

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-352/80-21
50-353/80-19
Docket No. 50-352/
CPPR-106
License No. CPPR-107 Priority -- Category A
Licensee: Philadelphia Electric Company
2301 Market Street
Philadelphia, Pa. 19101
Facility Name: Limerick Generating Station, Units 1 & 2
Inspection at: Limerick, Pa.
Inspection conducted: December 4-31, 1980
Inspectors: J.P. Durr 1/5/81
J.P. Durr, Senior Resident Inspector date signed
S.K. Chaudhary 1/19/81
S.K. Chaudhary, Reactor Inspector date signed
A.A. Varela 1/13/81
A.A. Varela, Reactor Inspector date signed
Approved by: J.C. Mattia 1/19/81
J.C. Mattia, Acting Chief Projects date signed
Section, Reactor Construction and
Engineering Support Branch

Inspection Summary: (Unit No. 1) Inspection on December 4-31, 1980
Report No. 50-352/80-21

Areas Inspected: A routine inspection by the resident and regional based inspectors of electrical, piping, and civil activities; observation of special testing on soil structure interactions; and licensee's actions on previous inspection findings. The inspection involved 62 inspector-hours on site by the resident and two regional based inspectors.

Results: No items of noncompliance were identified in 3 of the 5 areas inspected. Two items of noncompliance were identified in each of 2 areas (Licensee's actions on Previous Inspection Findings - Failure to provide adequate control of sampling inspections, para. 3 and electrical penetrations - Failure to properly control welding temperature, para. 4).

(Unit No. 2) Inspection on December 4 - 31, 1980 (Report 50-353/80-19)

Areas Inspected: A routine inspection by the resident and 2 regional based inspectors consisting of civil activities, special soil and structures interaction testing, and facility tours. The inspection involved 23 inspector-hours on site.

Results: No items of noncompliance were identified in the 3 areas inspected. One item of noncompliance was identified in one area (Licensee's Actions on Previous Inspection Findings - Failure to provide adequate control of sampling inspections.)

DETAILS

1. Persons Contacted

Philadelphia Electric Company

J. M. Corcoran, Field Q.A. Branch Head
G. Lauderbach, Quality Assurance Engineer (QAE)
P. L. Naugle, Engineer

Bechtel Power Corporation

T. Altum, Lead Welding Engineer
B. P. Dragon, QAE
H. D. Foster, Project Field Quality Control Engineer
H. F. Greenwalt, QAE
G. C. Kelly, QAE
J. L. Martin, Lead Site QAE
K. L. Quinter, QCE
D. C. Thompson, Assistant Project Field QCE
M. G. Tokolics, QAE
A. G. Weedman, Project Field Engineer

The above listed persons attended the exit interview held on December 18, 1980. Other craftsmen, quality control technicians, engineers, and supervisors were contacted as the inspection interfaced with their work.

2. Plant Tour and Licensee Meeting (Unit Nos. 1 and 2)

The inspector routinely tours the facility and outlying areas inspecting ongoing work for obvious defects and deviation from requirements. He observed electrical and instrumentation, concrete, pipe welding, and in-place storage activities.

During a tour of the cable spreading room, it was noted that anchor bolt supports for electrical conduits 1CH013 and 1DH010 have bolt to nut engagements which are flush. A review of the Quality Control Instruction E-2.0 disclosed that Specification C-64 and Drawing E-1406 are referenced for mounting acceptance criteria. Specification C-64 requires in paragraph 3.4.2 that thread engagement will be one full thread beyond the nut while Drawing E-1406 allows the end of the bolt to be flush with the nut.

In addition, Drawing E-1174, Revision 14, shows junction box 1DJ324 and conduit 1DH010 mounted on the "Mh" line reinforced concrete wall when, in fact, they are mounted on the adjacent concrete block wall.

These items are unresolved pending resolution of the difference between Specification C-64 and Drawing E-1406 and determination that the mounting of 1DJ324 on the concrete block wall is acceptable (80-21-01).

The inspector participated in a NRR/IE/licensee meeting in the local Pottstown area on December 9, 1980. The licensee presented the preliminary results of a "Risk Assessment Study" for the Limerick Generating Station. A second meeting was then held by NRR/IE for the hearing of public comments concerning NRC/licensee activities at Limerick.

3. Licensee Actions on Previous Inspection Findings

(Closed) Unresolved Item (352/80-19-03) Arc strikes on Reactor Pressure Vessel (RPV). Reference: IE Inspection Report 50-352/80-20, paragraph 7.

The inspector reviewed the Nonconformance Report Nos. LM-RPV-23 and 23A which document and disposition the identified arc strikes. He reviewed the training records, dated October 12 and 29, 1980, which promulgated instructions for arc strike handling. The current practice of arc strike handling was discussed with the quality control supervisor and a welding inspector. A tour of the work area verified arc strike preventive measures are being employed (see referenced report). This item is considered resolved.

(Closed) Infraction (352/80-08-04 and 80-08-05) Welding documents for the control room consoles had obsolete design criteria referenced and, more generally, other obsolete quality control acceptance criteria were referenced on Quality Control Inspection Records (QCIR).

The inspector initially identified obsolete revisions of Field Disposition Deviation Request (FDDR) No. HHL-1000 being used for construction. Further investigation disclosed that the QCIR for this work and two others contained obsolete inspection criteria.

The licensee responded as follows:

- (1) General Electric issued Revision 3 to the FDDR which considered the work as performed acceptable.
- (2) The revised FDDR was processed in accordance with the applicable Job Rule, G-39.
- (3) Area Superintendents rechecked work documentation to assure current criteria was being used.
- (4) The deficient QCIR's, M-602-W-1, E-1193-W-1, and E-1163-W-2 were corrected.

- (5) Construction foremen were given training concerning the problem.
- (6) Work completed under the deficient QCIR's was reviewed to assure the changes were incorporated.
- (7) Administrative Instruction #156 was issued prescribing instructions for entering inspection criteria revisions.
- (8) Quality Control Engineers were instructed to update active QCIR inspection criteria daily.
- (9) The licensee performed audits of QCIR update activities to assure compliance.

The inspector verified the foregoing corrective actions by the following:

- (1) Reviewed the licensee's Finding Report N-192 which documented and verified the previously listed corrective actions.
- (2) Reviewed Interoffice Memorandum, dated September 22, 1980, attesting to a review by Quality Control of 16 open and 50 closed QCIR's for accurate acceptance criteria.
- (3) Reviewed a copy of the attendance record for a June 12, 1980, training class for construction personnel directing a review of files for obsolete information.
- (4) Reviewed Administrative Instruction #156, dated August 25, 1980, providing instruction on the adding of revisions to QCIR's.
- (5) Reviewed FDDR No. HH1-1000, Revision 3, and performed visual and dimensional checks of selected welds on two control room consoles.
- (6) Reviewed Administrative Instruction #119, dated June 20, 1979, Revision 4, "Control and Changes of PQCI/IR. This describes the method by which design change documents are processed and incorporated into QCIR's. The working of this system was discussed with the Quality Control Supervisor, the Quality Control Engineers, and the Document Coordinator to determine its adequacy.
- (7) Training records were reviewed to verify that the referenced training sessions were conducted.
- (8) Reviewed the identified deficient QCIR's, M-602-W-1 and E-1163-W-2, and verified they have been corrected. QCIR E-1193-W-1 has been voided.
- (9) Reviewed the licensee's audit records for Nos. G-091, G-092 and G-094.
- (10) Selecting 5 active QCIR's and verified 18 of the referenced criteria were current.

No discrepancies were identified. These items are considered closed.

(Closed) Unresolved Item (352/80-19-02) Cut insulation on wire in Radiation Monitoring Cabinet, 10C790. The licensee issued Observed Condition Notice No. 1243, directing that the bracket be moved to eliminate the interference and retermination of the wire. The inspector verified the foregoing activities have been accomplished. This item is considered resolved.

(Closed) Unresolved Item (352/80-20-02) Failure to provide quantitative and qualitative acceptance criteria for sampling inspections. The inspector noted that the licensee has made a significant change in his pipe welding inspection program in that certain inspections are no longer "Hold Point". The quality control verification of purge gas, cleanliness, tack welds, and alignment are no longer performed on a 100% basis. This change is reflected in Bechtel Quality Assurance Manual - ASME Section III, Division 1, WD-1, paragraph 7.4. A note permits the Lead Welding Quality Control Engineer to determine if these attributes are checked on a "surveillance" or "inspection" basis. In this case, inspection meaning a hold point beyond which work may not proceed and surveillance meaning work may proceed without the check being made. The surveillances are made at the option of the inspector.

A sample of 100 document packages for completed welds disclosed the following:

Sample Size	100
Hold Point Inspections	64
Surveillances Specified	36
Surveillances Performed	2
Approximate Population	1000

Inspections which constitute less than 100% of the population are, in fact, sampling inspections. There are established sampling inspection techniques (e.g. MIL-STD-105) which prescribe sample sizes, acceptance quality levels, etc.

Other than the limited instructions provided in the BQAM-ASME Section III referenced above, there are no provisions on which to base increased inspection activity if an inordinate amount of rejectable findings are identified. Therefore, there are no quantitative or qualitative criteria to ascertain the acceptability of the inspection program. The failure to provide these criteria is contrary to 10CFR50, Appendix B, Criterion V and an item of noncompliance. (352/80-21-05 and 353/80-19-01)

4. Containment Electrical Penetrations (Unit No. 1)

The inspector toured the containment area and observed the status of work on electrical penetrations. He observed the handling and protection practices employed to prevent damage during installation. He selectively examined seals, wire insulation, and wires for obvious damage.

Material Receiving Report No. SF-2580 and Quality Control Inspection Record No. E-40-AC-SF-2580 were reviewed to verify that the appropriate materials, tests, and documentation had been supplied.

A review of the manufacturer's "Installation and Maintenance Manual", 8031-E-40-36-2, disclosed, in paragraph 5.4, that temperatures in excess of 300°F must be avoided to preclude damage to the seals. Containment electrical penetration 10JX101B was installed with welding procedure P8, P1-AT-Ag (CVN)1 which allows a 350°F interpass temperature. The failure to control welding of the containment electrical penetrations in accordance with special requirements is contrary to 10CFR50, Appendix B, Criterion IX and an item of noncompliance. (2/80-21-02)

5. Installation of Electrical Components

The termination cabinet 10C792 was selected for examination of the changes being implemented via Field Disposition Instruction, FDI No. TNDJ. The FDI requires a verification of proper T-Mod installation by part numbers. Termination cabinet 10C792 was visually inspected to verify correlation with GE Drawing 133D9318, Revision 5, the condition of wire, wire insulation and terminations. The inspector reviewed portions of the quality control program which delineates inspection criteria. No items of noncompliance were identified.

6. Piping and Penetration Welding

The following listed welds were examined for compliance with selected portions of the Bechtel Quality Assurance Manual - ASME Section III, Division I, the ASME III Code, and regulatory requirements:

FJ-DCA-107-J1/4 FW 7	Penetration	F
FJ-DCA-106-J1/4 FW 7	"	I
EBB-101-1/1 FW 59		F
BWRPD-1REC-1/4 WA 5	28" Class I	R, I
EBB-134-1/2 FW 52	10" Class II	F

(Note: F - Final, R - Root, I - Intermediate)

No items of noncompliance were identified.

7. Structural Response to Hydrodynamic (Mark II) Loads

The inspector witnessed the hydrodynamic load test carried out in the Unit 2 primary containment wet well. The objective of the test was to determine the response of structures located adjacent to the containment building in BWR plants. The test would provide a measured data base of containment and adjacent structures to simulated hydrodynamic loads. The hydrodynamic load source was basically a balloon filled with nitrogen with an actuator canister for pressurizing the bubble. When the actuator canister was triggered, the balloon was pressurized to approximately one atmosphere above local hydrostatic pressure. The balloon ruptured as it expanded, and a freely expanding nitrogen bubble was produced, which oscillated in wet well in a similar manner to the air bubble

produced during the air clearing phase of SRV discharge. This gas bubble oscillation produced the hydrodynamic loads on the containment walls which provide structural excitation to the adjacent buildings.

The inspector reviewed the documents, held discussions with licensee personnel, and observed the test set-up to determine that the preparation and set-up for the test conformed to the plans and instructions as required, the licensee QA personnel were involved in the preparation, measuring and test instrument were calibrated, and adequate engineering help was on hand to direct the test as planned. The inspector reviewed the following documents:

In-Plant Test Plan for Adjacent Structure Response to Hydrodynamic (Mark II) Loads.

PECo Audit finding - FR # 253

PECo Audit finding - FR # 254

PECo Audit Check List - AR # C-174

Memorandum from J.J. Clarey, PECO, to J.R. Reiney, Jr. of Bechtel, dated 12/10/80.

Bechtel QC Inspection Report - GQCG-1-28, "Pre and Post test Visual Inspection of Permanent Plant Structures"

Based on the personal observation, discussions with licensee personnel, and review of records and test data, the inspector observed that:

The test was carried out as planned, except the eight bubble test was eliminated after the first four bubble test. This modification in the test plan was based on the test results obtained from the first four bubble test, and was done properly by authorized technical personnel on site according to the procedure for such changes.

The set-up for the test was as required by the test plan and procedure.

The licensee's QA organization has audited the test preparation for conformance to his requirements.

The licensee had also directed the constructor to provide QC inspection of affected structures prior to and after the test for damages.

Therefore, based on the above observation, the inspector determined that the test was carried out properly as required by procedure, and was adequately controlled.

No items of noncompliance were identified.

8. Review of Spray Pond Design

The inspector's review of the PSAR disclosed that in amendments up to and including May 1977 the spray pond was to be unlined and was identified as Class I seismic design with adequate seepage allowance included in the design. Subsequent PSAR amendments the responses to NRC/NRR questions identify that the spray pond is to be used for the Ultimate Heat Sink, -- it is an emergency system used for plant shutdown if the cooling towers are not available for that purpose for a period of at least 30 days after the initiation of reactor shutdown. The inspector observed in his review of engineering and construction specifications for the Spray Pond Lining, number C-95 (latest addition No. 1 to Rev. 1, issued March 4, 1980) that they do not classify the Spray Pond Lining as a Safety Related item subject to NRC regulations of 10CFR50, Appendix B. Additionally, Revision Number 12 of Bechtel's "Q" List state that the Soil-bentonite lining and soil cover are not Q listed. The inspector considers the lining should be classified as a safety-related item for the following reasons:

- 1) PSAR Section 2.5.4.6.1 states in part: "...Because only 60 percent of the pond bottom will be exposed to rock and the balance exposed to materials (overburden) of markedly lower permeabilities, these estimates of total seepage loss are probably high....", and "...Until steady state conditions are achieved between ground water table and the spray pond, seepage losses may be somewhat higher."
- 2) Also in succeeding paragraphs "It is recognized that actual permeability values, as well as steady state seepage losses, could be higher if untreated open joints or fractures are present in the pond bottom...."
- 3) PSAR Section 2.5.4.1: "...Fracture zones with minor offsets apparently related to faults in the vicinity of the plant site, were encountered during excavation for other plant structures and it is likely that some will be encountered at the spray pond site. If such zones are encountered, they will be treated as necessary to ensure that excessive seepage losses will not occur and they will be adequate as a foundation for any structure founded on them...."

The inspector's concern regarding the spray pond lining not being classified as a safety-related item is due to the pond's questionable water retaining capability for the Ultimate Heat Sink. Since approximately 40 percent of the pond bottom is covered by overburden, the presence of "fracture zones with minor offsets" cannot be determined by visual inspection as presently provided for in the Non-Q spray pond excavation specifications number C-94.

Due to the possibility of high seepage losses in highly probable open joints or fractures in the rock beneath overburden, the inspector considers the water retaining capability of the spray pond must rely on the lining. Licensee decision to classify the lining as not safety-related will be referred to NRC/NRR for resolution. This is identified as Unresolved Item No. 80-21-03/80-19-02 since construction of the lining is not scheduled until 1983.

The inspector observed in his review of engineering and construction specification number C-94, Addition No. 2, Revision No. 1 of October 10, 1980, that it is not a Q-listed specification. Neither does it specifically identify treatment of open joints in exposed rock for the spray pond bottom as committed in the PSAR. Additionally, the specifications fail to establish a requirement that Bechtel's control of subcontract work under this specification addresses the following question: When open joints exposed in rock are found to continue beneath overburden (which occupies approximately 40% of the pond) what additional overburden excavation will be required? Licensee response to the latter at exit meeting December 23, 1980 was that the excavation specifications would be revised to correct this deficiency. This is unresolved item No. 80-21-04/80-19-03, pending inspector review of revised specification number C-94.

9. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain if it is an acceptable item, a noncompliance item, or a deviation. An unresolved item is discussed in paragraphs 2 and 8.

10. Exit Interview

The inspector held an exit interview with representatives of the licensee (denoted in paragraph 1) on December 18, 1980, to discuss the scope and findings of the inspection.