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REGION I

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Facility Name:	Limerick Generating Station, Units 1 and 2
Inspection Period:	July 12 to August 15, 1994
Inspectors:	T. A. Easlick, Acting Senior Resident Inspector N. S. Perry, Senior Resident Inspector R. L. Nimitz, Senior Radiation Specialist

Approved by: _____ 9/2/94
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EXECUTIVE SUMMARY
Limerick Generating Station
Report No. 94-17 & 94-17

Plant Operations

PECO Energy identified that Limerick Generating Station was not in full compliance with Appendix 9A, Fire Protection Evaluation Report, of the Updated Final Safety Analysis Report (UFSAR). A fire in the remote shutdown room could potentially result in the unavailability of the D12 4KV safeguards bus, required to support fire safe shutdown method 'D', due to the potential for fire induced damage to control cables. This issue will remain unresolved pending completion of an NRC review of PECO Energy's final investigation (50-352/94-17-01) (Section 1.2). A breaker in the 5010 Peach Bottom cross-tie line, Unit 2, tripped open and immediately reclosed during a storm. The voltage transient caused the 2A reactor recirculation pump to increase speed and the indicated average power range monitor (APRM) power to increase to 105% of rated. The issue will remain unresolved pending completion of the analysis of the actual thermal power reached, and the root cause of the recirculation pump speed increase (50-353/94-17-02) (Section 1.2). With Unit 1 at 100% of rated, radwaste personnel, changing light bulbs in the 1C reactor feed pump (RFP) room, tripped the pump when a ladder hit the RFP turbine manual trip lever. A good response by both the radwaste and operations personnel allowed a prompt and effective recovery from this transient (Section 1.3).

Maintenance

Observations of the performance of a Unit 1 reactor protection system (RPS) relay replacement for the turbine control valve fast closure signal indicated the Instrumentation and Controls (I&C) technicians exercised care while working in the panel. The relay replacement was well planned and performed in accordance with station procedures. All post maintenance testing was performed satisfactorily (Section 2.1). The D22 emergency diesel generator was declared inoperable for a planned 5-year overhaul. A visual examination of the water pump drive gears, lubricating oil pump drive gear and the lower air start distributor drive gear, indicated abnormal wear patterns, fretting, and pitting on the flexible drive gear, flexible drive driven gear, and the water pump driven gears. PECO Energy decided to replace all six damaged gears and initiate action to determine the root cause of the problem. PECO Energy's preliminary conclusion for the cause of the deterioration of the gears was the misalignment of the gear assembly of the pump flexible drive.

Surveillance

During the performance of the Unit 1 RCIC surveillance test, a turbine speed control problem was identified at low turbine speed, in that turbine speed could only be reduced to 2600 RPM. Troubleshooting identified that new paint on the servo/governor lever interface was limiting the sliding motion of the clevis pin. Information concerning areas to avoid painting, was not communicated to the painters. The response to this incident was thorough and the problem was corrected (Section 3.1).

Engineering

A portion of emergency service water (ESW) piping, for the 1D residual heat removal (RHR) pump, was being hydrostaticly pressure tested, when an overpressure condition occurred due to a malfunction in the operation of the hydrostatic pump at the start of the test. A non conformance report (NCR) concluded that the overpressure condition did not exceed the maximum working pressures for the piping and components, and this condition did not prevent these components from performing their intended function. The hydrostatic test was subsequently reperformed satisfactorily and the 1D RHR pump declared operable.

Plant Support

Selected aspects of the on-site waste storage program were reviewed. Specifically, the planning and preparation for placement of the initial liner of radioactive waste in the dedicated radwaste storage pad were reviewed. The inspectors reviewed the actual transport and placement of the initial liner at the pad facility and concluded that the licensee transferred and placed the liner in storage in an effective and well controlled manner.

Miscellaneous

An unresolved item was closed concerning an event where an engineered safety features (ESF) actuation occurred when an operator inadvertently pulled a wrong fuse. PECO Energy's investigation concluded that the event was caused by inadequate attention to detail in that operators failed to exercise proper self-check techniques. Corrective actions included disciplining the appropriate operators regarding proper self-checking practices, and strengthening evaluations of self-checking practices in the control room. Another unresolved item was closed concerning an instance where a manual air supply isolation valve was found closed, causing the closure of a scram discharge volume vent valve and drain valve. PECO Energy's investigation failed to identify the cause of the event; however, a clearance was removed in the area of the valve, and the valve could have been bumped closed during that activity.

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DETAILS

1.0 PLANT OPERATIONS (71707)[1]

The inspectors observed that plant equipment was operated and maintained safely and in conformance with license and regulatory requirements. Control room staffing met all requirements. Operators were found alert, attentive and responded properly to annunciators and plant conditions. Operators adhered to approved procedures and understood the reasons for lighted annunciators. The inspectors reviewed control room log books for trends and activities, observed control room instrumentation for abnormalities, and verified compliance with technical specifications. Accessible areas of the plant were toured; plant conditions, activities in progress, and housekeeping conditions were observed. Additionally, selected valves and breakers were verified to be aligned correctly. Deep backshift inspection was conducted on July 17, 1994.

1.1 Operational Overview

Both units operated at full power throughout the inspection period with the exception of slight power reductions due to increasing turbine backpressure, surveillance testing and control rod pattern changes. The increased turbine backpressure in both units was a result of reduced cooling tower efficiency due to hot weather conditions. Additionally, Unit 1 reduced power to 80% of rated following a loss of the 1C reactor feed pump (RFP) when a ladder, being used to change light bulbs, hit the RFP turbine manual trip lever (Section 1.3). Unit 2 is currently operating with all control rods in the "full-out" position, in preparation for the Unit 2 power coastdown, prior to its refueling outage in January 1995.

1.2 Event Reports

On July 13, 1994, a notification was made to the NRC concerning a chemical spill in the area of the spray pond pump house. The notification to NRC was made due to the required notification of offsite agencies. The chemical was CLAM-TROL CT-1, a biocide that contains ethylene glycol. The spray pond biocide injection skid was in service to chemically treat the residual heat removal (RHR) system heat exchangers, and to apply biocide to the pond for algae/pH control. The leak was from a ruptured hose on tubing at the discharge side of the pump. An estimated 10-20 gallons were spilled. While the chemical was contained onsite, due to the amount of ethylene glycol in the biocide, any spill greater than 0.4 gallons must be reported to offsite agencies. The spill was subsequently isolated and contained, and the Pennsylvania Department of Environmental Resources was notified. Further use of the spray pond injection skid will include constant operator coverage. The inspector noted that PECO Energy is pursuing the use of an alternative chemical, and had no further questions concerning this event.

A one hour non-emergency notification was made to the NRC on August 10, 1994. This notification concerned the discovery, by plant personnel, that Limerick Generating Station was not in full compliance with Appendix 9A, Fire

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

Protection Evaluation Report, of the Updated Final Safety Analysis Report (UFSAR). The deficiency concerned the instance where a postulated fire in the remote shutdown room could potentially result in the unavailability of the D12 4KV safeguards bus, required to support fire safe shutdown method 'D', as described in Section 9A.5, of the UFSAR. This condition was discovered during the performance of the Individual Plant Examination of Externally Initiated Events (IPEEE) Fire Risk Analysis. The immediate corrective action for this deficiency was to place the remote shutdown room in the fire impairment log with the appropriate compensatory actions taken. It should be noted that this area had been previously included as part of the roving hourly firewatch patrol rounds, in response to NRC Bulletin No. 92-01, Failure of Thermo-Lag 330 Fire Barrier System. At the close of this inspection period the fire risk analysis was nearing completion. This issue will remain unresolved pending completion of the analysis, and the NRC's review of PECO Energy's final investigation. (50-352/94-17-01)

On August 14, 1994, a notification was made to the NRC pursuant to the Limerick Generating Station Unit 2 operating license, which requires that a 24 hour notification be made whenever the maximum thermal power level is exceeded. On August 13, 1994, with Unit 2 operating at 100% of rated power, a breaker in the 5010 Peach Bottom cross-tie line, one of the three high voltage transmission line in the Unit 2 substation, tripped open and immediately reclosed during a storm. Within seconds of the electrical transient occurring, the Unit 2 reactor operator observed that the 2A reactor recirculation pump speed was increasing, and took immediate corrective actions to reduce reactor power to 97.5% of rated by lowering recirculation pump speed. The increased recirculation pump speed caused indicated average power range monitor (APRM) power to increase to 105% of rated.

Abrupt changes in the 2A recirculation pump speed had been seen before, but only in conjunction with the starting of the 2A reactor building ventilation supply fan, powered from the same electrical bus. This earlier problem was captured on the plant's Chronic System/Equipment Problems List and was being evaluated. The short term corrective action was to place the recirculation pump's scoop tube positioner in the "lockout" position prior to realignment of the reactor building ventilation system. This event was the first incident where something other than a fan start affected the recirculation pump speed.

At the close of this inspection period thermal power calculations were being performed, and other plant parameters, such as heat flux and generator output, were being reviewed to determine the maximum core thermal power reached during this transient. Additionally, a root cause analysis is being performed to determine the cause of the recirculation pump speed control problem so that proper corrective actions can be taken. These issues will remain unresolved pending completion of the analysis, and the NRC's review of PECO Energy's final investigation. (50-353/94-17-02)

1.3 Unit 1 Feedwater Transient

On July 29, 1994, with Unit 1 at 100% of rated power, radwaste personnel changing light bulbs in the 1C reactor feed pump room, tripped the 1C RFP when a ladder hit the RFP turbine manual trip lever. This resulted in a reactor

recirculation pump runback (high limiter), which occurred when the 1C RFP's flow was less than 20% of rated, and reactor vessel water level decreased to less than 27.5". Both reactor recirculation pumps responded as designed and reactor water level was restored to the normal band. Following the feedwater transient, reactor power stabilized at 80% of rated with 57% total core flow.

Three radwaste technicians had entered the 1C RPF room to change burned out lights. The technicians were using a 25 foot long stack ladder (three parts) to reach the lights. After changing the first light, one of the technicians, standing on the shield wall, was moving the ladder to the next location when it bumped the turbine trip lever. At the time, the technician was not aware of the fact that the ladder had caused the turbine trip, but he and the other two technicians exited the area when they heard the turbine slowly winding down. They contacted the radwaste decontamination coordinator, who had just come out to check on their progress, and he promptly contacted the control room. The operations floor supervisor was immediately dispatched to the area and determined that the ladder had contacted the RFP turbine trip lever while being moved to a new location. With the cause of the RFP trip known, operators were able to reset the RFP turbine and the recirculation pump runback, and reactor power was restored to 100% of rated.

The inspector observed recovery activities in the control room and was present for the debriefing of the personnel involved immediately following the event. The technicians acted responsibly by notifying the control room that they were working in the area of the 1C RFP when the pump tripped. This allowed operations to quickly diagnose the cause of the RFP trip and restore the plant to its normal configuration. The inspector noted that operations personnel thoroughly evaluated all plant parameters and conditions to ensure that the technicians had indeed caused the pump trip, since the technicians did not actually see the ladder contact the trip lever. Immediate and interim corrective actions included suspending work in the area of the RFP's and holding a meeting to discuss other activities that could effect the plant. Discussion with the Radwaste Manager indicated that all light bulb replacement around sensitive plant equipment has been suspended pending additional training for radwaste technicians. A good response by both the radwaste and operations personnel allowed a prompt and effective recovery from this transient.

2.0 MAINTENANCE (62703)

2.1 Maintenance Observations

The inspectors reviewed various safety-related maintenance activities to verify that repairs were made in accordance with approved procedures and in compliance with NRC regulations and approved codes and standards. The inspectors also verified that the replacement parts and quality control used on the repairs were in compliance with PECO Energy's Quality Assurance (QA) program.

The following maintenance activities were reviewed:

On July 28, 1994, the inspector observed the performance of a Unit 1 reactor protection system (RPS) relay replacement (C71A-K8A) for the turbine control valve fast closure signal. This relay also feeds the logic for the recirculation pump trip system 'A'. Prior to the start of this job, instrumentation and controls (I&C) personnel met with an operations shift supervisor and the system manager to review the plant conditions. The operating shift was then given a pre-job briefing, which included the fact that the work would cause an A1/RPS half scram and disable the 'A' recirculation pump trip system. The inspector observed the setup for the work in the RPS relay panel and noted that the I&C technicians exercised great care while working in the panel. A wooden platform was specially designed to be used at the base of the panel to give the technician better access in the panel. White plastic sheets were draped inside the panel on three sides, to ensure the technician would not come in contact with any of the exposed terminal boards. These actions provided a safer working environment for the technicians, as well as helping to preclude inadvertent RPS actuations. The I&C technicians were very knowledgeable of the replacement procedure, having been involved in similar relay work during the previous Unit 1 outage.

At one point during the replacement work, a wire lug broke off the wire from a terminal on relay C71A-K10A to relay C71A-K8A, and had to be replaced. Recognizing that this wire was a 'Q' (qualit') component, the technicians immediately stopped work and contacted their supervisor for guidance. The scope of the original work order was expanded to include a third activity to relug the wire using 'Q' parts. A quality control inspector was present for the relugging of the wire and the replacement work continued as planned. The inspector also noted the operations shift supervisor was made aware of the addition of the third activity, prior to reinstallation of the wire, and concurred with the post maintenance testing for the newly lugged wire. The inspector concluded that the relay replacement was well planned and performed in accordance with station procedures. All post maintenance testing was performed satisfactorily.

On July 31, 1994, the Unit 2 D22 emergency diesel generator was declared inoperable for a planned maintenance outage using maintenance procedure (M)-020-025, Diesel Engine 5-year Examination and General Maintenance. The technical specification limiting condition for operation (LCO) for one inoperable diesel generator is 30 days. The inspector observed the inspection and reinstallation of the number eight upper piston on August 2, 1994. The piston pin and piston bushings were inspected and measurements were taken and verified against proper acceptance criteria. The technicians were very familiar with the maintenance procedure and effectively used the vendor representative throughout the process. The technicians were careful to properly perform both independent and double verifications when required by the procedure. A considerable effort, on the part of the workers, was noted by the inspector with regard to general housekeeping practices. The work area was kept clean and oily rags were frequently collected and placed in plastic bags for disposal.

The inspector had one concern regarding the use of a cable tray as a makeshift table during the piston work. The cable tray was adjacent to the scaffold platform where they were working. This apparently made it a convenient place to lay the procedure book, tools, and micrometers. These objects were resting directly on the cables. The inspector discussed this concern with the technicians and they agreed that this was not a good work practice and removed all the objects from the cable tray, with no damage to any cables indicated. Subsequent visits to the work area indicated that this practice was no longer occurring.

Maintenance procedure M-020-025 also required the technicians to visually examine the water pump drive gears, lubricating oil pump drive gear and the lower air start distributor drive gear for damage and/or abnormal wear. When this was done on August 3, 1994, technicians found abnormal wear patterns, fretting and pitting on the flexible drive gear, flexible drive driven gear, and to a lesser extent, the water pump driven gears. The flexible drive gear is connected to the lower crankshaft and drives the auxiliary diesel pumps. On the evening of August 3, PECO Energy decided to replace all six damaged gears and to determine the root cause of the problem. The vendor representative said that this type of wear damage has been seen before, but on engines with 30,000 hours of operation; D22 has less than 500 hours of operation. The vendor also recommended changing the damaged parts. Possible causes included: gear box alignment problem, auxiliary pump misalignment, bad bearings, flexible drive gear spring problems, circulating currents along the shaft, lubrication problems or materials. The metallurgist from PECO Energy's Valley Forge Laboratory examined the gears before they were removed from the engine and suspected contact type fatigue due to the irregular pitting on the gears.

Measurements were taken to check the gears' alignment before they were disassembled. Eight mils of run-out was seen on the flexible drive gear (vendor manual states 3 mils maximum as acceptable) and 5 mils of movement was seen on the flexible drive driven gear. (The flexible drive driven gear showed the most pitting damage.) The company photographer photographed the damaged parts and pictures were sent to the vendor. The vendor also recommended inspecting the number 13 bearing for signs of pitting due to circulating currents, which would also be seen there, if that was the problem. This was done and no pitting was found, ruling out circulating currents along the shaft as a possible problem.

Suspecting that a misalignment of the gears was the problem, the flexible drive gear assembly was disassembled and the effected parts were taken to the maintenance shop for further measurements. After disassembly, the lubricating oil drive and driven gears also showed signs of an irregular wear pattern and light pitting. Maintenance technicians determined the perpendicularity of the mounting face to the shaft bore, of the pump flexible drive housing, was out of specification by 6 mils. Discussions with the vendor indicated that the vendor needed to have the pump flexible drive housing returned to the factory for measurements and a verification of the error. The part was sent by overnight mail and the vendor confirmed PECO Energy's finding, indicating that in fact the error was actually 7 mils out of tolerance (maximum vendor recommended tolerance for this part was 1 mil). A new pump flexible drive

housing was ordered and delivered with the other new gears for reinstallation in D22. Additionally, the old pump flexible drive housing was returned for further analysis by PECO Energy. On August 17, 1994, the post maintenance test and surveillance runs were completed, and D22 was declared operable.

The inspector followed this event closely, attending strategy meetings, visiting the Valley Forge Laboratory, and directly observing the maintenance work. Excellent coordination between maintenance, planning, engineering, and operations enabled the diesel to be returned to service quickly. It should be noted that the maintenance teams provided round-the-clock coverage during the reassembly of the diesel, and that the work was done correctly, efficiently and without incident. In addition to the plant staff, PECO Energy solicited the aid of a consulting engineer specializing in troubleshooting mechanical problems. This individual was brought in when the gear problem was initially identified. The services of a local gear manufacturing company were also requested to assist in the analysis and determination of the root cause of the gear problems. PECO Energy's preliminary conclusion for the cause of the deterioration of the gears was the misalignment of the gear assembly of the pump flexible drive. This conclusion was supported by findings of the local gear manufacturing company. The investigation of the cause of the gear assembly misalignment was still in progress at the end of the report period. The inspector will review the investigation as part of the routine inspection program.

2.2 Maintenance Management Team Meeting

On August 8, 1994, the inspector attended the third in a series of Maintenance Division Management Team Meetings held at the PECO Energy Learning Center, Norristown, Pennsylvania. The meeting was well attended by maintenance management, which included first line supervisors from both the maintenance and instrumentation and controls groups. The manager of the Independent Safety Engineering Group (ISEG) was also present. The agenda included such topics as the self-assessment process, peer inspection program, and the self-check program. Discussions were conducted in a very open manner, with the Director of Maintenance facilitating the meeting. The inspector noted that the discussion concerning the peer inspection program was particularly informative. The group concluded that peer inspection, and the move toward quality-to-the line (QTL), would be a major initiative requiring behavioral change on the part of the workers, as well as the supervisors. The need for positive reenforcement for workers who identify errors was discussed. In order for the program to work there would be a need for an increase in the reporting of problems, so that they can be tracked and trended. These issues, as well as others, were addressed in a candid forum, which solicited ideas on how to make the peer inspection program work effectively. The group also "brain stormed" on what a supervisor needs to do to ensure that workers are using the self-check program to reduce errors.

The inspector concluded that there was a good exchange of ideas during this meeting. Taking a large group of supervisors off-site for a day long meeting of this nature is indicative of PECO Energy's continuing commitment to improve plant maintenance. The inspector will continue to monitor these meetings and any resulting changes in the program.

3.0 SURVEILLANCE (61726)

3.1 Surveillance Observations

During this inspection period, the inspectors reviewed in-progress surveillance testing and completed surveillance packages. The inspectors verified that surveillances were completed according to PECO Energy approved procedures and plant technical specification requirements. The inspectors also verified that the instruments used were within calibration tolerance and that qualified technicians performed the surveillances.

The following surveillances were reviewed:

- ST-6-049-230-1, RCIC PUMP, VALVE AND FLOW TEST

During the performance of the Unit 1 reactor core isolation cooling (RCIC) pump valve and flow surveillance test (ST)-6-049-230-1, Revision 25, on August 2, 1994, a turbine speed control problem was identified at low turbine speed. After completing a satisfactory full flow test run, the ST procedure required the operator to reduce RCIC turbine speed to 2250 RPM, prior to manually tripping the turbine. Turbine speed could only be reduced to 2600 RPM. (Note that the turbine speed control responded smoothly down to the point of 2600 RPM, at which time it no longer responded.) Troubleshooting was performed using the troubleshooting control procedure to check the servo overtravel on the turbine governor control valve. The system manager determined that new paint on the servo/governor lever interface was limiting the sliding motion of the clevis pin (the pin that joins the servo actuator with the governor lever). This problem apparently only affected the turbine speed control at the low end of turbine operation. The RCIC room and pump skid had been painted between the weeks of July 11, and August 1, 1994. The affected parts were disassembled and cleaned, and a RCIC run was then performed. The inspector observed the RCIC operation from the control room and noted that the control of the turbine was satisfactory for the full range of normal operation, from 2200 to 4500 RPM. The system manager determined that the problem did not cause the RCIC system to be inoperable at any time, since RCIC was able to perform its intended function. The inspector reviewed the ST procedure and the noted that the step that required the operator to reduce turbine speed to 2250 RPM was not part of the ST's acceptance criteria.

Discussions with the system manager regarding the RCIC painting evaluation indicated that prior to the start of the painting, a walkdown was performed with the system manager and the painting supervisor. During the walkdown, areas to avoid painting were pointed out to the painting supervisor; this included the governor servo linkage. Apparently, this information was not communicated to the painters and the linkage ended up being painted. The high pressure coolant injection (HPCI) room and skid were also recently painted; however, the system manager verified that this problem did not occur on that system. The inspector concluded that the response to this incident was thorough and that the problem was correctly identified and corrected. While the walkdown prior to the painting job was considered a positive initiative, its outcome was less than adequate as areas where painting should be avoided

ended up being painted. The inspector had no further questions concerning this event and will review the followup actions to resolve the communications problem as part of the routine inspection program.

- ST-6-051-232-2, B RHR PUMP, VALVE AND FLOW TEST

On August 3, 1994, the inspector observed the performance of ST-6-051-232-2, Revision 13, B RHR Pump, Valve and Flow Test on Unit 2. One portion of the test was unsatisfactory when the HV-51-2F021B, drywell spray inboard valve, could not be stroked for timing of the valve. Following the stroking of HV-51-2F016B, drywell spray outboard valve, the piping between the valves could not be drained prior to stroking HV-51-2F021B, as required by the ST. Operators estimated that HV-51-2F016B was leaking by at a rate of one gallon per minute. The system manager was immediately notified, the drywell penetration (for this spray line) was declared inoperable, and isolated by deactivating HV-51-2F021B in its isolated or closed position. This was performed in accordance with Technical Specification 3.6.3a.2., Primary Containment Isolation Valves. Additionally, an equipment trouble tag was initiated for the repair of HV-51-2F-16B. The remainder of the ST was completed without incident. The inspector observed good coordination between the operators, shift supervision, and the RHR system manager. The problem with the inboard valve was identified and dispositioned in accordance with station procedures.

- ST-6-055-230-1, HPCI PUMP, VALVE, AND FLOW TEST

On August 15, 1994, the inspectors observed performance of ST-6-055-230-1, HPCI Pump, Valve, and Flow Test, Revision 23, on Unit 1. Prior to the test, the inspectors observed the pre-job briefing in the control room. The pre-job briefing was very good, with good participation from operations, engineering, maintenance, and health physics personnel. The test was conducted quite well, with good communications between the various groups. Personnel involved in the test were very knowledgeable concerning the system and the surveillance testing. No major problems were encountered during the performance of the test.

4.0 ENGINEERING

4.1 Unit 1 D Residual Heat Removal Pump

On August 11, 1994, a portion of emergency service water (ESW) piping, for the 1D residual heat removal pump, was being hydrostaticly pressure tested, when an overpressure condition occurred. The hydrostatic test was being performed for a post maintenance test (PMT) on a new spool piece recently installed. The PMT required a minimum pressure of 173 psig and a maximum pressure of 181 psig during the pressure test. A malfunction was experienced in the operation of the hydrostatic pump at the start of the test, and personnel observed 425 psig prior to turning the pump off. The test pressure was in excess of the required 181 psig for approximately one minute. The test was stopped, and it was determined that an engineering evaluation was needed prior to reperforming the hydrostatic pressure test and declaring the 1D RHR pump operable. A noncompliance report (NCR) was generated and an engineering evaluation was

performed. Components affected by the overpressure condition included the seal oil cooler, the motor oil cooler, and associated piping. The NCR, completed by site engineering, concluded that the overpressure condition did not exceed the maximum working pressures for the piping and components, and that this condition did not prevent these components from performing their intended function.

The hydrostatic test was subsequently reperformed satisfactorily and the 1D RHR pump declared operable. At the end of this report period PECO Energy's investigation of this event was still in progress; therefore, the investigation will be reviewed, by the inspectors, as part of the routine inspection program.

5.0 PLANT SUPPORT (71707)

5.1 Radiological Protection

During the inspection period, the inspectors examined work in progress in both units including health physics (HP) procedures and controls, as low as reasonably achievable (ALARA) implementation, dosimetry and badging, protective clothing use, adherence to radiation work permit (RWP) requirements, radiation surveys, radiation protection instrument use, and handling of potentially contaminated equipment and materials.

The inspectors observed individuals frisking in accordance with HP procedures. A sampling of high radiation area doors was verified to be locked closed 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 to be meeting the applicable requirements.

On June 30, 1994, the Barnwell, South Carolina radwaste disposal facility was closed to out-of-state waste generators. In preparation for the anticipated closure, PECO Energy established and implemented on-site storage facilities for radioactive waste generated at the Limerick Station.

The inspectors reviewed selected aspects of PECO Energy's on-site waste storage program. Specifically, the inspectors reviewed the planning and preparation for placement of the initial liner of radioactive waste to be placed in the dedicated radwaste storage pad. In addition, the inspectors reviewed the actual transport and placement of the initial liner at the pad facility. The inspectors review was with respect to criteria contained in the following documents:

- Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water Cooled Nuclear Power Plants, dated October, 1979

- NRC Information Notice No. 83-14, De-watered Spent Ion-Exchange Resin Susceptibility to Exothermic Chemical Reactions

- NRC Generic Letter 81-38, Storage of Low-Level Radioactive Waste at Power Reactor Sites, dated November 10, 1981

- NRC Generic Letter 85-14, Commercial Storage of Low-Level Radioactive Waste Not Generated by the Utility, dated August 1, 1985

- NUREG/CR-4062, Extended Storage of Low-Level radioactive Waste: Potential Problem Areas, dated December, 1985

The evaluation of PECO Energy's performance in this area was based on the inspectors' observations of the pad storage location, performance of independent radiation measurements, review of applicable documentation including applicable safety evaluations, and discussions with personnel.

The following matters were reviewed:

- performance of appropriate safety evaluations to support radioactive waste storage at the storage pad
- controls for waste placed in storage
- development of appropriate procedures for transport, handling, and inspection of waste containers
- development of appropriate incident/emergency procedures for the facility
- personnel training and qualifications
- implementation of appropriate radiological controls during the activity including posting, barricading, High Radiation Area access controls, use of personnel dosimetry, and implementation of the radiation work permit program

On July 25, 1994, PECO Energy transferred the initial liner of radioactive waste to the radwaste storage pad. The liner, No. 94-DR3007, (High Integrity Container No. 1534) contained 40% condensate demineralizer resin and 60% sludge waste. The liner, which weighed 9,100 pounds, exhibited contact radiation dose rates ranging from 500-1500 millirem/hr on contact and contained about 2.12 curies of principle Cobalt 60, Cesium -137, and Zinc-65. The liner measured about 300 millirem/hr at one meter. The transport and loading of the liner into a vault at the pad was accomplished using a "transfer bell" which minimized personnel radiation exposure. The container was loaded into a vault at the radwaste storage pad.

The inspectors noted that PECO Energy plans to remove the waste from storage and dispose of it at an appropriate disposal facility when one (to which the licensee is permitted to send waste) becomes operational. The facility is intended for storage of waste such as de-watered waste and dry-activated waste. Inspector discussions indicated the facility is sized to support 1.5 years of operation. The facility will be expanded as needed.

The inspectors' review indicated the following:

- A safety evaluation (in accordance with 10 CFR 50.59) to support the on-site storage at the pad location was completed.

- Applicable procedures for loading and transfer of the liner to the radwaste storage pad were established and implemented.

- Applicable procedures for inspection of waste containers, as outlined in Generic Letter 81-38 were established.

- PECO Energy implemented physical controls of the waste stored in the Controlled Area to prevent its unauthorized removal.

- PECO Energy performed a complete dry-run, using a water filled, non-radioactive liner for mock-up training.

- Personnel received appropriate training including ALARA briefings.

- Station management observed the initial placement of waste into the vault at the radwaste storage pad. Radiological controls supervisors also observed the transfer and placement of the liner in storage.

- Effective radiological controls were implemented for the transfer including a radiation work permit.

- PECO Energy's radiation protection personnel developed and implemented a Radiation Protection Performance Standard that provided detailed requirements for surveys and radiological controls for transfer and storage of the liners.

- The inspectors' independent radiation measurements did not identify any abnormal radiation levels at the boundary of the facility during transfer or placement of the liner into storage, including radiation levels at the radwaste storage pad fence boundary.

- Integrating radiation monitoring devices (thermoluminescent dosimeters (TLDs)) were placed on the radwaste storage pad fence to monitor accumulated radiation exposure for purposes of compliance with applicable radiation dose limits.

- PECO Energy's contamination surveys of the liner indicated no contamination was detected during liner transfer and unloading at the radwaste pad.

- Inspector observations of industrial safety matters did not identify any concerns.

The following matters were brought to PECO Energy's attention for review and evaluation, and enhancement (if appropriate).

- The inspectors' observation of loading of the liner into the transfer bell in the radwaste building identified a crane operator in proximity to the radiation shine from the liner. The plant manager indicated a remote control (radio-operated crane pendant) was being evaluated for

use in liner loading. The inspectors' discussions indicated no significant exposure was sustained but the observation indicated an apparent opportunity to reduce personnel radiation exposure.

- During initial hook-up of the liner to the crane at the radwaste storage pad, an individual leaned over the transfer bell to latch (using a "Shepard's Hook") the crane hook to the waste liner. The action resulted in the individual's head entering the radiation shine from the liner while the individual's personnel monitoring device was shielded by the liner's transfer bell. Although the inspector believed no significant exposure was unmonitored, the action, on higher activity liners, could result in potential unmonitored radiation exposure. Limerick's radiation protection supervisor indicated the matter would be reviewed.

- The inspectors discussed the potential for rupture of a waste liner during transfer at the radwaste storage facility and what emergency procedures were in place to respond to the spill. The inspectors' discussions indicated a spill kit was in close proximity but it was unclear as to the extent of procedures established for responding to and controlling gross failure of a liner. The inspectors noted that Generic Letter 81-38, Section V. recommends procedures for mitigation of accidents. The inspectors did note that PECO Energy's safety evaluation for the storage pad indicated that higher activity waste (i.e. reactor water clean-up resin) would be transferred in a secondary container thereby minimizing the potential for spills of higher activity de-watered waste resin.

  PECO Energy subsequently revised procedure RW 226, Loading and Transfer of high intensity containers (HICS) to the Radwaste Storage Pad, on August 10, 1994, to include guidance regarding response to a spill associated with a high integrity container inside or outside the facility. PECO Energy also revised procedure SE 15, Large Volume Radioactive Substance Spill Incident, to also include guidance on this matter. PECO Energy also issued a memorandum to radiation protection field office personnel regarding actions to take regarding a spill and directed the technicians to specific procedures. Lastly, the licensee provided training of personnel on the procedure changes.

  The inspectors had no further questions on this matter at this time but indicated additional review of the licensee's on-site storage program would be performed during a future inspection.

The inspectors concluded that PECO Energy transferred and placed the liner in storage in a generally effective, well controlled manner.

5.2 Security

Selected aspects of plant physical security were reviewed during regular and backshift hours, to verify that controls were in accordance with the security plan and approved procedures. This review included the following security measures: guard staffing, vital and protected area barrier integrity, and

implementation of access controls including authorization, badging, escorting, and searches. The inspectors concluded that observed activities were conducted properly with good management involvement.

5.3 Emergency Preparedness

During this inspection period one notification was made to the NRC in the emergency preparedness area. A one-hour notification was made on July 25, 1994, after it was determined that more than 10% of the offsite sirens had been unavailable for more than one hour. During severe thunderstorms passing through the Limerick Emergency Planning Zone, a total of sixty-five sirens (65 of 164) in the public alert notification system were lost due to local power outages. On July 27, 1994, the system was below the reporting criteria when local power was restored to most of the area with all but four sirens being available.

6.0 REVIEW OF LICENSEE EVENT AND ROUTINE REPORTS (90712, 90713)

6.1 Licensee Event Reports (LERs)

The inspectors routinely reviewed LERs and performed followup inspections to PECO Energy's actions regarding the disposition of corrective initiatives. The inspectors reviewed the following LERs and found that the events were described accurately, PECO Energy had identified the root causes, implemented appropriate corrective actions and made the required notifications.

LER 1-94-009, radiation monitor alarm circuit card malfunction results in an inadvertent isolation of several primary containment isolation valves, event date: June 17, 1994, report date: July 12, 1994.

This event was reviewed in NRC Combined Inspection Report Nos. 50-352/94-15 and 50-353/94-15, Section 1.2.

LER 1-94-010, Two primary containment isolation valves inadvertently isolated, an ESF, due to a personnel error during the application of a clearance, event date: June 26, 1994, report date: July 26, 1994.

This event resulted in an unresolved item, which is closed out in Section 7.0 of this inspection report.

The inspectors found that the LERs listed above met the requirements of 10 CFR 50.73 and had no further questions regarding these events.

6.2 Routine Reports

Routine reports submitted by PECO Energy were reviewed to verify the reported information. The following reports were reviewed and satisfied the requirements for which it was reported.

Station Monthly Operating Report for June 1994, dated July 12, 1994, and for July 1994, dated August 10, 1994.

7.0 FOLLOWUP OF PREVIOUS INSPECTION FINDINGS (92702)

Closed (Unresolved Item 50-352/94-15-01) ESF Caused When Wrong Fuse Pulled

This unresolved item concerned an event where an ESF actuation occurred, when an operator inadvertently pulled a wrong fuse. The item remained open pending completion of the investigation of this event. PECO Energy's investigation concluded that the cause of the event was less than adequate attention to detail in that operators failed to exercise proper self-check techniques. The clearance that was being applied correctly identified the fuse and the panel where it was located; however, the similarly labeled panel, where the incorrect fuse was located, was in close proximity, which contributed to the operator focusing on the incorrect panel. Corrective actions included disciplining the appropriate operators regarding proper self-checking practices, and strengthening evaluations of self-checking practices in the control room. Additionally, the inspectors noted that the label for the incorrect fuse that was pulled will be changed to better indicate the purpose of the fuse. Other similar fuses will be relabeled as necessary to indicate their purpose more clearly.

The inspectors reviewed the corrective actions, walked down the appropriate portion of the clearance with plant personnel, and reviewed the labeling associated with the panels and fuses. The corrective actions taken appear adequate to address the problem; therefore, this open item is closed.

Closed (Unresolved Item 50-353/94-15-02) Scram Discharge Volume Valve Mispositioned

This unresolved item concerned an instance where a manual air supply isolation valve was found closed, causing the closure of a scram discharge volume vent valve and drain valve. The item remained open pending completion of the investigation of the event. PECO Energy's investigation failed to identify the cause of the events; however, a clearance was removed in the area of the valve, and the valve could have been bumped closed during that activity. Personnel involved with the clearance removal could not recall bumping the valve. No other potential cause could be identified for the mispositioned valve. This event was included in the review of mispositioned valves at Limerick for trending purposes.

The inspectors reviewed the event, looked at the area where the valve is located, and discussed the event with plant personnel. Although it is unlikely that the valve could be bumped closed, due to other equipment blocking access, it is possible. Additionally, there does not appear to be a history of similar mispositioning events; therefore, the inspectors concluded that this was an isolated event. This item is closed based on the satisfactory conclusion of the investigation and the associated trending of the event.

8.0 MANAGEMENT MEETINGS

8.1 Exit Interviews

The inspectors discussed the issues in this report with PECO Energy representatives throughout the inspection period, and summarized the findings at an exit meeting with the Plant Manager, Mr. R. Boyce, on August 17, 1994. PECO Energy personnel did not express any disagreement with the inspection findings. No written inspection material was provided to licensee representatives during the inspection period.

8.2 Additional NRC Inspections this Period

Two Region-based inspections were conducted during this inspection period. Inspection results were discussed with senior plant management at the conclusion of the inspections.

Date	Subject	Inspection No.	Lead Inspector
7/18-22/94	EDSFI Open Item Followup	50-352/94-18 50-353/94-18	L. Scholl
7/22/94	Operator Initial License Exam	50-352/94-16 50-353/94-16	D. Florek