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REGION I

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Facility Name:	Limerick Generating Station, Units 1 and 2
Inspection Period:	August 27, 1996 through October 21, 1996
Inspectors:	N. S. Perry, Senior Resident Inspector F. P. Bonnett, Resident Inspector
Approved by:	Walter J. Pasciak, Chief Projects Branch 4

EXECUTIVE SUMMARY

Limerick Generating Station, Units 1 & 2
NRC Inspection Report 50-352/96-07, 50-353/96-07

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers an 8-week period of resident inspection.

Operations

- In general, the operators' conduct of operations was professional and safety-conscious. Operators conducted normal activities well and continued to demonstrate good communication skills (Section O1.1).

- Both units and the control room operators responded well to a partial loss of 500kv offsite power supplies. The operators demonstrated a cautious assessment of plant conditions and good management oversight was noted. Support from engineering and I&C to troubleshoot and repair affected systems was excellent (Section O1.2).

- Control room operators performed activities to reduce reactor power and remove the main turbine from service to replace the strainer basket in the stator water cooling system well. Personnel controlled and executed each task professionally. The evolution was well planned, with contingencies, and prestaged; which reduced plant impact and delays (Section O1.3).

- The inspectors accompanied a few operators on their daily tours, and conducted a review of completed logs and verified that the appropriate personnel were in the required areas and for the approximate necessary time period. No discrepancies were identified (Section O1.4).

- An unauthorized individual signed the final approval of a temporary change (TC) for procedure T-103 as the Responsible Supervisor. Technical Specification 6.8.3.c, Procedures, specifies that TCs are required to be documented, reviewed, and approved by the proper authority. The inspector identified several instances where this did not occur and therefore, this was categorized as a violation. The inspector noted that no actual safety consequences occurred from this event and that management's corrective actions were appropriate and complete (VIO 50-352/353 96-07-01).

  Further, several programmatic weaknesses for performing temporary changes to plant impact procedures existed. The administrative procedures did not give adequate guidance for implementing the TC process, did not preserve the integrity of plant impact procedures, nor were there adequate controls for maintaining the responsible authority designations. Corrective actions for the programmatic weaknesses were slow and required prompting. (Section O3.1)

- The dual-role shift technical advisor program conforms with Generic Letter 86-04 and is being effectively implemented. Operations management revised the governing Operations Manual procedure to clarify the program's method of implementation and eliminate confusion (Section 5.1).

- Oversight review committees effectively reviewed several activities related to safe station operation. The committee's members actively participated in the meeting with open discussions on plant issues while maintaining a focus on safety. An Independent Safety Engineering Group (ISEG) report of a July scram at Unit 1 identified and challenged the operations department concerning weaknesses in communications and timely awareness of changes in plant parameters (Section O7).

Maintenance

- Maintenance personnel performed corrective maintenance activities well, including the Unit 1 rod drive control system repair, the Unit 2 strainer basket and the Division 4 safeguards battery replacement. Personnel controlled and executed each task professionally (Section M1.1).

- Surveillance testing was conducted well. A minor problem occurred during a Unit 1 high pressure coolant injection system test and an emergency diesel generator (EDG) test. Excellent engineering support of testing activities resulted in resolving the immediate issues and the rapid restoration of the systems (Section M1.2).

- Plant management properly ensured that the backlog was reduced without compromising any of the activities or plant conditions. Management's focus was not only on the overall backlog number, but also on the efficient conduct of the activities, including proper planning and completing the activity correctly the first time, and therefore avoiding rework (Section M1.3).

Engineering

- The formation of the new engineering branch to address EDG concerns was a good management initiative. The resolution of a failure to adequately perform a technical specification surveillance issue was appropriate, performed in a timely manner, and with very good support by engineering personnel and management. Corrective actions taken were comprehensive and appropriate for the circumstances. The issue had more-than-minor consequences, and is categorized as a non-cited violation (Section E1.1).

- Overall, engineering provided excellent support to operations to proactively replace degraded cells, and ultimately replace the entire Division 4 safeguards battery (Section E1.2).

- PECO Energy personnel completed a verification of the accuracy of selected information in the Updated Final Safety Analysis Report. The verification process was a good initiative to correct deficiencies and sensitize personnel to the importance to properly maintaining the Licensing Bases (Section E1.3).

- The engineering metallurgy report comprehensively addressed the extensive wear of the D-12 EDG flexible drive gear. The inspector concluded that the program to continue inspecting these gears during every overhaul is an effective preventive maintenance initiative (Section E1.4).

Plant Support

- Overall, PECO Energy's follow-up to a potential missed fire protection surveillance test concern was comprehensive. The issues concerning the original identified instance of apparent failure to perform a surveillance as required and the inaccuracy of documentation will remain an unresolved item pending completion of the NRC's investigation into the event (URI 50-352 & 353/96-07-02)(Section F1.1).

Report Details

Summary of Plant Status

Unit 1 began this inspection period operating at 100 percent power. The unit remained at full power throughout the inspection period with minor exceptions for testing.

Unit 2 began this inspection period operating at 100 percent power and remained at this power for essentially the entire period. During the period operators responded to the following:

- October 4 — One of the two generator output breakers (235) tripped open when the two 500kv transmission lines (5030, 5031) to the Whitpain Substation de-energized because of a transformer fire at the substation.

- October 6 — Power reduced to 25 percent to remove the main generator from the grid and replace a clogged strainer basket in the stator cooling system. Operators returned the unit to full power on October 7.

- October 12 — Power reduced to 83 percent to remove the 2B condensate pump from service because of high bearing vibration. Power was further reduced to 55 percent to remove the 2A reactor feed pump (RFP) from service due to feedwater piping vibration concerns. Operators returned the 2A RFP to service on October 14 and maintained reactor power at 72 percent until the condensate pump bearing was repaired. Operators returned the unit to full power on October 16.

I. Operations

O1 Conduct of Operations[1]

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, PECO Energy's conduct of operations was professional and safety-conscious. Operators conducted normal activities including shift turnovers and pre-shift briefings well. Operators continued to demonstrate good communication skills and responded well to stabilize plant conditions following several transient events and evolutions detailed below.

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[1]Topical headings such as O1, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics.

O1.2 Partial Loss of 500 KV Offsite Power Sources (71707)

a. Scope

The two 500kv transmission lines (5030 and 5031) that interconnect the 500kv switchyard with the Whitpain Substation tripped at 3:25 a.m. on October 4, as a result of a transformer fire at the Whitpain Substation. The inspector reviewed the plant and operator's response to this event. Specifically, the transient's affects on both unit's rod drive control system (RDCS) and fuel pool cooling (FPC) system at Unit 2. The inspector discussed the systems response with the appropriate system manager.

b. Observations and Findings

Control room operators responded well to the transient and took a cautious approach in restoring the affected systems. The RDCS systems at both units were affected, in that the control rods could not be selected nor moved, though rods would still scram. Operators immediately reset the Unit 2 RDCS; however, the Unit 1 RDCS would not reset due to a blown 5 volt power supply fuse on the data driver card. During the troubleshooting and repair activities, the operators effectively assessed the condition of the RDCS system and determined that reactor power could be reduced to 90 percent with recirculation flow and all other control rod motion would be by scram. This action was appropriate per operating procedure and technical specifications.

The Unit 2 FPC pumps tripped, but Unit 1 experienced no FPC pump trips nor other fuel pool related problems. The operators determined that the pumps tripped on undervoltage, since no thermal or magnetic overloads were tripped. The FPC pumps were promptly restarted and no fuel pool temperature increases were noted.

The units responded well to the transient. The Unit 2 generator output (235) breaker feeding the affected side (bus 1) of the 500kv switchyard tripped open. The generator did not trip because the Peach Bottom 500kv line (5010) and the 220kv switchyard (Unit 1) cross-tie remained in service. The voltage transient did momentarily affect the output of the 20 start-up transformer (13kv) and the 201 safeguards bus which was feeding two of the four vital busses at each unit.

PECO engineers determined that the vital bus alignment with respect to the 500kv switchyard caused the component problems at both units. The 201 safeguards bus essentially experienced a temporary undervoltage condition, which tripped the Unit 2 FPC pumps and affected the Unit 1 RDCS. The duration of the undervoltage condition did not affect other systems. Electrical engineers reviewed the effects of the transient on other components to assure that their response was correct.

c. Conclusions

The unit and control room operators responded well to the transient. Cautious assessment of plant conditions and management oversight was demonstrated. Support from engineering and I&C to troubleshoot and repair affected systems was excellent.

O1.3 Unit 2 Power Reduction and Stator Cooling System Repair (71707)

a. Scope

Control room operators reduced reactor power at Unit 2 to 25 percent on October 6, to replace the strainer basket in the stator water cooling system. The inspector observed the operations from the control room.

b. Observations and Findings

The control room operators performed reactor operations well to reduce reactor power from 100 to 25 percent and remove the main generator from service. The operators performed the maneuver in accordance with the applicable steps of General Procedure (GP) 3, Normal Plant Shutdown. Shift management maintained excellent command and control in the control room at all times, and the reactor operators executed their tasks professionally. Following the maintenance activities, the control room staff placed the main turbine in service, synchronized the main generator to the grid, and restored power to 100 percent. The inspector noted proper briefings and communication prior to and during all plant evolutions.

c. Conclusion

The inspector determined that control room operators performed the reactor operations well. Personnel controlled and executed each task professionally. The evolution was well planned, with contingencies, and prestaged; which reduced plant impact and delays.

O1.4 Verification of Operations Activities (71707)

During this inspection period the inspectors verified that a number of operator log activities were performed as required and as indicated by signoffs. The inspectors accompanied a few operators on their daily tours, and conducted a review of completed logs and verified that the appropriate personnel were in the required areas and for the approximate necessary time period. No discrepancies were identified during this review.

O2 Operational Status of Facilities and Equipment

O2.1 Routine Plant Tours (71707)

The inspectors used Inspection Procedure 71707 to perform routine tours of the facility and also to walk down accessible portions of the following engineered safety feature (ESF) systems:

- 1A and 2B Core Spray - Units 1 and 2
- Safeguards Pipe Fill System - Unit 1 and 2
- 125 vdc safeguards batteries - Unit 2
- Emergency Diesel Generators - Unit 1 and 2

Equipment operability, material condition, and housekeeping were acceptable in all cases. Several minor discrepancies were brought to management's attention and were corrected. The inspectors identified no substantive concerns as a result of these walkdowns.

O3 Operations Procedures and Documentation

O3.1 Emergency Operating Procedure Temporary Change

a. Scope

The inspector assessed the procedure temporary change (TC) process while reviewing a TC to a transient response implementation plan (TRIP) procedure and several other associated procedures. The inspector reviewed administrative procedure A-3, Temporary Changes to Approved Procedures; A-C-226, TRIP Procedure Program; and PORC Position No. 33. The inspector also reviewed a sample of other TC forms and discussed the TC process with appropriate management and plant personnel.

b. Observations and Findings

The operations shift manager initiated a TC to raise the reactor water clean-up (RWCU) regenerative heat exchanger area temperature alarm setpoint from 114 degrees F to 120 degrees F in procedures T-103, Secondary Containment Control, (Table SCC-1, Maximum Normal Operating (MNO) Values); T-290, Instrumentation for T-103; and in the operators logs. This was necessitated by a temporary increase in area temperature caused by a known steam leak in the area. The MNO value is based on equipment being in the MNO temperature for a one year period. Raising the temperature setpoint for a short period does not impact the environmental qualification of equipment in the area because the average temperature is typically less than the MNO. The inspector determined that the TC was technically correct and did not change the intent of the procedure.

The inspector identified that an unauthorized individual signed the final approval as the Responsible Supervisor. The Responsible Supervisor authorizes, within 14 days after the TC's implementation, that the procedure change was valid and accomplished its objectives. PORC Position No. 33 designates who these individuals are. The unauthorized individual had been delegated approval authority in a memorandum from the responsible supervisor. However, this activity did not comply with the guidance in A-3 or Technical Specifications. The inspector discussed this issue with several senior managers, but corrective action was not completed until after the 14-day grace period expired.

Further, the inspector identified several other programmatic discrepancies with the TC that were contrary to the guidance in A-3 and PORC Position No. 33. The shift manager, who actually completed the TC form (A-3, Exhibit A-3-2), filled in the names of two engineers as the TC originator and technical reviewer. One of these engineers (who was listed as the originator) also performed as the station qualified reviewer (SQR). This is not in accordance with the procedure program guidance. Lastly, the technical reviewer never documented his review of the TC as to what applicable documents and drawings were used.

Additionally, the inspector identified another TC that was approved by an unauthorized Designated Individual. The designated individual approves the TC prior to its being implemented. A plant regulatory engineer explained that the individual was qualified to approve this change, but PORC Position No. 33 had not been updated to include his name. A new revision to the PORC position was immediately issued.

The TRIP writers guide (A-C-226) did not address how to perform a TC to a TRIP procedure. The TRIP procedures are pre-planned strategies that undergo an intense review, and validation and verification process to maintain the fidelity and high quality of the procedures. A-C-226 gave specific guidance for revising the TRIPs, but never stated if a TC was allowed. The inspector determined that TRIP procedures could be changed temporarily as long as the process preserved the fidelity and high quality of the procedure. Further, procedure A-3 identified TRIP procedures as "plant impact" procedures to indicate the higher importance of the procedure. The TC guidance in A-3, however, was generic and the same as for any other procedure TC. The inspector determined that the guidance in A-C-226 and A-3 was not preserving the integrity of the TRIP process and discussed these procedure inadequacies with plant management.

To address the programmatic weaknesses, plant management revised A-3 to define the specific guidance for changing plant impact procedures. The TC form (Exhibit A-3-2) was revised to clearly document the bases for the change, list the documents/drawings reviewed, and verify that an intent change does not occur. A-C-226 was revised to reference the TC process in A-3.

c. Conclusion

The inspector concluded that an unauthorized individual signed the final approval of the TC for T-103 as the Responsible Supervisor. Technical Specification 6.8.3.c, Procedures, specifies that a TC is to be documented, reviewed, and approved by the proper authority. Contrary to this guidance, the inspector identified several instances where this did not occur and therefore, this is being categorized as a violation. The inspector noted that no actual safety consequences occurred from this event and that management's corrective actions were appropriate and complete (VIO 50-352/353 96-07-01).

Further, the inspector concluded that several programmatic weaknesses for performing temporary changes to plant impact procedures existed. The administrative procedures did not give adequate guidance for implementing the TC process, was not preserving the integrity of plant impact procedures, nor were there up-to-date controls maintaining the responsible authority designations. Corrective actions for this programmatic weakness were slow and required prompting.

O5 Operator Training and Qualification

O5.1 Dual Role SRO/STA Function (71707)

a. Scope

The shift technical advisors (STA) are senior licensed reactor operators (SRO) with engineering degrees who serve a dual role function as control room supervisor (CRS) and STA. The duties and responsibilities for the STA function are detailed in the operations manual (OM) procedure OM-L-3.2, section 7.0. The inspector reviewed the OM, the technical specifications, and the Updated Final Safety Analysis Report (UFSAR), Section 13.1.2.1.1, and discussed the program with the appropriate operations management personnel to determine the adequacy of the program.

b. Observations and Findings

The STA program conforms to Generic Letter (GL) 86-04, NRC Policy Statement on Engineering Expertise on Shift. The UFSAR establishes that the STA program is required to be in conformance with NUREG-0737, TMI Action Plan Requirements or GL 86-04. Per NUREG-0737, the STA must hold a bachelor's degree and be an independent individual who assesses and advises the CRS of plant conditions during a transient. The GL promotes a dual role licensed individual, eliminating the separate STA position, by combining the STA and SRO positions. All the dual role SRO/STA individuals meet the qualification criteria of GL 86-04.

The inspector noted that the OM procedure did not clearly declare what preferred method (as stated in the UFSAR) the STA program was conforming to. The OM discussed the duties and responsibilities of the STA in generic terms that presented the STA as a separate individual. The Operations Senior Manager agreed and revised the OM procedure to eliminate the confusion.

The inspector identified that a commitment in the OM procedure appeared to be out of date and no longer applicable. The commitment referred to an administrative procedure that had since been canceled and to guidance that had since been superseded. Operations management agreed that the commitment appeared confusing and was no longer necessary, and revised the OM procedure.

c. Conclusion

The dual-role SRO/STA program conforms with GL 86-04 and is being effectively implemented. Operations management revised the OM procedure to clarify the program's method of implementation and eliminate confusion.

O7 Quality Assurance in Operations

O7.1 Self-Assessment Activities (71707)

During the inspection period, the inspectors reviewed or attended multiple self-assessment activities, including:

- the October 3, regularly scheduled Nuclear Review Board (NRB) meeting;
- various Plant Operational Review Committee (PORC) meetings and all meeting minutes;
- various quality verification (QV) and independent safety engineering group (ISEG) reports;

The NRB and PORC reviewed several activities related to safe station operation. The NRB and PORC members actively participated in the meeting with open discussions on plant issues while maintaining a focus on safety. The inspector concluded that the self-assessment activities were effective.

O7.2 ISEG Review of July Unit 1 Scram (71707)

a. Scope

The ISEG issued a report of their review of the Unit 1 Scram that occurred on July 25, 1996. The inspectors shared several concerns identified in the report and discussed these with ISEG and senior operations management personnel.

b. Observations and Findings

The ISEG report was comprehensive and identified several critical issues and concerns with operator performance during the event, including communications and operator focus during the event. Discussions of these issues and concerns with all parties involved disclosed to the inspector a more thorough understanding of the event that was not depicted in the ISEG report. Specifically, several proactive actions taken by the operators were not highlighted in the report. The effort needed to conduct these activities during the event helped to provide perspective on the significance of the ISEG observations. However, the inspectors considered ISEG's observations and recommendations to be appropriate.

Further discussion of the event with the Senior Manager-Operations and the Shift Manager of the crew involved with the event, clarified several issues and concerns. The discussion focused on further details of the event, the operators performance, and management's expectations. The inspectors and managers agreed that weaknesses in communications and timely awareness of changes in plant parameters needed further management attention.

Operations management has already implemented several corrective actions to address these concerns, including a procedure revision to the reactor maneuvering shutdown

instruction and emphasis of this event in operations staff training. Management will continue to stress their expectations to the operations and training staffs.

c. Conclusion

The ISEG report identified and challenged the operations department concerning several operator performance issues. The report was appropriately self-critical, although it did not enumerate the totality of operator responses to the challenges caused by this event. The inspector considered the impact of these concerns on continued safe operation of the plant to be minimal.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Closed) VIO 50-352, 353/96-03-02, Failure to properly maintain temporary plant alterations in accordance with procedures

This violation concerned several instances where temporary plant alterations (TPAs) were not filed in the main control room (MCR) in accordance with controlled procedure MOD-C-7, Revision 1, and the method utilized by operations to track TPA status was not accurate. Plant management resolved the immediate concern by installing copies of the missing packages for the installed TPAs in the MCR file and verifying the file was complete. The method to track TPA status was changed from a computer based tracking system to a paper based system and verified to be correct. In addition, a shift night order was issued to ensure operators were aware of the revised tracking system. Plant personnel determined that the computer based tracking method was susceptible to inaccuracies because the data base included all approved TPAs and not necessarily the installed TPA's.

Long term corrective actions included changing the plant procedures to clearly define who has responsibility for ensuring the MCR file is updated properly and accurately maintained. The inspectors reviewed the procedure changes, interviewed MCR personnel, audited the TPA file and discussed the corrective actions with appropriate personnel. The inspectors concluded that the actions taken were appropriate. This open item is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments (62707)

a. Inspection Scope

The inspectors observed all or portions of the following work activities:

- Replacing the data driver card in the Unit 1 RDCS system on October 4;
- Replacement of the strainer basket in the Unit 2 stator cooling water system on October 6;
- Unit 2 Division 4 battery replacement.

b. Observations and Findings

Unit 1 RDCS Driver Card Replacement

Instrumentation and controls (I&C) technicians found a blown 5 volt power supply fuse on the Unit 1 RDCS data driver card during the event discussed in Section O1.2. The card necessitated replacement because the fuse was soldered to the driver card. The system manager determined that the fuse blew because power to the Unit 1 RDCS system was aligned to the 201 safeguards bus, which was affected by the transmission line transient.

Unit 2 Strainer Basket Replacement

A clogged strainer basket on the inlet to the Unit 2 main generator stator cooling water system was causing low flow and high discharge pressure conditions. Copper metal circulating in the cooling water as ionic copper had fouled the strainer basket. Cupric ions precipitate out as metal in the basket, bridging across the basket's stainless steel mesh reducing the system's flow and decreasing cooling efficiency.

The maintenance task required that the main generator be removed from service since the stator cooling system had to be secured. The inspector observed that the technicians had prestaged many of their tools in the area and began work as soon as the system was removed from service. The strainer was replaced and the stator cooling system returned to service within one hour. The inspector examined the original strainer and noted that the cupric oxide had fouled about one-third of the strainer.

The inspector noted system manager oversight during the strainer maintenance. The system manager explained that this phenomena is an industry issue and the subject of a study performed by the Electric Power Research Institute (EPRI) (Primer on Maintaining the Integrity of Water-Cooled Generator Stator Windings, EPRI TR-105504 Project 2577 Sept 1995) and a General Electric Technical Information Letter TIL1098-3R2 (1/24/95). This is the third occurrence of this type of fouling at Unit 2.

PECO Energy engineers are developing a modification to relocate the strainer outside the influence of the main generator field and install a duplex strainer so that the basket can be replaced without impacting plant operations. Plans are to implement this modification during the next refueling outage in February 1997.

The inspector attended the staff planning meeting on the previous day and noted that it was well attended by the appropriate departments and personnel. The planning manager discussed the load drop schedule, the maintenance tasks to be completed, and the time required for the tasks to be performed. Contingency plans, in the event that reactor power had to be further reduced or the reactor shutdown, were also reviewed and discussed.

Unit 2 Division 4 Battery Replacement

During the week of October 14, I&C technicians replaced the entire Unit 2 Division 4 safeguards battery. This planned activity was in response to the identification of degrading cells during the previous several months. The inspectors observed portions of the

activities associated with the replacement of the 60 cells. The inspectors noted very good attention to detail by the I&C technicians performing the replacement, who were very knowledgeable of the overall activity. Additionally, very good supervisory and engineering oversight was observed. I&C coordinated with operations personnel well and the battery replacement was completed without serious incident.

c. Conclusion on Conduct of Maintenance

The inspector determined that maintenance personnel performed the corrective maintenance activities well. Personnel controlled and executed each task professionally. The evolutions were well planned, with contingencies, and prestaged; which reduced plant impact and delays.

M1.2 General Comments on Surveillance Activities (61726)

a. Inspection Scope

The inspectors observed selected surveillance tests to determine whether approved procedures were in use, details were adequate, test instrumentation was properly calibrated and used, technical specifications were satisfied, testing was performed by knowledgeable personnel, and test results satisfied acceptance criteria or were properly dispositioned.

The inspectors observed portions of the following surveillance activities:

- RCIC Pump, Valve and Flow Test, ST-6-049-230-2, revision 25, observed September 12;
- Daily Surveillance Log/OPCONs 1; 2; 3, ST-6-107-590-2, revision 51, observed September 13;
- D13 Diesel Generator Slow Start Operability Test Run, ST-6-092-313, revision 37, observed September 17;
- HPCI Pump, Valve and Flow Test, ST-6-055-230-1, revision 31, observed September 25;
- HPCI Pump, Valve and Flow Test, ST-6-055-230-2, revision 24, observed September 26;
- D14 Diesel Generator Slow Start Operability Test Run, ST-6-092-314-1, revision 36, observed October 1;
- Diesel Generator RHR Pump Reject Test, ST-6-092-110-0, revision 0, observed October 11.

b. Observations and Findings

Unit 1 High Pressure Coolant Injection (HPCI) test

For this surveillance test, the inspector noted very good oversight of the test by the system manager and operations supervision. When the pump was started, it oversped and tripped twice before operators appropriately stopped the test due to no indicated flow; this was done based on system manager recommendation. Due largely to immediate system

manager involvement, the suspected cause for the event was quickly determined and verified by I&C technicians to be the lack of a speed feedback signal from the speed sensor, due to a loose connection. The I&C technicians appropriately tightened the connection, and the system was successfully retested. Other similar connections were checked for tightness, including the Unit 2 HPCI speed sensor. Due to very good and timely attention by engineering and maintenance personnel, a safety important system was restored to service within a very short period of time from its recognition. At the end of the inspection period, the root cause and corrective actions for the loose speed sensor connection had not been fully determined. The inspectors will assess the final root cause and corrective actions when the associated licensee event report is submitted.

Emergency Diesel Testing

During this inspection period, the inspectors observed numerous tests on the emergency diesel generators (EDG) for both units. Overall, the inspectors observed very good involvement by operations supervision and engineering personnel during performance of the testing. In at least one instance, this resulted in a conservative decision, by the system manager, to shut down the diesel engine early to address a concern with candling (a small open flame) observed on the exhaust piping. The inspectors noted that engineering involvement during EDG testing was improved during this inspection period.

c. Conclusions on Conduct of Surveillance Activities

The inspectors concluded that engineering support of testing activities during this inspection period was excellent, which resulted in resolving issues and rapid restoration of the systems.

M1.3 Non-outage Corrective Maintenance Backlog (6270.

a. Inspection Scope

Throughout this inspection period, plant management focused efforts to reduce the non-outage corrective maintenance backlog. The inspectors attended meetings where the backlog reduction effort was discussed, observed plant conditions to ensure that they did not degrade during this effort, and ensured that maintenance was conducted properly by procedures.

b. Observations and Findings

In June 1996, the non-outage corrective maintenance backlog was approximately 900; it was successfully reduced to approximately 600 at the end of the inspection period. The overall effort involved several organizations at the plant. Activities were evaluated, planned and efficiently performed in order to work off activities from the backlog. During the inspection period the inspectors observed that management focused on the backlog and also ensured that plant personnel continued to identify items for work, so that plant conditions would not deteriorate. Plant management's new goal is to reduce the backlog to 500 by the end of the year.

c. Conclusions

The inspectors concluded that plant management properly ensured that the backlog was reduced without compromising any of the activities or plant conditions in general. Management's focus was not only on the overall backlog number, but also on the efficient conduct of the activities, including proper planning and completing the activity correctly the first time, and therefore avoiding rework.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) Unresolved Item 50-352/353 95-07-01, Energization of Spare Electrical Equipment Space Heaters

The inspector determined that maintenance management adequately satisfied a concern involving the energization of spare electrical equipment space heaters while the equipment was in storage. Previously, the inspector identified that the programmatic controls for use of the space heaters were unclear. Specifically, the UFSAR committed the station to energize enclosed space heaters in electrical components. The engineering staff evaluated the program for storage of electrical components and submitted a reduction of commitment request to the NRC in accordance with 10 CFR 50.54(a). Predictive maintenance had been performed on stored equipment to determine component degradation. The engineering staff concluded that the assessment of predictive maintenance data combined with the controlled environment in the warehouse satisfied the programmatic intent of determining that space heaters were not required. This updated commitment is reflected in the applicable sections of the UFSAR. The inspector concluded, however, that the space heaters were not being used as per the former commitment, and no safety evaluation of the change had been completed. This failure constitutes a violation of minor consequence and is being treated as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy.

M8.2 (Updated) Unresolved Item 50-352/353 95-10-01, Generic Concerns With Storage of Spare Plant Components

The inspector reviewed PECO Energy's corrective actions addressing several generic concerns dealing with the storage of safety-related spare components. Component engineering initiated a performance enhancement program (PEP) review and formed a committee to evaluate station compliance with the applicable sections of the American National Standard Instruction (ANSI) 45.2.2, Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants. Discussion of the PEP and programmatic review with the lead component engineer indicated that the evaluation has been completed and a reduction of commitment request to the NRC has been drafted, in accordance with 10 CFR 50.54(a). Submittal of the request is pending the completion of a similar review at other PECO Energy facilities. This item will remain unresolved pending the inspectors review of the facilities compliance with the new commitment.

III. Engineering

E1 Conduct of Engineering

E1.1 Special EDG Engineering Branch (37551)

a. Inspection Scope

In September, plant management formed a separate EDG branch in the Engineering Division to address EDG performance issues, including the four crankcase overpressurization events during the past year. The inspectors discussed the new branch with plant management, the branch manager, and various branch members. Additionally, the inspectors observed the branch members at the EDGs and reviewed some of the recent issues identified by members. Finally, the inspectors reviewed an ISEG report which provided input to the branch.

b. Observations and Findings

The new EDG branch consists of 4 engineers and 1 manager, and will remain in place until January 1997. The branch was formed to improve the performance, reliability, and material condition of the EDGs. An ISEG report, issued in September 1996, provided input to the branch. The report concluded that Limerick's EDG performance can be improved compared to industry data. Several recommendations were turned over to the EDG branch.

On October 10, the inspectors became aware that EDG branch personnel had identified an instance where some of the EDGs on both units had not fully met a technical specification surveillance requirement. Specifically, Technical Specification Surveillance Requirement 4.8.1.1.2 e.2. requires a 24-month verification of the EDG capability to reject a load greater than or equal to 992 Kw for each EDG, while maintaining voltage and frequency in a specified range. Engineering personnel determined that this requirement had been met for only one of four EDGs for each unit. The other six EDGs' capability to reject a load greater than or equal to 992 Kw had not been verified because at the time of the testing, the systems were set up such that the load for the residual heat removal (RHR) pump motor at the given flow was somewhat less than 992 Kw. Engineering personnel immediately verified analytically that the EDGs met the surveillance requirement, by extrapolating the data for the conditions and verifying that the voltages and frequencies met the requirements.

PORC reviewed this information on October 10, and concluded that the analytical method was acceptable, and that all of the EDGs now met the technical specification surveillance requirements, except for the Unit 2 D24 EDG. The data could not be found for the last performance of the load reject test for this EDG. Therefore, management decided that this load reject test should be reperformed to meet the technical specification surveillance requirement. This special test was successfully performed on October 11.

The inspectors attended the PORC meeting on October 10, independently verified the analytical results for two of the EDGs, and observed the load reject test on October 11. The engineering presentation at the PORC was complete and in-depth; PORC's review of the issues was thorough. The inspector's independent verification of the results of the analytical process found the results to be conservative. The load reject test was appropriate, with very good engineering support.

c. Conclusions

The inspectors concluded that the formation of the new branch was a good initiative to address EDG concerns. The ISEG report was in depth, and provided good input to the EDG branch. The resolution of the technical specification surveillance issue was appropriate, performed in a timely manner, and with very good support by engineering personnel and management. The inspectors concluded that this failure to adequately perform surveillance testing as required had more-than-minor consequences. Corrective actions taken were comprehensive and appropriate for the circumstances. In accordance with Section VII.B.1 of the NRC Enforcement Policy, this violation is non-cited. The condition was identified by PECO Energy personnel and could not reasonably be expected to have been prevented by corrective actions for a previous event.

E1.2 Unit 2 Division 4 Battery Corrective Actions (37551)

a. Inspection Scope

During this inspection period, the inspectors continued to monitor actions being taken to address the degrading Unit 2 Division 4 safeguards battery. As documented in NRC Integrated Inspection Report 50-352/96-06, 50-353/96-06, cells in this battery were failing due to lead deposit buildup causing bridging/shorting of the cell plates. The inspectors observed activities at the battery, and discussed the actions being taken with engineering, maintenance, and management personnel.

b. Observations and Findings

Operators measured the cell voltages each day, and cells were replaced as necessary when voltage became decreased. Some cells were also changed based on visual inspections. Engineering personnel worked closely with operators and I&C personnel to ensure that the battery operability was maximized. The replacement battery was obtained as quickly as possible, and the battery was changed out during the week of October 14-18. Plant engineers concluded that the bridging/shorting did not affect the battery's capability to perform its safety function during accident conditions since the bridging/shorting would break when the battery is loaded. the NRC agreed with this assessment.

c. Conclusions

Overall, the inspectors concluded that engineering provided excellent support to operations to proactively replace degraded cells, and ultimately replace the entire battery.

E1.3 UFSAR Verification Process (37551)

During this inspection period, PECO Energy personnel completed a verification of the accuracy of selected information in the UFSAR, to identify and remedy inconsistencies and significant omissions; thirty sections of the UFSAR were reviewed. The effort was also intended to sensitize the PECO Nuclear technical community to the regulatory requirements involving context and maintenance of the Licensing Bases, and to provide recommendations to the Engineering Council for further actions. The inspectors discussed the results of the verification effort with key personnel, and attended the review panel for the RCIC system.

Most of the discrepancies identified were ambiguous statements, and typographical errors, though some incorrect statements were also identified. All of the discrepancies were evaluated for safety and regulatory significance, and recommendations were established. Although several hundred discrepancies were identified, no significant discrepancies, those involving an Unreviewed Safety Question, were identified. The inspectors concluded that the UFSAR verification process was a good initiative to correct deficiencies and sensitize personnel to the importance of properly maintaining the Licensing Bases.

E1.4 D-12 Flexible Drive Gear Failure Report (37551)

a. Inspection Scope

During the 18-month inspection of the D-12 emergency diesel generator (EDG) in August 1996 (see Inspection Report 96-06), mechanical technicians noted heavy wear on the flexible drive gear teeth and lesser wear on the driven jacket water, oil pump, and air cooler teeth. PECO Energy's corporate laboratory evaluated the gears and issued a report of their findings. The inspector reviewed this report and discussed it with the EDG system manager.

b. Observations and Findings

The drive gear displayed damage that resulted from small variations in tooth surface-to-surface contact. The flexible drive gear showed heavily tapered adhesive and spalling wear across the entire drive contact surface of each tooth. Whereas the driven gears displayed lesser wear and were generally burnished smooth from wear. The burnishing was due to the natural wearing-in process that occurs during the first 200 hours of operation.

PECO engineers concluded that the nuclear application of the EDG, which consists of a very high number of starts with relatively short run times, may have lessened the probability of a successful break-in of the flexible drive gear. The engineers intend to continue to inspect these gears during each 18-month overhaul, trend the gear's wear, and deal with each EDG on a case-by-case basis. To date, all pending gear problems have been repaired and addressed.

c. Conclusion

The engineering metallurgy report comprehensively addressed the extensive wear of the D-12 EDG flexible drive gear. The inspector concluded that the program to continue inspecting these gears during every overhaul is an effective preventive maintenance initiative.

E8 Miscellaneous Engineering Issues

E8.1 (Closed) URI 50-352, 353/96-04-01, SRV Setpoint Drift Concerns (92903)

This item was unresolved pending further NRC review of the concerns with main steam system safety relief valve (SRV) setpoint drift. The NRC concluded that the current concerns with SRV setpoint drift are being adequately addressed by PECO Energy and the BWR Owners Group, and that there is margin in BWR designs which can accommodate setpoint drift such as that which has been experienced at most operating plants. This open item is closed.

E8.2 (Closed) LER 1-96-017, Inoperability of four Emergency Diesel Generators that Resulted from Separate Crankcase Pressurization Events due to a Common Cause (90712)

The events were described in NRC Integrated Inspection Report 50-352/96-04, 50-353/96-04. The LER adequately described the events and the subsequent actions taken.

E8.3 Special Report for the Inoperability of a Loose Part Detection System Channel for More Than 30 Days (90712)

The inspector reviewed the special report for an inoperable loose-part detection system channel for more than 30 days. The report adequately met the technical specification requirements for outlining the cause of the malfunction and the plans for restoring the channel to operable status.

IV. Plant Support

S1 Conduct of Security and Safeguards Activities

S1.1 Verification of Security Activities (71750)

During this inspection period the inspectors verified that a number of security log activities were performed as required and as indicated by signoffs. The inspectors conducted a review of completed logs and verified that the appropriate personnel were in the required areas and for the approximate necessary time period. No discrepancies were identified during this review.

S8.1 (Closed) LER 1-96-014, Revision 01, Improperly Controlled Safeguard Information (90712)

This event was described in NRC Integrated Inspection Report 50-352/96-03, 353/96-03 and Notice of Violation, and resulted in an apparent violation. The LER adequately described the event and the subsequent actions taken.

F1 Control of Fire Protection Activities

F1.1 Missed Fire Protection Surveillances (71750)

a. Inspection Scope

In August, PECO Energy conducted an investigation into a potential instance of an individual failing to properly perform a required fire protection surveillance test. PECO Energy management informed the inspectors of the investigation, and periodically updated the inspectors throughout the inspection period. PECO Energy's investigation was completed in September, and the inspectors were informed of the results. PECO Energy management tasked the Limerick Quality Division with performing an independent surveillance of the other work groups at Limerick for any other indications of personnel failing to perform their duties as required. In October, the inspectors were informed of the results of this activity.

b. Observations and Findings

PECO Energy's investigation concluded that the individual did not properly perform several activities, during a year and a half period, and had signed them as having been properly completed. The individual was disciplined for the actions. Further investigation of the fire protection group revealed a few minor irregularities, which were satisfactorily resolved.

The Limerick Quality Division performed a broad based look at several of the work groups at Limerick. The review compared work process documents and sign-offs against security and health physics dosimetry records to ensure that the individuals were actually in the specified area for a reasonable length of time to adequately perform the task. A total of 150 documents were reviewed, for a one year period (July 1995 to August 1996), which incorporated approximately 140 individuals from a cross section of site work groups. The results were considered satisfactory for Limerick Generating Station personnel.

c. Conclusions

Overall, the inspectors concluded that the PECO Energy follow-up to the concerns was comprehensive. The issues concerning the original identified instance of apparent failure to perform a surveillance as required and the inaccuracy of documentation will remain an unresolved item pending completion of the NRC's investigation into the event. **(URI 50-352 & 353/96-07-02)**

V. Management Meetings

X1 Management Meeting Summary

The senior management of PECO Nuclear met with NRC senior management at the Region I office on September 23. Discussions involved general topics of nuclear safety and Limerick Station operations.

X2 Exit Meeting Summary

The inspectors presented the inspection results to members of Limerick Generating Station management at the conclusion of the inspection on October 21, 1996. The plant manager acknowledged the findings presented.

The inspectors asked whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

X3 Review of UFSAR Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR description. While performing the inspections discussed in this report, the inspector reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspector verified that the UFSAR wording was consistent with the observed plant practices, procedure and/or parameters.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Boyce, Plant Manager
M. Gallagher, Director Engineer
W. Sproat, Director Maintenance
J. Grimes, Engineering Sr. Manager
J. Hutton, Sr. Manager Operations
S. Gamble, Shift Manager
R. Weingard, Manager Electrical Branch
R. McKinley, System Manager
T. Moore, Manager EDG Branch
J. McLaughlin, System Manager
D. Neff, Regulatory Engineer
G. Reid, Performance and Reliability Manager
C. Mengers, Quality Division Manager
R. Bixler, Claims Security Investigator
D. Helker, LGS Project Manager

NRC

F. Rinaldi, Limerick Project Manager
G. Hammer, NRR

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observation
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 90712:	In-office Review of Written Reports
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901:	Followup - Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering
IP 93702:	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

352, 353/96-07-01	VIO	Failure to Properly Process a Temporary Procedure Change (03.1)
352, 353/96-07-02	URI	Missed Fire Protection Surveillances (F1.1)

Closed

1-96-014	LER	Improperly Controlled Safeguard Information (Rev. No. 01) (S8.1)
1-96-017	LER	Inoperability of four Emergency Diesel Generators that Resulted from Separate Crankcase Pressurization Events due to a Common Cause (E8.2)
352, 353/96-03-02	VIO	Failure to properly maintain temporary plant alterations in accordance with procedures (O8.1)
352, 353/95-07-01	URI	Energization of Spare Electrical Equipment Space Heaters (M8.1)
352, 353/96-04-01	URI	SRV Setpoint Drift Concerns (E8.1)
352, 353/96-07-01	VIO	Failure to Properly Process a Temporary Procedure Change (03.1)

Discussed

352, 353/95-10-01	URI	Generic Concerns With Storage of Spare Plant Components (M8.2)

LIST OF ACRONYMS USED

ANSI	American National Standard Instruction
ASME	American Society of Mechanical Engineers
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
CRS	Control Room Supervisor
DP	Differential Pressure
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EPRI	Electric Power Research Institute
ESF	Engineered Safety Feature
FME	Foreign Material Exclusion
FPC	Fuel Pool Cooling
FR	Federal Register
GL	Generic Letter
HPCI	High Pressure Coolant Injection
I&C	Instrumentation and Controls
IFI	Inspection Followup Item
IR	Inspection Report
ISEG	Independent Safety Engineering Group
LER	Licensee Event Report
MCR	Main Control Room
MSIV	Main Steam Isolation Valves
NCV	Non-Cited Violation
NRB	Nuclear Review Board
NRC	Nuclear Regulatory Commission
OM	Operations Manual
PEP	Performance Enhancement Program
PORC	Plant Operations Review Committee
PSA	Probabilistic Safety Assessment
QA	Quality Assurance
QC	Quality Control
QV	Quality Verification
RCA	Radiological Controlled Area
RCIC	Reactor Core Isolation Cooling
RDCS	Rod Drive Control System
RFP	Reactor Feed Pump
RHR	Residual Heat Removal
RWCU	Reactor Water Clean-Up
SQR	Station Qualified Reviewer
SRO	Senior Licensed Reactor Operator
SRV	Safety Relief Valve
STA	Shift Technical Advisor
TC	Temporary Change
TPA	Temporary Plant Alteration
TRIP	Transient Response Implementation Plan
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VIO	Violation