gilbody, Quality Assurance Engineer
*C. Harmon, Quality Assurance Engineer
*A. MacAinsh, Quality Assurance Site Supervisor
*W. McCullough, Project Startup Engineer
*K. Meck, Quality Assurance Engineer
J. Murphy, Startup Scheduler
J. Rubert, Lead Quality Control Engineer

Other NRC Personnel

*J. Wiggins, Senior Resident Inspector, Limerick 1

The inspector also contacted other members of the licensee's technical and QA/QC staff during the inspection.

2. Follow-up of Previous Inspection Findings

(Closed) Violation (84-26-04) Diesel generator test program did not satisfy two criteria specified in Regulatory Guide 1.108. Specifically, these are a complete loss of load and a loss of coolant accident (LOCA) coincident with a loss of offsite power (LOOP) which occurs while the unit is undergoing periodic surveillance testing.

The inspector verified the licensee's September 6, 1984 response to the above items during the preoperational test procedure results evaluation discussed in Paragraph 3.2.1 of this report.

The first item, complete loss of load, was initially conducted on 2 of 4 diesels. When identified, the licensee revised preoperational test procedure 1P-100.4 to specify the trip from 100 percent load and tested the remaining two diesel generators. The capability of the diesel generators to respond to a LOCA-LOOP during periodic surveillance was demonstrated during the combined testing of 1P-24.1, 1P-100.1 and TCN 12 to 1P-100.1. The ability of the diesel generator breakers to trip on a LOCA signal was performed during 1P-24.1 which places the diesel generators in a running but off-line condition. The ability of the diesels to respond to a LOOP is tested in 1P-100.1. Taken collectively, the data show the diesels will respond properly to the above events.

3. Test Procedure Review for Test Results Evaluation

3.1 Scope

The 58 completed test procedures listed in Attachment A were reviewed during this and other NRC:RI inspections as indicated in the attachment to verify that adequate testing had been conducted to satisfy regulatory guidance, licensee commitments and FSAR requirements and to verify that uniform criteria are being applied for evaluation of completed test results in order to assure technical and administrative adequacy.

The inspector reviewed the test results and verified the licensee's evaluation of test results by review of test changes, test exceptions, test deficiencies, "As-Run" copy of test procedure, acceptance criteria, performance verification, recording conduct of test, QC inspection records, restoration of system to normal after test, independent verification of critical steps or parameters, identification of personnel conducting and evaluating test data, and verification that the test results have been approved.

3.2 Findings

3.2.1 Diesel Generator Performance

During review of 1P-100.4, Revision 0, Standby Diesel Generator Loading, the inspector noted that Test Exceptions 15 and 16 identified a problem with diesel generator ability to recover voltage and frequency to within 90 and 95 percent of rated values, respectively, within 60 percent of the load sequence time interval. This problem was evident only during the 3 second time interval after the Residual Heat Removal (RHR) pump and the 480V load center breaker closure. Regulatory Guide 1.9, Section C.4, states the above recovery time and allows a greater time interval if justified. The concern is that large loads may not accelerate within their required time intervals.

The licensee's Engineering and Research Department analysis has determined the above to be acceptable since the 480V load center is a relatively small load and they desire power to the load centers as soon as possible to allow the motor operated core spray (CS) and Low Pressure Coolant Injection (LPCI) valves to open.

The inspector reviewed the Visicorder strip charts of these load sequences and the recorded times to achieve rated CS and LPCI flow. Rated flows were achieved well within the required times. The voltage and frequency recovery to stable (90 percent voltage and 95 percent frequency) conditions appeared to be about 2 to 2.2 seconds after the RHR

pump start for each diesel, (60 percent of 3 seconds is 1.8 seconds). This review did not identify any unacceptable equipment operation. The licensee has also initiated a Licensing Document Change Notice to revise the FSAR to state that recovery of voltage and frequency is obtained in all cases except the interval between the RHR pump start and the 480V Load center breaker closure.

Diesel generator reliability testing (69 consecutive starts) was addressed and found acceptable in NRC:RI Inspection Report 50-352/84-43.

3.2.2 Reactor Protection System

During review of 1P-58.1, Revision 0, Reactor Protection System (RPS) the inspector noted that 23 test exceptions were issued regarding the greater than 50 millisecond response time from the opening of a sensor contact up to and including the opening of the scram contactors. This item was also noted in NRC:RI Inspection Report 50-352/84-07. The problem was addressed by G.E. in FDDR No. HHI-0941. The disposition stated that the slow response, (worst case 14.5 milliseconds over specification, including recorder response of 3 milliseconds) for one section of the RPS circuit did not impact on the required overall RPS response time. All total RPS response times were well within the required system response times. The inspector had previously asked why the 50 millisecond response specification had not been revised, since this was a known problem with Agastat relays, or why the slow relays had not been replaced with relays having a faster time response.

Revision 6 to G.E. specification 22A3083AB, Paragraph 4.1.8, apparently in progress at the time of the previous questions, was issued by G.E. on May 10, 1984. Revision 6 allows the 50 millisecond response measurement to be taken downstream of the slow relay thereby eliminating it from the measurement. The upstream response measurement is still taken (Paragraph 4.1.8.1 of the same specification) as part of the sensor time response as well as overall RPS system response time.

No unacceptable conditions were identified.

3.2.3 Test Exceptions

No unresolved discrepancies or violations were noted in the above review. However, numerous open test exceptions require licensee resolution. Previous unresolved item numbers 84-37-01 and 84-46-01 regarding open test exceptions are closed. The following open test exceptions collectively constitute Unresolved Item 352/84-54-01.

Procedure Number	Short Title	Open Test Exception No.
1P-2.2	125/250 VDC	19
1P-25.1	Primary Cont. Instr. Gas	1, 2, 3 and 4
1P-34.2	Reactor Encl. HVAC	8
1P-39.1	Condensate Filter Demins	2
1P-51.1	Core Spray System	11, 13, 14, 17, 54, 56, 59 and 65
1P-57.1	Uninterruptible AC Power	1
1P-66.1	Reactor Encl. Cooler	2
1P-80.1	Reactor Vessel Instr.	29
1P-100.2	Loss of Instr. Air	4, 11 and 12
1P-13.1	Fire Prot. Water	8, 15 and 18
1P-24.1	Standby Diesel Generators	1, 8, 53 and 59
1P-30.1	Control Encl. HVAC Sys.	13 and 14
1P-30.2	Control Encl. CW Sys.	2, 8, 11. 12, 13 and 15
1P-32.2	Control Room Isol. and Purge	2, 3, 4, 5, 6 and 9
1P-34.1	Reactor Encl. HVAV	4, 13, 14, 15 and 18
1P-42.1	Circ. Wtr. Sys.	19, 34 and 35
1P-54.1	Emer. Service Wtr.	2
1P-58.1	Reactor Prot. Sys.	54, 55, 56, 57 and 58
1P-59.1	Cont. Isol. & NSS Shutoff Sys.	7, 9, 10, 11, 12 and 13
1P-59.2	ILRT	2 and 13
1P-62.1	Reactor Vessel and Aux.	1 and 6
1P-66.2	Control Encl. Unit Coolers	1
1P-99.2	Seismic Monitoring System	1 and 2
1P-100.1	Loss of Offsite Power	2 and 11
1P-41.1	Cooling Tower Sys.	6, 7 and 8
1P-3.1B	13.2KV	4
1P-3.1G	13.2KV	1
1P-3.1H	13.2KV	1
1P-7.1	Standby DC Lighting	2, 3 and 6
1P-13.4	Smoke Detection System	1
1P-16.1	RHRSW	12
1P-28.2	Spray Pond Structure HVAC	4
1P-33.1	Turb. Encl. HVAC	14, 20, 21, 22 and 24
1P-44.1	Condensate	1, 9, 12 and 15
1P-50.1	RCIC	24 and 30
1P-60.1	DW HVAC	11, 22, 24, 32, 33, 34, 35 and 37
1P-64.1	Reactor Recirc.	44, 45, 47 and 49
1P-65.1	Radwaste Encl. HVAC	2, 5 and 7
1P-69.3B	Liquid Radwaste (RCPB Leakage)	3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15
1P-85.1	Cathodic Prot.	21
1P-99.1	Reactor Encl. Crane	4 and 17

Procedure No.	Short Title	Open Test Exception No.
1P-99.3	Pub. address & Evac. Sys	2, 3, 4, 5, 6, 7 and 8
1P-69.1	Equip. Dir. Coll. & Storage	11
1P-69.3A	Liquid Radwaste	8
1P-76.1	Process Samp.	3, 4 and 5
1P-37.1	Demin. Wtr. Transfer	5, 10 amd 11
1P-53.1	SBLCS	15
1P-18.1	Instr. Air Sys.	1 and 7
1P-83.2	ADS	19

The above test exceptions were those that were open at the time of the inspector's review of the test results. The list takes into account those cleared by the license and reviewed by the inspector during this inspection. Priorities for closure are not listed in this report; however, by test endorsement record most were assigned an initial priority of closure prior to fuel load. The licensee is currently formulating a consolidated listing of open test exceptions which will be considered the controlling list with priorities for resolution assigned by the Plant Operations Review Committee (PORC). The licensee's list will be reviewed in detail by NRC:RI during a future inspection.

3.2.4 Acceptance Test Results

The inspector reviewed the acceptance test results of 1A-74.1, Nitrogen System and 1A-99.3, Component Vibration Monitoring System. Both tests had been conducted in accordance with the procedures and had received the appropriate PORC review and approval.

No unacceptable conditions were identified.

4. Test Witnessing

4.1 Scope

Test witnessing by the inspector included the observations and overall crew performance identified in Paragraph 3.2 of NRC:RI Inspection Report 50-352/84-04.

4.2 Preoperational Testing Witnessed

The inspector observed a portion of the following test:

-- IP-83.1, Main Steam System, Revision 0.

During a portion of the test observed, the MSIV leakage control, the procedure called for measuring the time required to obtain a minimum of 1 inch of water gauge (WG) vacuum on instrument PI40-IR656. The inspector observed that the particular gauge read in inches of mercury. A test hold was applied at that point. A test run was performed to measure the time required to draw 1 inch of mercury vacuum. This took approximately 5 minutes. A check was made of the following documents.

-- G.E. Test Specification, 22A2271AY

-- G.E. Design Specification, 22A4633AA, Revision 3

-- G.E. Instrumentation Data Sheet 262A7801TN, Revision 7

The Design Specification and Instrumentation Data Sheet call for instrumentation to read in inches of mercury and the Test Specification calls for a one time test of greater than one inch of water to be drawn. The pre-operational test procedure was subsequently changed to read a minimum of 1 inch of mercury.

No unacceptable conditions were identified.

5. Preoperational Test Procedure Verification

The inspector verified that the licensee has issued approved preoperational test procedures for all the systems identified in FSAR Chapter 14, Table 14-2.4, that had not been previously reviewed by the NRC:RI.

No unacceptable conditions were identified.

6. QA/QC Interface

Quality assurance review of the completed properational tests discussed in Paragraph 3 of this report was found acceptable. The inspector also observed proper QC surveillance of preoperational testing activities during the test witnessing discussed in Paragraph 4 of this report.

No unacceptable conditions were identified.

7. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, an item of noncompliance or a deviation. An unresolved item is identified in paragraph 3.2.

8. Plant Tours

The inspector made several tours of various areas of the facility to observe work in progress, housekeeping, cleanliness controls and status of construction and preoperational test activities.

9. Exit Interview

A management meeting was held on October 5, 1984, to discuss the inspection scope and findings as detailed in this report (see Paragraph 1 for attendees). No written information was provided to the licensee at any time during the inspection.

Attachment A

Completed Procedures Reviewed for Test Results Evaluation

-- 1P-13.1, Revision 0, Fire Protection Water System, Results Approved September 12, 1984;

-- 1P-24.1, Revision 0, Standby Diesel Generator System, Results Approved September 10, 1984;

-- 1P-30.1, Revision 0, Control Enclosure HVAC System, Results Approved September 21, 1984;

-- 1P-30.2, Revision 0, Control Enclosure Chilled Water System, Results Approved September 13, 1984;

-- 1P-32.2, Revision 0, Control Room Isolation and Purge, Results Approved September 5, 1984;

-- 1P-34.1, Revision 0, Reactor Enclosure HVAC, Results Approved September 5, 1984;

-- 1P-41.1, Revision 0, Cooling Tower System, Results Approved October 1, 1984;

-- 1P-42.1, Revision 0, Circulating Water System, Results Approved June 1, 1984;

-- 1P-54.1, Revision 0, Emergency Service Water, Results Approved September 12, 1984;

-- 1P-56.1C, Revision 0, Reactor Manual Control System Rod Sequence Control System (RSCS), Reslts Approved July 3, 1984;

-- 1P-58.1, Revision 0, Reactor protection System, Results Approved September 12, 1984;

-- 1P-59.1, Revision 0, Containment Isolation and Nuclear Steam Supply Shutoff System, Results Approved September 5, 1984;

-- 1P-59.2, Revision 0, Integrated Leak Rate Test, Results Approved September 13, 1984;

-- 1P-62.1, Revision 0, Reactor Vessel and Auxiliaries (NSSS) System, Results Approved August 27, 1984;

-- 1P-66.2, Revision 0, Control Enclosure Unit Coolers, Results Approved September 7, 1984;

-- 1P-78.2, Revision 0, Power Range Neutron Monitoring System, Results Approved August 23, 1984;

-- 1P-78.3, Revision 0, Traversing In-Core Probes (TIP) Calibration System, Results Approved September 20, 1984;

-- 1P-99.2, Revision 0, Seismographical Monitoring System, Results Approved September 12, 1984;

-- 1P-100.1, Revision 0, Loss of Offsite Power, Results Approved September 8, 1984; and,

-- 1P-100.4, Revision 0, Standby Diesel Generator Loading, Results Approved September 7, 1984.

The following completed procedures reviewed for test results are documented in NRC:RI Inspection Report 50-352/84-49.

-- 1P-3.1,A through H, 13.2 KV Unit Auxiliary Power System;

-- 1P-7.1, Standby DC Lighting;

-- 1P-13.2, Fire Protection CO^2 System;

-- 1P-13.3, Fire Protection Foam System;

-- 1P-13.4, Smoke Detection System;

-- 1P-16.1, Residual Heat Removal Service Water System;

-- 1P-28.2, Spray Pond Pump Structure HVAC;

-- 1P-33.1, Turbine Enclosure HVAC;

-- 1P-44.1, Condensate System;

-- 1P-50.1, Reactor Core Isolation Cooling System;

-- 1P-56.1B, Rod Worth Minimizer;

-- 1P-56.1B1, Rod Worth Minimizer (Back Up Computer);

-- 1P-57.1B, Uninterruptible AC Power System, APRM;

-- 1P-60.1, Drywell HVAC;

-- 1P-64.1, Reactor Recirculation System;

-- 1P-65.1, Radwaste Enclosure HVAC;

-- 1P-69.3B, Liquid Radwaste (RCPB Leakage);

-- 1P-83.2A, Automatic Depressurization System TMI Modification;