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Facility Name: Limerick Generating Station, Units 1 and 2

Inspection Period: February 16 - March 14, 1992

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Approved by:


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4/16/92
Date

Inspection Summary: This inspection report documents routine and reactive inspections during day and backshift hours of station activities including: plant operations; radiation protection; surveillance and maintenance; and safety assessment/quality verification.

EXECUTIVE SUMMARY
Limerick Generating Station
Report No. 92-10 & 92-09

Plant Operations

Unit 1 was shutdown on March 20, 1992, for its fourth refueling outage. The inspectors found the shutdown was well controlled, there was very good use of procedures, and very good attention to detail on part of the operators. The shutdown was completed without incident.

Surveillance and Maintenance

During maintenance on a core spray pump room cooler, PECO personnel recognized that a seismic problem could exist with the emergency service water (ESW) system. Spool pieces removed for cooler cleaning eliminated an anchor point for the "B" loop of ESW, possibly rendering the loop inoperable. Subsequently it was discovered that an analysis was done that proved the system was seismically acceptable without the spool pieces for this particular cooler. PECO's own review of the maintenance activity indicated similar problems involving poor planning and lack of attention to detail noted in inspection report nos 50-352/92-03 and 50-353/92-03. (Details in Section 2.1)

Safety Assessment and Quality Verification

After a series of problems with blown fuses with the high pressure coolant injection (HPCI) system Topaz Inverter, PECO conducted a check of all inverters for problems. An inverter with an inoperable cooling fan was identified. PECO requested a temporary waiver of compliance (TWOC) to repair the fan while on line. The inspector found the effort to check all inverters to be a good initiative and reflected a good safety attitude. Also, the preparation and safety assessment for the TWOC was thorough. (Details in Sections 1.2 and 4.0)

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Attachment A: Request for Temporary Waiver of Compliance

DETAILS

1.0 PLANT OPERATIONS (71707)¹

The inspectors conducted routine entries into the protected areas of the plant, including the control room, reactor enclosure, fuel floor, and drywell (when access was possible). During the inspections, discussions were held with operators, health physics (HP) and instrument and control (I&C) technicians, mechanics, security personnel, supervisors and plant management. The inspections were conducted in accordance with NRC Inspection Procedure 71707 and confirmed PECO's commitments and compliance with 10 CFR, Technical Specifications, License Conditions and Administrative Procedures.

1.1 Operational Overview

During this report period both units operated at or near 100 percent power until March 20, at which time Unit 1 was shutdown for its fourth refueling outage.

The inspector observed the Unit 1 reactor shutdown, including the manual scram from approximately 15 percent power as part of a required surveillance test. The inspector found the shutdown to be well controlled and the use of procedures was excellent. An additional shift supervisor was added to the shift so that he could concentrate on the shutdown of Unit 1, while the regularly assigned shift supervisor supervised the remaining plant activities.

There have been very few reactor shutdowns at Limerick Generating Station so operations personnel do not get much first hand experience in this evolution. Shutdowns are complex evolutions requiring the use of many integrated procedures and where attention to detail is essential. Operators periodically receive training on this type of evolution at the simulator. The inspector noted the shutdown was completed without any problems, reflecting in a positive manner on the training program and the attention to detail demonstrated by the operators during the evolution.

1.2 Reportable Events

Unit 1

On February 26, 1992, an inadvertent control room heating, ventilation and air conditioning (HVAC) system isolation signal occurred when the control room operator was restoring the control room ventilation system to a normal lineup following maintenance. The problem occurred when the operator missed a step in the procedure he was using. He immediately realized his error and was able to correct the switch alignment before the system components (dampers and fans) realigned. Based on the fact that the isolation signal was not long enough to cause the complete engineered safeguards feature (ESF), PECO retracted the notification on March 16, 1992. The resident inspector discussed the retraction with NRR and determined that the initial report could be withdrawn.

¹The NRC Inspection Procedures used as guidance are listed parenthetically throughout this report.

Unit 2

On March 3, 1992, an ENS notification was made when the 'B' loop of Emergency Service Water was declared inoperable as a result of maintenance activities. This report was subsequently retracted. Refer to Section 2.0 for details.

On February 21, 1992, the high pressure coolant injection (HPCI) system Topaz inverter power supply fuse (F28) blew making the system inoperable. Since the reactor core isolation cooling (RCIC) system was already inoperable due to maintenance, plant Technical Specification (TS) 3.5.1 could not be satisfied. However, RCIC was made operable within one hour, before the plant shutdown was required to be initiated. An inoperable HPCI is a 14 day limiting condition for operation (LCO). The HPCI inverter fuse was replaced and the inverter functioned normally. Troubleshooting efforts did not identify any cause for the blown fuse and HPCI was declared operable.

On February 24, another HPCI inverter power supply fuse (F29) blew, making the system inoperable. During this event the RCIC system was available. The fuse was replaced. More extensive troubleshooting and testing was performed since it was the second blown fuse within a 4-day period. However, no problems could be identified and the HPCI system was declared operable. On February 26, the HPCI F28 inverter power supply fuse blew again, making the HPCI system inoperable. Although troubleshooting could not pinpoint any specific component problem, PECO concluded that an intermittent fault was occurring within the inverter and replaced the inverter on February 28. There were no additional fuse problems following the replacement. The original inverter was returned to the manufacturer for a failure analysis.

The NRC received reports of the above events via the Emergency Notification System (ENS). The inspectors determined that the licensee's initial response and corrective actions were appropriate. The root cause analysis and the need for additional/long term corrective action will be reviewed upon issuance of the Licensee Event Reports as part of the routine inspection program.

2.0 MAINTENANCE OBSERVATIONS (62703)

The inspector reviewed safety related maintenance activity WO ROO45967, "Clean, examine core spray (CS) pump room cooler 2B-V211. Remove and inspect supply and return spool pieces," to verify that it was performed in accordance with approved procedures and in compliance with NRC regulations and recognized codes and standards. The inspector also verified that the replacement parts and quality control used during the maintenance were in compliance with PECO's QA program.

On December 11, 1991, site engineering initiated Engineering Work Request (EWR) A0166553 to have corporate engineering evaluate whether or not the seismic integrity of the

emergency service water (ESW) system would be adversely affected by the removal of the piping spool pieces to the various emergency core cooling system (ECCS) room coolers. This would allow on line maintenance activities, such as room cooler cleaning, without affecting the operability of the whole ESW system.

During the work on ESW room cooler 2B-V211, a maintenance engineer recognized that the seismic evaluation (EWR A0166553) had not yet been performed for this particular room cooler. He immediately informed the operations department shift manager who then declared the 'B' loop of ESW inoperable. With a loop of ESW inoperable both units entered TS 3.0.3 due to the loss of multiple trains of ECCS. As required by TS 3.0.3, plant shutdowns were commenced on both units and the NRC notified by an ENS call. Only minor power reductions were actually performed until the ESW system was returned to an operable status by reinstalling the spool pieces.

Follow-up investigations by PECO determined that the removal of these particular CS room cooler spool pieces had previously been analyzed during the Unit 2 construction and did not affect the seismic qualification of the ESW system. Based on this finding PECO retracted an ENS notification made to the NRC on March 3, 1992.

PECO subsequently performed a detailed review of the event to determine why the work was released without verification that the required seismic analysis had been performed. The inspector found the review to be very thorough in determining the reasons for the maintenance error. The review identified problems with attention to detail and informal work practices on the part of maintenance and quality control personnel. These problems are similar to those documented in NRC inspection report nos. 50-352/92-03 and 50-353/92-03. A violation was issued in that report for failure to follow maintenance procedures. PECO's corrective actions with regard to the problems with planning, conduct and oversight of maintenance activities noted in that inspection report will be reviewed during followup of the violation when the response is received.

3.0 RADIOLOGICAL PROTECTION (71707)

During the report period, the inspector examined work in progress in both units and included health physics procedures and controls, ALARA implementation, dosimetry and badging, protective clothing use, adherence to RWP requirements, radiation surveys, radiation protection instrument use, and handling of potentially contaminated equipment and materials.

The inspector observed individuals frisking in accordance with HP procedures. A sampling of high radiation area doors was verified to be locked as required. Compliance with RWP requirements was reviewed during plant tours. RWP line entries were reviewed to verify that personnel provided the required information and people working in RWP areas were observed as meeting the applicable requirements. The inspector found no unacceptable conditions.

4.0 SAFETY ASSESSMENT/QUALITY VERIFICATION

As a result of the HPCI inverter problem described in Section 1.2, PECO engineers and I&C technicians checked the remaining inverters for problems. On March 11, 1992, the cooling fan for inverter E21R601D was found inoperable. This inverter converts Division 4 DC power to AC which then supplies power to control circuits and initiation logic for various Emergency Core Cooling Systems (ECCS). PECO took immediate compensatory measures by opening the panel door and supplying additional cooling to the inverter.

PECO had discussions with the inverter manufacturer and confirmed that the inverter would eventually fail without its internal cooling fan. A replacement cooling fan was located; however, to replace the fan the inverter needed to be deenergized. It was estimated the repair would take 2 to 4 hours to complete. Although this inverter had a safety related backup power supply, the back-up power supply would add a slight delay to the response times of the ECCS equipment it supplied. As a result, PECO determined the various ECCS equipment supplied by this inverter would be inoperable during the repair. Since multiple systems were involved, this would require entry into Technical Specification (TS) 3.0.3. As voluntary entry into TS 3.0.3 is normally discouraged and the repair time would exceed the TS 3.0.3 action statement of one hour to commence a plant shutdown, PECO sought a temporary waiver of compliance (TWOC) to do the repairs.

On March 13, 1992 at 7:30 p.m., PECO initiated a conference call with the NRC in order to discuss and obtain a waiver of compliance. The licensee's presentation included all the necessary information and basis required by the NRC to make a decision regarding a TWOC. A list of these requirements is contained in a memorandum on Temporary Waivers of Compliance from the Director of the Office of Nuclear Reactor Regulation to the Regional Administrators dated February 22, 1990. The waiver was granted by NRC verbally on March 13. PECO documented their request in writing to the NRC on the following business day. The NRC documented approval of the TWOC in a letter dated March 23, 1992.

The waiver granted entrance into TS 3.0.3 and allowed for the extension from 1 hour to commence a plant shutdown to 4 hours provided the following conditions were established:

1. The D11 emergency diesel generator (EDG) that had been out of service for overhaul, was made operable prior to removing the inverter from service;
2. The load dispatcher confirmed the stability of the offsite power grid prior to removing the inverter from service;
3. The offsite power availability surveillance test procedure was performed satisfactorily prior to removing the inverter from service; and

4. An orderly shutdown of Unit 1 would be commenced immediately during the four (4) hour waiver of compliance should another event or condition occur that would require entry into TS Section 3.0.3.

PECo operators established the above conditions and entered TS 3.0.3 at 2:58 a.m. on March 14. The inverter was repaired, tested operable and returned to service at 5:36 a.m. on March 14. Technical Specification 3.0.3 was exited and normal operation continued.

The inspector concluded PECO took a good initiative in checking all inverters for problems following the HPCI inverter failure. This reflected a good safety attitude. The inspector also determined PECO did a good job in assessing the need for a TWOC. PECO's evaluation and safety assessment for the waiver were thorough. All the necessary information was provided to the NRC to make a decision.

5.0 REVIEW OF LICENSEE EVENT REPORTS (LERs), ROUTINE AND SPECIAL REPORTS (90712, 92700)

5.1 Licensee Event Reports (LERs)

LERs are 30 day reports submitted to the NRC, by PECO, as required by 10 CFR 50.73. These reports document: the major occurrences present during an event, including all component or system failures; a clear specific narrative description of what occurred; plant operating conditions before the event; status of contributors to the event; dates and approximate times of contributing factors; the causes and failure modes; personnel errors if applicable; procedural deficiencies if applicable and the short term and long term corrective actions taken to prevent recurrence. The resident inspector routinely reviews these documents and performs follow-up to PECO's actions regarding the disposition of corrective initiatives. In his review, the inspector validates the above and determines whether events are described accurately and whether corrective and compensatory actions have been properly addressed. During this inspection period the following LER was reviewed and determined to meet the requirements discussed above.

LER 2-92-003, Event Date: February 4, 1992, Report Date: February 28, 1992

This LER describes an event where a watertight door was found open and unsupervised resulting in a condition outside the moderate emergency line break analysis. The door separates the two residual heat removal (RHR) system pump rooms and functions to ensure that in the event of a line break in one of the rooms the equipment in the adjacent room will not become inoperable due to flooding. This event was reviewed and discussed in detail in inspection report nos. 50-352/92-03 and 50-353/92-03.

The licensee determined that the door was open for a period of 22 minutes until found and closed by a fire watch patrol. The licensee was unable to identify the reason the door was left open. At the time of the event station supervisors were in the process of disseminating

information to station personnel on the barrier control program. This information should prevent recurrence of similar events. Barrier control training has also been added into the General Employee Training (GET) program. The inspector had no further questions regarding this event.

5.2 Routine and Special Reports

Routine and special reports are submitted by PECO to inform the NRC of routine operating conditions and other noteworthy occurrences that are reportable due to requirements in 10 CFR 20, technical specifications and other regulatory documents. The inspector reviews these reports for information and confirms the accuracy of the reports. During this inspection period, the following report was reviewed and determined to satisfy the requirements for which it was reported.

- Monthly Operating Report for January 1992, dated March 6, 1992

The inspector had no concerns or questions regarding the above listed report and LER.

5.0 FOLLOW-UP OF PREVIOUS INSPECTION FINDINGS (92702)

(Closed) Violation (50-353/91-23-01) This violation concerned the failure to follow administrative and surveillance test procedures. Specifically, during the performance of an emergency service water (ESW) system surveillance test (ST), check valve 11-0063 failed to check flow as required. Based on this failure a maintenance request form should have been initiated and a senior plant staff member should have been immediately informed to determine operability of the system. Neither of these actions were taken as required by the station procedures due to personnel error.

The inspector noted PECO took the following corrective actions in response to this violation:

- Plant operators were immediately informed of the event via the shift night orders and a recorded phone message that emphasized the importance of promptly initiating corrective actions. The proper response to failures of inservice test (IST) failures was also stressed.
- The plant manager issued a letter to all Senior Reactor Operators to reiterate management expectations of initial responses to equipment malfunctions.

- A "For Your Information" (FYI) notice was distributed to first line supervision to provide a clear, concise set of management expectations regarding immediate corrective actions to be taken upon the discovery of deficient equipment. This information was then disseminated to all appropriate station personnel by the supervisors.
- Operations department management clarified the senior staff notification requirements in the event of failed STs.
- Licensed operator training will be revised to add training relevant to inservice test program requirements.
- Administrative Guideline AG-41, "Staff Duty Stander," was revised to include managements expectations to ensure immediate operability determinations are made following the failure of IST steps and to ensure corrective actions are promptly initiated.

The inspectors determined the corrective actions were adequate. Inspectors have observed a heightened awareness by station personnel regarding this issue. The inspectors had no further questions concerning the corrective actions and consider this item closed.

7.0 MANAGEMENT MEETINGS

7.1 Exit Interview

The NRC resident inspectors discussed the issues in this report with PECO representatives throughout the inspection period, and summarized the findings at an exit meeting with the Plant Manager, Mr. J. Doering, on March 20, 1992. No written inspection material was provided to licensee representatives during the inspection period.

7.2 NRC Management Visit

On March 4, 1992, Mr. William Kane, Deputy Regional Administrator, USNRC, Region I and Mr. A. Randolph Blough, Chief, Reactor Projects Branch 2, USNRC, Region I took a general familiarization and informational tour of the site and met with plant management.