U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-352/84-64

Docket No. 50-352

License No. NPF-27 Priority - Category C

Licensee: Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Facility Name: Limerick Generating Station, Unit 1

Inspection At: Limerick, Pennsylvania

Inspection Conducted: October 12, 15-19, 22-31 and November 1 and 2, 1984

Inspectors: J. Beall, Project Engineer — 12/21/84 date

N. Blumberg, Lead Reactor Engineer — 12/13/84 date

L. Briggs, Lead Reactor Engineer — 12/20/84 date

M. Gaudino, Reactor Engineer — 12/13/84 date

S. Kucharski, Reactor Engineer — 12/20/84 date

D. Vito, Reactor Engineer — 12/19/84 date

Approved by: L. Bettenhausen, Chief, Test Programs Section, Engineer Programs Branch — 12/20/84 date

Inspection Summary:
Inspection on October 12, 15-19, 22-31 and November 1 and 2, 1984 (Inspection Report No. 50-352/84-64)

Areas Inspected: A routine unannounced inspection of licensee action on previous inspection findings, initial fuel load operations, startup test procedures, startup test program, fuel handling training, QA/QC interfaces, preoperational test results, electrical safeguard system and overall plant conditions. The inspection involved 297 inspector hours onsite and one hour in-office by six region-based NRC inspectors.

Results: Two violations were identified - (Violation - Failure to enter material on Material Accountability Log - Paragraph 3.2.2) and (Violation - Failure to properly protect a vital area - Paragraph 3.2.5).

1. Persons Contacted

Licensee Representatives, Contractors and Consultants

*J. Basilio, Administrative Engineer - PECO
*J. Corcoran, Field Quality Assurance (QA) Branch Head - PECO
*J. Doering, Operations Engineer - PECO
*C. Endriss, Regulatory Engineer - PECO
E. Firth, Limerick Training Coordinator
*J. Franz, Assistant Plant Superintendent
*G. Gilbody, QA Engineer - PECO
*R. Hennessy, Operations Quality Control (QC) Supervisor - PECO
*A. Jenkins, Startup Test Program Supervisor - GE
*G. Leitch, Plant Superintendent
*S. MacAinsh, QA Site Supervisor - PECO
*K. Meck, QA Engineer - PECO
*J. Phillabaum, Licensing Engineer - PECO

USNRC

*L. Bettenhausen, Chief, Test Programs Section
*W. Borchardt, Reactor Engineer
*D. Florek, Lead Reactor Engineer
*J. Wiggins, Senior Resident Inspector

The inspector interviewed other licensee personnel including reactor operators, refueling bridge operators, and quality control inspectors.

*Denotes those present at exit interview conducted on November 2, 1984.

2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (50-352/84-42-03). This item concerned the licensee's accountability of Local Leakage Rate Testing (LLRT) results and their application to Technical Specification containment leakage limits. In a letter to R. W. Starostecki, Director, DPRP, NRC Region I, dated September 7, 1984, the licensee has committed to the reporting, calculation and retention of LLRT results in accordance with national standard ANSI/ANS 56.8-1981.

This item is closed.

3. Initial Fuel Load Operations and Plant Tours

3.1 Fuel Load Witnessing

Initial fuel load activities commenced on October 26, 1984. NRC inspectors were continuously onsite for the first eight shifts. Subsequent inspections were performed daily on a random sampling basis. Fuel load activities were observed at the Control Room, refueling floor, and refueling bridge. In addition to inspection of

fuel load operations, the inspectors performed general plant tours. The Senior Resident Inspector and one region-based inspector, performing the duties of a resident inspector, also participated in the inspection of fuel load activities. The details of their inspection activities are included in Inspection Report 50-352/84-60.

Fuel load activities were reviewed for the following:

-- Test procedures and fuel handling procedures were being complied with.

-- Required licensed personnel were present in the Control Room and on the refuel bridge during actual fuel movement.

-- Communications were established between the refuel bridge and the Control Room.

-- Core status was maintained current at both the Control Room and refuel floor.

-- Source range instruments were operating properly.

The following test procedures were being performed by the licensee:

-- STP 3.1, Fuel Load

-- STP 5.1, [Control Rod] Insert-Withdraw Checks

The following activities were observed:

-- Movement of new fuel from the spent fuel pool to the reactor vessel.

-- Movement of neutron monitoring fuel load chambers.

-- Operation of the refueling bridge.

-- Control rod insert and withdrawal checks.

-- Preliminary shutdown margin test with 144 fuel bundles installed.

-- Overall test control from the Control Room.

-- Performance of inverse multiplication plots.

-- Adequacy of shift turnovers.

3.2 Findings

3.2.1 At about 4:30 p.m. on October 27, 1984, a licensee representative informed the inspector that fuel loading operations had been stopped because they had discovered that the following two surveillance tests required by the Technical Specifications had not been performed.

Technical Specification	Function	Test and Frequency
4.3.1.1-1.8A	Scram Discharge Volume (SDV) Level Transmitter Channel Check	Channel check every 12 hours with a control rod withdrawn
4.3.2.1-1.7C	Refueling Floor Ventilation Exhaust High Radiation Instruments	Channel check every 12 hours when handling irradiated fuel in secondary containment and during core alteration and operations with a potential for draining the reactor vessel

Following the identification of the two missed surveillance tests, the inspector requested that the licensee perform a review to ensure that no other required surveillance tests were overlooked prior to commencing fuel load. Subsequently, the licensee appropriately revised the daily surveillance procedure; performed the required channel checks; and found no additional missed surveillances.

On October 28, 1984, after fuel load recommenced, licensee engineering personnel performed an additional review to assure that all required surveillance tests were being performed. And, on October 29, 1984, the Plant Superintendent informed the inspector that a special task force had been established to assure that the licensee was performing the required surveillance tests to satisfy the Technical Specifications for each of the upcoming operating conditions.

Although the failure to perform the required surveillances or to observe limiting conditions for operations (LCOs) is a violation of NRC regulations, no notice of violation was issued because the following measures were taken by the licensee which adhere to criteria specified in 10 CFR 2, Appendix C, Section IV:

(1) The violation was identified by the licensee;

(2) The violation could not be categorized above a Severity Level IV;

(3) The licensee has stated that the event will be reported as a 30 day licensee event report (LER);

(4) Prompt corrective measures including measures to prevent recurrence were taken; and

(5) There were no previous similar violations for which corrective actions should have prevented this violation.

The safety concerns posed by these missed surveillances were minimal in that only one control rod at a time was being withdrawn during this stage of fuel load. Further, Technical Specifications did not require secondary containment to be established for the fuel load operating condition (OPCON 5), therefore, the safety functions performed by the radiation instruments (containment isolation) were not required to be operable.

3.2.2 Procedure A-30, "Administrative Procedures for Housekeeping," requires that the refueling bridge be maintained as a Housekeeping Zone I area when the reactor vessel head is removed and that personnel and material entering or leaving the refuel bridge must be entered in a special log. On October 27, 1984, during initial fuel load operations, the inspector noted numerous items on the refueling bridge such as binoculars, loose procedures, pens, and clipboards which had not been identified in the refuel bridge housekeeping log. While housekeeping log books were maintained at each end of the refuel bridge, no person was assigned the responsibility of ensuring these logs were being properly maintained.

The inspector notified the Operations Shift Superintendent of the problem and immediate corrective action was taken, in that all items on the bridge were inventoried and entered into the log.

Failure to properly control an established housekeeping zone is contrary to 10 CFR 50, Appendix B; ANSI N45.2.3; and Procedure A-30 and is a violation. (50-352/84-64-01)

Procedure A-30 requires the use of an accountability log but does not define this log in the procedure. The inspector observed that an informal handwritten log was in use and informed the licensee that since the log performs an important function, the information on this log should be procedurally defined and

approved by licensee management. The licensee stated that Procedure A-30 would be revised to include the accountability log. This item is unresolved pending completion of licensee action and subsequent NRC:RI review. (50-352/84-64-03)

3.2.3 On November 2, 1984, during performance of core component transfer step no. 245, the licensee had difficulty in inserting fuel bundle LY 8313 into the core at grid location 15-14. On insertion, slack on the weight gage indicated that the bundle received some resistance for a few seconds. It was not known whether the resistance occurred following partial insertion or was due to a misalignment during insertion.

The licensee spent most of the day using underwater television cameras to inspect the area around this bundle. However, no problems could be seen. Eventually, bundle LY 8313 and its diagonal bundle located in that cell were lifted separately for an underwater TV inspection. Only minor scratches were observed on the diagonal fuel bundle channel; however, fuel bundle LY 8313 channel had many scratches, indications of raised metal, and numerous "scuff" marks at the bottom of the channel. Most of the underwater TV inspections were witnessed by an NRC inspector.

Fuel bundle LY 8313 was ultimately reinserted into the core, and fuel load was continued. A licensee representative stated that this bundle will be removed from the core following fuel load for further inspection and possible rechanneling. Licensee resolution to this item will be followed during a subsequent NRC inspection (50-352/84-64-05).

3.2.4 During a plant tour, the inspector noted that the licensee had modified their suppression pool to drywell vacuum breaker valve position indication system to conform to drywell to suppression pool bypass leakage addressed in NRC Standard Review Plan (SRP) 6.2.1.1.C, Appendix A, "Steam Bypass for Mark I, II and III Containments and Problems Identified at Other Facilities." The modification consists of 4 microswitches mounted on each valve flange (2 valves in series, 8 switches) with adjustable actuating rods on each microswitch touching the valve disk. A very small movement of the disk will actuate the switch. This arrangement should provide positive position indication of the valve disk and eliminates the previous complicated and inaccurate method using a microswitch actuated by the valve operating linkage.

The accuracy of the method resulting from modification should enable the licensee to accurately determine if bypass leakage exists between the drywell and the suppression pool and to comply with the SRP position.

3.2.5

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4. Startup Test Procedure Review

Startup test procedures listed in Attachment A were reviewed for conformance to the standards, specifications, and guidelines and for the criteria as previously defined in Inspection Report 50-352/84-50. No violations or other deficiencies were observed.

5. Startup Test Program

5.1 References

-- Regulatory Guide 1.68, Revision 2, August 1978, Initial Test Programs for Water-Cooled Nuclear Power Reactors

-- ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase Of Nuclear Power Plant"

-- Limerick Generating Station FSAR, Chapter 14, "Initial Test Program"

-- A-200, Startup Test Procedure Format and Content, Revision 1, June 27, 1984

-- A-201, Startup Test Procedure Control, Revision 1, June 27, 1984

-- A-202, Startup Test Implementation, Revision 1, July 10, 1984

-- A-203, Startup Test Program Personnel Training and Qualification, Revision 0, May 30, 1984

5.2 Program Review

Procedures A-200, 201, 202 and 203 were reviewed for their conformance to the requirements and guidelines of Regulatory Guide 1.68, ANSI N18.7, and FSAR Chapter 14. The startup test program was reviewed for the following attributes:

-- A startup test program has been developed and its basic phases identified.

-- A startup test schedule has been developed.

-- The test organization has been established and responsibilities have been assigned

-- Interfaces between organizations involved in the test program have been clearly defined.

-- Methods have been established for identifying, documenting, and resolving test exceptions and test deficiencies.

-- Methods and responsibilities have been established for evaluation and approval of test results.

-- Test procedures formats have been established.

-- Test procedures are properly approved.

-- Methods have been established for control of test procedures and test changes.

No violations or deficiencies were identified.

6. Fuel Handling Training

Regulatory Guide 1.68-1978, Appendix C, states that initial fuel load procedures should specify dry runs be performed by fuel handling personnel. The inspector verified that procedure FH-602, "Qualification of Refueling Platform Operators," provides for extensive training and performance of dry runs for bridge operators. The inspector reviewed a sampling of training records required by FH-602 and determined that adequate dry runs were performed.

No violations or deficiencies were identified.

7. QA/QC Interfaces

The inspector observed that there was quality control (QC) inspector coverage for all shifts of fuel load operations. QC inspectors were performing random surveillances of fuel load activities using specifically prepared QC checklists. All startup test procedures, as a prerequisite, require notification of QC. QC copies of the startup test procedures are stamped with specific QC witness points. After initial notification of QC by test personnel regarding test commencement, it is the responsibility of QC inspectors to perform specific witnessing.

The inspector reviewed specific QC checklists and discussed QC inspections with on-shift personnel.

No violations or deficiencies were identified.

8. Preoperational Test Procedure Review for Test Results Evaluation

8.1 Scope

Two completed test procedures were reviewed during this inspection 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. The following tests were reviewed:

-- 1P-58.2, Redundant Reactivity Control System, Revision 0 (Deferred Test) and

-- 1P-85.2, Freeze Protection and Heat Trace System, Revision 0.

8.2 Test Exceptions

8.2.1 No unresolved discrepancies or violations were noted in the above review. However, several open test exceptions require licensee resolution. During this inspection, licensee resolution of 102 test exceptions was reviewed and found acceptable by NRC:RI inspectors. Attachment B is a listing, by priority, of test exceptions considered open by the inspectors and collectively constitute unresolved item 352/84-64-04. Previous unresolved item 352/84-54-01 concerning open test exceptions is closed.

8.2.2 As of the close of this inspection (November 2, 1984), the licensee has physically completed all preoperational tests including those tests tha' had been deferred until after initial fuel load. The deferred preoperational tests are currently in the process of licensee results review and approval. Unresolved test exceptions will be evaluated and prioritized to determine if any unresolved test exceptions could impact initial criticality. The licensee's priority listing will be reviewed and evaluated by NRC:RI during routine inspection.

9. Electrical Safeguard System Review

The inspector performed an electrical safeguard system review which compared selected electrical equipment and procedures of the Limerick facility with the Susquehanna Loss of AC Power Event discussed in NRC:RI Inspection Report 50-388/84-34. The comparison was performed to evaluate whether a similar event was possible at the Limerick facility.

A 13.2 KV breaker (101 safeguard transformer breaker) and a 4 KV Safeguard Bus breaker (201-D13) were physically examined by the inspector for proper DC control power labeling and to see if knife switches or fuse blocks could be mistakenly operated. The breaker cubicles contain fuse blocks which are properly labeled and affect DC control power for that breaker only. No knife switches are used. No ECCS DC logic control power disconnects or fuse blocks are located in the breaker cubicles. ECCS DC logic control power is supplied from distribution panels separate from breaker cubicles.

Annunciation is provided in the Control Room for each main safety related DC logic control panel breaker. In addition, each ECCS DC logic feeder breaker, if opened, will actuate a common alarm (system inop) in the Control Room and will indicate on a status panel what has been lost or disabled. Based on the above sample, the Limerick facility DC logic and control circuits seem well annunciated and appear to fully meet the guidance of RG 1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems."

The Limerick facility does not share Emergency Diesel Generators (EDG) or 4160 VAC Safeguard power busses. Limerick has 4 EDG for each unit with separate and independent DC logic and control power supplies for each EDG and ECCS train. Susquehanna shares 4 EDGs which can swing between two units and must share certain ECCS and 4 KV safeguard bus logic.

The inspector reviewed the following Limerick procedures:

-- S91.8.A, Racking 13 KV/2.3 KV Breakers in/out of Compartments;

-- S92.8.A, Racking 4 KV Breakers in/out of Compartments; and

-- A41, Procedure for Control of Safety Related Equipment.

The inspector noted that, during normal rackout at Limerick, the DC control power fuse blocks are not removed unless work is to be performed within the breaker cubicle. The normal procedure at Susquehanna is to de-energize DC breaker control power by opening a knife switch when the breaker is racked out.

Procedure A-41 requires duplicate blocking permits to be completed by two separate individual operators. Although not specifically stated, it is implied that the independent verification is performed after the initial blocking. Discussion with several operators indicates that totally separate verification is normal practice.

Based on the above review, it appears that an event similar to that which happened at Susquehanna would be much less likely to occur at the Limerick facility.

No unacceptable conditions were identified.

10. Independent Measurement, Calculations and Verifications

During this inspection, the inspectors performed the following independent measurements, calculations and verifications:

-- On a sampling basis, control rod withdrawal and insert times were measured by the inspector during performance of STP 5.1.

-- For preoperational test procedures 1P-65.1, "Radwaste Enclosure HVAC Filter Assembly OAS-340, Filter No. OAF-355," and 1P-30.1, "Control

Enclosure HVAC System Filter Assembly OAS-143, Filter No. OAF-161," the inspector independently checked calculations for the arithmetic average, maximum deviation, and percent deviation for the filter assemblies. One error was found in 1P-65.1 which was promptly corrected by the licensee.

-- The inspector independently witnessed and confirmed licensee observations during television inspections of core support structures, control rod blades and fuel elements as detailed in paragraph 3.2.3.

11. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, deviations or violations. Two unresolved items were identified during this inspection and are detailed in Paragraphs 3.2.2 and 8.2.

12. Management Meetings

Licensee management was informed of the scope and purpose of the inspection on October 16, 1984. The findings of the inspection were periodically discussed with licensee representatives during the course of the inspection. An exit interview was conducted on November 2, 1984 (see Paragraph 1 for attendees) at which time the findings of the inspection were presented.

At no time during this inspection was written material provided to the licensee by the inspector(s).

ATTACHMENT A

STARTUP TEST PROCEDURES REVIEWED

-- STP-12.0, APRM Calibration Main Body, Revision 0, June 1, 1984

-- STP-12.1, Constant Heatup Rate APRM Calibration, Revision 0, June 1, 1984

-- STP-12.3, High Power APRM Calibration, Revision 0, June 1, 1984

-- STP-25.0, Main Steam Isolation Valves - Main Body, Revision 0, July 13, 1984

-- STP-25.1, MSIV Functional Test, Revision 0, July 13, 1984

-- STP-25.2, Full Closure of Fastest MSIV, Revision 0, July 13, 1984

-- STP-25.3, Full MSIV Isolation, Revision 0, July 13, 1984

-- STP-26.0, Relief Valves - Main Body, Revision 0, March 2, 1984

-- STP-26.1, Relief Valve Low Pressure Test, Revision 0, March 2, 1984

-- STP-26.2, Relief Valve Rated Pressure Test, Revision 0, March 2, 1984

ATTACHMENT B

UNRESOLVED TEST EXCEPTIONS

Initial Criticality Items

Procedure No.	Short Title	Open Exception No.
1P-66.1	Reactor Encl. Cooler	2
1P-80.1	Reactor Vessel Instr.	29
1P-30.1	Control Encl. HVAC	13
1P-30.2	Control Encl. C.W.	13
1P-58.1	Reactor Prot. Sys.	57
1P-59.1	Cont. Isol. and NSSS	7, 10, 11 and 12
1P-59.2	ILRT	3
1P-66.2	Control Encl. Unit Coolers	1
1P-99.2	Seis. Monitoring Sys.	2
1P-100.1	Loss of Offsite Power	2
1P-60.1	D.W. HVAC	35
1P-65.1	Radwaste Encl. HVAC	2
1P-99.1	Reactor Encl. Crane	4
1P-69.1	Equip. Dr. Collection and Stor.	11
1P-83.2	ADS	19
1P-85.2	Freeze Protection	9, 11, 16 and 17

Low Power Testing Items

1P-3.1B	13.2 KV	4
1P-44.1	Condensate	15
1P-64.1	Reactor Recirc.	44
1P-76.1	Process Sampling	5
1P-41.1	Cooling Twr. Sys.	6 and 7

Commercial Operation Items

1P-41.1	Cooling Twr. Sys.	8
1P-7.1	Standby D.C. Lighting	2
1P-85.2	Freeze Protection	2, 3, 5, 6 and 7

1st Refueling Outage Items

1P-30.1	Control Encl. HVAC	14
1P-62.1	Reactor Vessel and Aux.	6
1P-44.1	Condensate	9 and 12
1P-37.1	Demin. Wtr. Transfer	10

Test Exceptions Considered Closed By The Licensee But Not Reviewed By NRC:RI

Procedure No.	Short Title	Open Exception No.
1P-34.2	Reactor Encl. HVAC (Required Floor)	8
1P-34.1 (Deferred Test)	Reactor Encl. HVAC	13, 14, 15 and 18
1P-100.1	Loss of Offsite Power	11
1P-16.1 (Deferred Test)	RHRSW	12
1P-33.1 (Deferred Test)	Turb. Encl. HVAC	20 and 24
1P-76.1	Process Sampling	4
1P-58.2 (Deferred Test)	RRCS	7