

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 87-15

Docket No. 50-353

License No. CPPR-107 Category A

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

Facility Name: Limerick Generating Station, Unit 2

Dates: July 13, - August 30, 1987

Inspectors: R. A. Gramm, Senior Resident Inspector  
J. E. Kaucher, Resident Inspector  
A. A. Varela, Lead Reactor Engineer

Approved by: J. C. Linville, Chief

J. C. Linville, Chief  
Reactor Projects, Section 2A

9/22/87  
date

Inspection Summary: Report for Inspection Conducted July 13 - August 30, 1987  
(Report No. 50-353/87-15)

Areas Inspected: Routine inspection by the resident inspectors of work activities, procedures, and records relative to masonry block walls, startup activities, electrical components, piping and pipe supports and instrumentation and controls components.

The inspector reviewed licensee actions on previously identified items and performed plant inspection tours. The inspection involved 137 hours by the inspectors.

Results: No violations were identified.

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## DETAILS

### 1.0 Plant Inspection Tours

The inspector observed in-progress work activities, completed work, and plant status in several areas during inspection tours. Work was examined for defects and compliance with regulatory and licensee requirements. Particular note was taken of the presence of quality control inspectors and quality control evidence such as inspection records, material identification, nonconforming material identification, housekeeping and equipment preservation. The inspector interviewed craft supervision, craft and quality control personnel in the work areas. Observations are noted below:

- Selected wetwell structural steel platform connections were examined. The bolted joint configuration was reviewed with respect to Bechtel drawing C-228 and found adequate.
- In-process work on the core spray pump seal piping was examined and the associated Nonconformance Report 11710 was reviewed.
- Temporary setting of a Residual Heat Removal pump was observed. The lead mechanical engineer for the reactor building was interviewed regarding the pump installation.
- The inspector questioned the licensee concerning a potential design deficiency relating to Bechtel Engineering Corporation computer code ME101, identified on the South Texas Project. The deficiency concerns an erroneous stiffness factor for nozzles, used in some source codes, for dynamic analysis of pipes. Bechtel Engineering had initiated Problem Investigation Request No. SF-87-02EP which directed the review of source codes used on ME101 computer runs for the Limerick project. Bechtel verified that the erroneous codes were not used on the Limerick project.

No violations were identified.

### 2.0 Licensee Action on Previously Identified Items

- a. (Closed) Followup Item (79-SB-01): The project procurement records were reviewed by the licensee and no records of Industrial Piping Supply Company were found in the vendor files. Since no tanks had been procured from this vendor, this item is closed.

- b. (Closed) Construction Deficiency (80-00-02): Wiring defects on American Warming and Ventilating back pressure dampers. The following documents were reviewed by the inspector: Nonconformance Reports 4108, 4125 and 5532; PECO audit M-452; Bechtel Management Corrective Action report No. 21; and PECO significant Deficiency Report No. 10. The documentation indicated that the rework on the wire lugs and nicked insulation was completed for the 182 dampers. The butt splices for the wire harness replacements have additionally been completed. This item is closed.
- c. (Closed) Construction Deficiency (81-00-05): 480 volt Load Center Breakers. Gould ITE "K" line circuit breakers were found with wiring to the circuit breaker trip coils arranged such that the insulation could be damaged by the rocking gear mechanism. A ground condition or an open circuit could result, thus preventing the circuit breaker from tripping. All 38 of the "K" line circuit breakers at the Limerick site, none of which had been installed, were reworked in accordance with manufacturer instructions. The inspector reviewed the rework instructions, the field inspection report and the completed nonconformance report. This item is closed.
- d. (Closed) Construction Deficiency (81-00-09): Loose contact blocks on General Electric supplied CR2940 tandem block control switches. The inspector reviewed Field Deviation Disposition Request HH2-1226, the associated Quality Control check list and the production data sheets. The CR2940 switches were examined by the licensee and the loose contact blocks were reworked. This item is closed.
- e. (Closed) Construction Deficiency (83-00-02): Radiation Monitoring RM-23 display system lock-up. GA Technologies developed new RM-23 software that eliminated the lock-up problem. The safety related modules were rectified prior to shipment by the vendor and two portable test modules were returned to GA Technologies and repaired. This item is closed.
- f. (Closed) Construction Deficiency (83-00-14): Check valves on safeguard piping fill were installed backwards. As documented in NRC inspection report 50-352/84-14, the valves were reoriented and corrective action including small bore pipe walkdowns and further training sessions were completed. The inspector examined the equivalent check valves (2036A/B) on the Unit 2 piping and found them properly installed. This item is closed.
- g. (Closed) Construction Deficiency (84-00-04): Attachment of Q-listed commodities to non-Q steel plates. The inspector reviewed Bechtel MCAR 1-35 and Quality Action Request 475. The licensee had performed



area walkdowns to identify all instances where Q equipment was attached to nonsafety related steel. The nonconforming conditions were further evaluated by engineering and found acceptable on the bases of structural integrity, location, and component function. Unit 2 non-Q steel has been stenciled to highlight that no attachments are allowed. This item is closed.

- h. (Closed) Construction Deficiency (84-00-17) Control room emergency fresh air fan shaft key improperly installed. As previously documented in NRC inspection report 50-352/84-43, the two affected fans (OAV127 and OBV127) were reworked. This item is closed.
- i. (Closed) Construction Deficiency (84-00-20): Potential leakage path on Rosemount Pressure Transmitters. The deficiency is associated with the Rosemount Model 1153 series B and involves a potential leakage path in the seal of the threads between the sensor module and the electronics module. Transmitters manufactured between January 1984 and August 1984 were affected. The licensee identified six deficient transmitters onsite, which were spares and had not been installed in the plant. The inspector verified that the six transmitters have been returned to Rosemount for inspection and repair. This item is closed.
- j. (Closed) Unresolved Item (86-15-01): Bent core support plate stabilizer bar. The inspector reviewed GE nonconformance report 2-26 and FDDR HH2-8271. The stabilizer bar welds were examined by the licensee with liquid penetrant. General Electric engineering found the condition acceptable. This item is closed.
- k. (Closed) Unresolved Item (86-18-05): Seismic truss and stabilizer assemblies for the biological shield wall. Bechtel issued Licensing Document Change Notice FS-1104 to revise the FSAR figures to reflect the as built condition of the field assemblies. The licensee re-examined the stabilizer flange members and identified the excessively thick members on NCR 11564. Project Engineering evaluated the effects of the additional member mass and found it acceptable. The licensee also identified the undersized weldments. Project Engineering evaluated stress levels assuming that the undersized welds were not present and found the stresses acceptable. This item is closed.
- l. (Closed) Unresolved Item (86-18-06): Seismic clearance criteria. Bechtel engineering reviewed the electrical, structural and mechanical specifications for compatibility. The specifications were revised accordingly. Quality Control personnel performed walkdown inspections for building seismic gap clearances. Several nonconformance reports were issued for engineering evaluation. Personnel training regarding the new criteria was performed. This item is closed.

- m. (Closed) Unresolved Item (87-07-03): Difference between MCC load tabulation and load center tabulation. The inspector reviewed calculation 6300-E-18 (load study) which tabulates service load conditions in various normal and emergency conditions to determine the worst case service load conditions. The inspector verified that this data was correctly used on the load center tabulation drawing. The difference between the two types of drawings is that the MCC tabulation uses nameplate rating for each connected load and the load center tabulation uses worst case service load data for each MCC connected to the load center. This item is closed.

### 3.0 Masonry Block Walls

The inspector reviewed the licensee design and construction program related to masonry block walls. The following documents were reviewed:

- NRC IE Bulletin 80-11, "Masonry Wall Design"
- Limerick 2 FSAR Section 3.2, and 3.8.4.3
- Limerick 2 FSAR questions/responses 220.10 and 220.11
- Bechtel Specifications
- A-2, "Furnishing and Installing Masonry for Limerick Units 1 and 2"
- 8011, "Criteria for Re-evaluation of Concrete Masonry Walls for Limerick Units 1 and 2"
- M-400, "Safety Impact Review Program"
- Bechtel drawings C-701, C-702, C-703 and C-704

The inspector reviewed the selection of Unit 2 Seismic Class I and IIA walls that were converted from masonry to poured concrete construction. The reinforcing bar and form work installations were examined for selected walls. The quality records for completed walls were reviewed by the inspector. The licensee audit reports covering field activities, engineering, quality control, and material supplies were examined. The licensee activities were found satisfactorily implemented.

No violations were identified.

### 4.0 Startup Activities

- a. The inspector reviewed the following documents with regard to administration of the startup test program:
  - AD 5.2, "Startup Safety Tagging Procedures"
  - AD 2.3, "Construction/PECo Startup Interface Responsibilities"



- AD 6.4, "Startup Work Order Procedure"
- AD 6.5, "Unit 2 to Unit 1 Isolation Control Program"
- AD 6.9, "Test Equipment Control Procedure"
- AD 6.8, "Temporary Modification Procedure"
- AD 6.12, "Startup Change Notice"

A generic recalibration interval of 31 days is specified for pressure test gauges used during preoperational testing. The procedures provided latitude for the test director to continue testing with the gauges beyond the calibration due date. The licensee committed to revise the procedure to include additional restrictions on the use of the gauges beyond the calibration interval. The inspector had no further questions.

- b. The inspector reviewed the startup administrative procedure training program conducted by PECO quality assurance for the startup test engineers. The training covers the administrative responsibilities of the startup engineers including control of test equipment, interface responsibilities, Unit 2 to Unit 1 isolation control, safety tagging, startup work orders and startup change notices. The inspector reviewed the lesson plans, training aids, tests and interviewed the personnel responsible for preparation and presentation classroom material. The training program appears to be adequate and the licensee continues to evaluate and upgrade the training as appropriate.
- c. The inspector attended the Test Review Board (TRB) meeting for the liquid radwaste system (2P-69.3). The chairman reviewed with the members their responsibilities and the TRB process. The board was conducted in a professional manner with open discussion between the members. The TRB chairman maintained the procedure "copy of record" to be returned to startup for resolution. The TRB members questioned how the operation of Unit 1 and common equipment is to be addressed in the preoperational test procedures to preclude impacting Unit 1 operation. A unanimous decision by the TRB was made to withhold approval of the procedure until startup, operations and the TRB come to a resolution on how to generically address this concern. This method of questioning both the technical adequacy and testing philosophy provides evidence that the TRB is functioning as an independent body.
- d. The inspector reviewed the Test Review Board (TRB) chairman files for preoperational test procedure P14.1, "Reactor Enclosure Cooling". Revision E of the procedure had been initially rejected by the TRB. The comment resolution sheets and the subsequent test procedure revision were examined. The TRB review reports were examined. The inspector had no question regarding the resolution of the TRB concerns.

- e. During a plant tour, the inspector noted the accumulation and overflow of water from several pump pits at elevation 177 in the Unit 2 Reactor Building. Licensee investigation found that Unit 1 flushing activities on the Service Water System had dumped the water into the Unit 2 drain system. The flow was beyond the sump pump capacity to remove the water. The licensee assured that the water was not contaminated. Bechtel personnel walked down areas that were flooded and documented concerns on Inprocess Rework Notices M-132, M-133, M-134, P-7433 and P-7432. Additionally, NCR 12303 was issued for a snubber that was partially covered with water. The inspector was informed that precautions would be issued for the operations staff to preclude a recurrence of this evolution.
- f. The inspector reviewed the following documents that relate to the system turnover process from construction to startup:
  - PECO QA Manual Volume 1, Section 14
  - Construction Procedure CP-T-1, "System/Partial Turnover"
  - Startup Administrative Manual, AD 6.1, "System/Component Turnover to PECO Startup"
  - Bechtel NQAM Section IV NO. 10, "Turnover of Systems and Facilities"
  - Bechtel QA Department Manual Section C No. 17, "Turnover Packages for Systems and Facilities"
  - Bechtel QC Project Special Provision 10.1, "Component/System Turnover"

The turnover process involves system walkdowns, identification of incomplete punchlist items, review of QC records to assure all inspections have been performed, joint involvement of startup and construction personnel, and development of turnover packages with scoped P&IDs.

The inspector interviewed the systems completion coordinator, the lead QC turnover engineer and QA personnel involved with the turnover process. The turnover packages associated with the partial turnover of wetwell systems were reviewed. The inspector accompanied licensee personnel during the walkdown of the 227 elevation which included portions of the residual heat removal, equipment drain, main steam safety and relief valve piping and downcomer piping. The wetwell turnover process is performed by elevation as staging is removed to facilitate completion of sand blasting and coating application. The compilation of punchlist items was monitored and several open Startup Work Orders were reviewed. The deferral of the official startup

walkdown until a later time when accessibility to the system will be limited due to staging removal is unresolved pending assurance that the startup requirements for the turnover walkdown can be fulfilled. (87-15-01)

No violations were identified.

#### 5.0 Piping and Pipe Supports

- a. The inspector observed inprocess welding activity on small bore line SP-HCC-232E7 joint 12. The associated quality records were reviewed. Proper joint fitup, cleanliness, and electrodes were verified. The appropriate quality control hold points had been assigned and signed off.
- b. Inprocess work activities were observed on the following pipe supports:
  - SP-DCA-407-E1 hanger 5
  - GBB-219 hanger 37
  - EBC-208/2 lug weld 4-F

The hanger configuration, location, material size and filler metal were verified. The Bechtel program to assure proper weld size on pipe support lug welds was reviewed. The inspector had no questions.

No violations were identified.

#### 7.0 Electrical Equipment

The inspector reviewed the following documents relating to the installation of safeguards batteries 2B1D101 and 2B2D101.

- Work Package EI30-0077, Install batteries (LC21) in Room No. 426
- Construction Aid Document 1, sheet 4, battery cell arrangement
- Construction Aid Document 2, battery temporary storage and cleaning
- Construction Aid Document 5, C&D stationary battery installation and operating instructions
- C&D Battery Division Drawing M-7115-2, Battery arrangement

The inspector verified that the assembly, installation and location of the battery rack and restraints in accordance with the manufacturer and project engineering instructions and drawings, and that the correct size and type cells are in place. The inspector witnessed the installation of the intercell connections including the application of approved thin film grease to the posts and final torquing of cell post bolts to manufacturer's specifications. The inspector also verified proper QA/QC coverage and proper documentation of in-process inspection activities. No items of concern were identified.



## 8.0 Instrumentation and Control

The inspector reviewed the following documents relating to control systems for the High Pressure Coolant Injection (HPCI) system.

- Elementary Diagram M1-E41-1040-E-026.2 HPCI
- Elementary Diagram M1-E41-1040-E-022.2 HPCI
- Elementary Diagram M1-E41-1040-E-023.2 HPCI
- Elementary Diagram M1-E41-1040-E-024.2 HPCI
- Elementary Diagram M1-E41-1040-E-021.2 HPCI

The inspector performed a field walkdown of PGCC cabinets including a verification of selected point-to-point wiring in HPCI cabinets. Four cabinets were partially inspected (H12-P620, H12-P618, H12-P641 and H12-P647). The inspector physically verified the wiring of trip units, control relay coils and contacts, and alarm relay coils and contacts. During the conduct of the verification, the inspector examined the cabinet wiring for proper channel separation and identification, use of fire barrier wrap, and flexible conduit grounding. No items of concern were identified.

## 9.0 Allegations

During the inspection period, the inspector conducted inspections and interviews in response to an allegation received by the NRC. The inspector and licensee actions resulting from the allegation is noted below:

(RI-87-A-0035) The NRC received an anonymous allegation that two guards were sleeping on duty. The roster for site guard forces was reviewed and confirmed that the two individuals were assigned to Unit 2 construction security. While they were badged for Unit 1 access, they performed no Unit 1 security duties. This allegation is closed as the individuals do not carry out nuclear security responsibilities.

## 10.0 Unresolved Items

Unresolved items are matters about which more information is required to ascertain if it is acceptable, a violation, or a deviation. An unresolved item was discussed in paragraph 4.f.

## 11.0 Exit Meeting

The NRC resident inspector discussed the issues and findings in this report with members of the licensee's staff on a weekly basis, and at an exit meeting held on August 28, 1987. Based on discussions held with licensee representatives on August 28, 1987, it was determined that this report does not contain information subject to 10 CFR 2.790 restrictions.