U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No.	90-07 90-06
Docket No.	50-352 50-353
License No.	NPF-39 NPF-85
Licensee:	Philadelphia Electric Company Correspondence Control Desk P.O. Box 195 Wayne, Pa 19087-0195
Facility Name:	Limerick Generating Station, Units 1 and 2
Inspection Period:	January 30 - March 5, 1990
Inspectors:	T. J. Kenny, Senior Resident Inspector L. L. Scholl, Resident Inspector M. G. Evans, Resident Inspector

Approved by: _____ 4/13/90
for Lawrence T. Doerflein, Chief Date
Reactor Projects Section 2B

Summary: Routine daytime and backshift/holiday inspections by the resident inspectors consisting of (a) plant tours, (b) observations of maintenance and surveillance testing, (c) review of LERs and periodic reports, (d) review of operational events and (e) system walkdowns.

During this inspection period:

Unit 1 An apparent violation involving improper installation of solenoid valves in the Reactor Core Isolation System is documented in paragraph 4.1.

Common Five of fourteen candidates failed the NRC administered requalification examination resulting in the requalification program being declared unsatisfactory.

DETAILS

1.0 Persons Contacted

Within this report period, interviews and discussions were conducted with members of PECo management and staff as necessary to support inspection activity.

2.0 Operational Safety Verification

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

2.1 Inspector Comments and Findings

At the start of the inspection period both Units were operating at 100% power.

On January 31, the licensee determined during an engineering study that the emergency operating procedures, for a reactor scram, take the plant outside the design basis as described in the Final Safety Analysis Report (FSAR) for an Electro-Hydraulic Control (EHC) regulator failure. The NRC was informed via the Emergency Notification System (ENS). When the reactor automatically scrams, the Emergency Operating Procedure (EOP) directs the operator to place the mode switch in "shutdown" to backup the automatic scram. Shifting to "shutdown" also bypasses the low pressure main steam line isolation valve closure. The FSAR indicates an Electro-hydraulic Control (EHC) regulator failure in the high direction causes a low reactor pressure followed by high reactor level and credit is taken for the low pressure Main Steam Isolation Valve (MSIV) closure function to limit the transient. However, the licensee determined that the EHC failure would result in reactor vessel level swell, a high reactor vessel level turbine trip and the resultant reactor scram before the MSIV low pressure isolation setpoint was reached. Placing the mode switch in shutdown prevents the MSIV closure and is therefore outside the design basis as described in the FSAR section 15.1.3. The interim corrective action, incorporated by PECo, is the implementation of an operational transient procedure (OT-110) which provides guidance to manually scram and close the MSIVs in the event of an uncontrolled high reactor level. The inspectors reviewed a Justification for

Continued Operations (JCO) prepared by PECo and found it to be satisfactory. PECo has discussed this with General Electric (GE) and, pending the results of GE's evaluation, will submit a special report on this issue to the NRC. Permanent corrective actions will be reviewed as part of the routine resident inspection program when this report is issued.

On February 8, prior to performing a High Pressure Coolant Injection System (HPCI) low pressure steam supply functional surveillance test, an I&C technician verified that the first of two channels of the isolation logic to the HPCI inboard steam supply isolation valve (HV55-1F002) was not in the trip mode per the test procedure. During the test, the I&C technician tripped the second isolation logic channel per the test procedure and the valve went closed even though the logic system requires two of two channels to be in the tripped condition. The cause of the valve closure was due to a faulty Rosemount trip unit in the isolation channel not under test which resulted in the inadvertent completion of the logic. The intermittent failure of the trip unit was due to degradation of the Darlington output transistor. Degraded transistors had been previously identified and PECo along with the manufacturer are continuing to investigate the root cause of the transistor failure. The licensee plans to submit a supplemental LER when the root cause is determined. The trip unit was replaced, the valve reopened, and the test was satisfactorily completed. The NRC was informed via the ENS.

The results of the NRC administered requalification examination performed during the week of January 29 - February 2, 1990 indicated that the requalification program at Limerick was unsatisfactory. Thirteen licensed candidates (eight operators and five staff) in 4 four-person crews were examined. One additional staff operator was used to serve as the fourth person on the staff crews only during the simulator portion of the examination. NRC and PECo results indicated that five of the 14 candidates failed the examination (two operators failed the written portion only and three staff failed the written and/or operating portions) including the additional staff operator used only in the simulator. PECo has removed those individuals that failed from licensed duty. A meeting was held on February 5, 1990 with PECo management and the Deputy Regional Administrator in which PECo described their results and corrective actions to be taken. On February 7, 1990, PECo submitted a Basis for Continued Operation (BCO). The Region I Administrator issued a Confirmatory Action Letter on February 9, 1990 confirming PECo's commitment to remove the operators who failed the requalification examination from licensed duties and to identify problems and root causes as to why the program was unsatisfactory. The letter also required a corrective action program with a schedule of milestones. A subsequent exit meeting was held on March 2, 1990, where additional requalification program inspections conducted

by the NRC were discussed. This matter is being followed up by Region I examiners and will be documented in inspection reports 352/90-01; 353/90-01; and 352/90-10, 353/90-09.

On February 11, the licensee noted a roving firewatch failed to inspect two areas in the Unit 1 reactor enclosure during one of the hourly rounds. Subsequently, the individuals were counselled regarding the performance of their duties, checks of the effected areas were performed and no deficiencies were noted. The inspectors found the licensee's corrective actions appropriate.

On February 23, the licensee determined that during the time period January 12, 1990 to February 7, 1990 the capability to activate the public notification system (sirens) for Berks County was lost. A problem with telephone lines and later the siren control computer prevented Berks County from being able to activate the sirens. A back-up capability exists at the site to activate the sirens at the request of the County. However, personnel trained in this activation were not available on site at all times. Training of technicians has subsequently been accomplished and procedures developed to ensure the backup capability is available at all times.

On March 2, the Unit 1 Reactor Core Isolation Cooling (RCIC) system was declared inoperable due to the failure of two solenoid operated valves which isolated the turbine steam supply steam trap. Repairs were made and the system declared operable on March 3. See section 5.0 for additional details.

At the end of this inspection period both reactors were operating at 100% power.

2.2 Review of Potentially Significant Events

Reactor Protection System Trip Breaker Design

The failure of a reactor protection system (RPS) circuit breaker recently resulted in the loss of shutdown cooling at a Susquehanna Steam Electric Station (SSES) reactor. Based on this event, the inspectors reviewed the design of the Limerick RPS system circuit breakers to determine if the same type of failure was possible. The review determined that the circuit breaker manufacturer and installation configuration at Limerick is different than that of the SSES plants and thus is not likely to experience the same failure mode. The inspector did note that although Limerick is not susceptible to the same failure mode as occurred at SSES the plant management directed a review of the station procedures used to cope with a loss of RPS power event to ensure their adequacy.

Loss of Fill Oil in Rosemount Transmitters

At other sites, the loss of fill oil in rosemount transmitters Models 1151 (commercial grade), 1152 (seismically qualified), 1153 and 1154 (both seismically qualified and environmentally qualified) pressure and differential pressure transmitters has led to failures in their application. Based on discussions with PECo engineers the inspector confirmed the following:

- Operators have been apprised on the mode of failure if the oil leaks from the glass to metal seal (which cannot be detected externally).
- NRC Information Notice 89-42 describing this problem has been discussed with operators during requalification training.
- I&C technicians have also been trained regarding the failure mode.
- In July 1989 Rosemount lifted their part 21 after they discovered ways to prevent leakage of oil.

At Limerick effected transmitters are installed in the following three systems: Unit 1 Condensate Storage Tank (CST) Level and Core Spray Flow, and Unit 2 Drywell Floor Drain Sump Level, all of which are low pressure systems. According to the Information Notice the leaks have been prevalent in high pressure systems. Several other transmitters were identified in the store room. These are being returned to Rosemount. PECo is strongly considering replacement of the three transmitters currently installed at the earliest opportunity. This issue is subject to additional review as part of the routine inspection program and in light of the NRC Bulletin recently issued on this matter.

3.0 Surveillance/Special Test Observations (61726)

During this inspection period, the inspector reviewed in-progress surveillance testing as well as completed surveillance packages. The inspector verified that surveillances were performed in accordance with licensee approved procedures, plant technical specifications, and NRC Regulatory Requirements. The inspector also verified that instruments used were within calibration tolerances and that qualified technicians performed the surveillances.

ST-6-076-250-1	SGTS and RERS Flow Test
ST-6-092-311-1	D11 Diesel Generator Operability Test Run
ST-6-092-313-1	D13 Diesel Generator Operability Test Run
ST-6-001-765-2	Turbine Control Valve Exercise Test

No problems or concerns were noted by the inspectors except as described below:

3.1 Operation of Main Control Room Annunciators

During the performance of ST-6-076-250-1, SGTS and RERS Flow Test, the inspector noted that the SGTS heater trouble annunciator actuated approximately 15 minutes after the system startup. This condition was discussed with the plant operators and the system engineers. The cause of the alarm is that the differential temperature developed by the heater banks is approximately 25 degrees Fahrenheit (F) and the alarm actuates at 19 degrees F. Plant technical specifications require that the temperature rise be greater than or equal to 15 degrees F. The plant staff has determined that the observed temperature rise does not affect the operability of the SBGTS. However, the inspector identified a concern that because this is a common alarm also serving the low differential temperature setpoint and the alarm is sealed in until reset, with the system operating with a constant alarm condition if the heaters were subsequently lost, a low differential temperature would not be annunciated. The inspector questioned why the annunciator modules for these alarms were not operated in the "auto reset" mode. In this mode if the high temperature condition clears due to a loss of heater operation, the alarm would automatically reset and then would be capable of annunciating should the temperature decrease to the low differential temperature setpoint. Upon review of this concern the licensee determined that the annunciator auto reset mode was appropriate and positioned the switches accordingly. The inspector also questioned what program was in place to control the position of all annunciator mode switches and was informed that at the present time there is none. PECo has begun a review to determine what the proper position should be for each of the control room annunciator mode switches and is developing a method to control the switch positions. The implementation of these controls will be reviewed as part of the routine resident inspection program.

4.0 Maintenance Observations (62703)

The inspector reviewed the following safety related maintenance activities to verify that repairs were made in accordance with approved procedures and in compliance with NRC regulations and recognized codes and standards. The inspector also verified that the replacement parts and quality control utilized on the repairs were in compliance with the licensee's QA program.

MRF	8902455	Unit 2 Reactor Core Isolation Cooling (RCIC) Turbine Nut Alignment Check.
MRF	8982509	Limitorque Inspection on RCIC Valve HV-055-225-OP.
MRF	9080008	Limitorque Inspection on RCIC Valve HV-049-2F012.

MRF 9080009 Limitorque Inspection on RCIC Valve HV-049-2F010.
MRF 8982198 RCIC Solenoid Valve Replacement via Procedure PMQ-600-023
MRF 8982199 RCIC Solenoid Valve Replacement via Procedure PMQ-600-023

The inspectors did not identify any concerns during this review.

4.1 Incorrect Solenoid Valve Installation

On February 28, 1990, during the walkdown of the Unit 1 Reactor Core Isolation Cooling (RCIC) system panel in the control room, the inspector identified that the RCIC vacuum tank drain valve (HV-50-1F005) was in the closed position with the associated control switch in the open position. Upon notification, the PECo operator took prompt action to determine the cause and discovered that the solenoid for the valve had failed. The solenoid was still warm indicating it had just failed and therefore was not identified during panel walkdowns during shift turnover. Actions were initiated to replace the solenoid operated valve (SOV). PECo informed the inspectors on March 2, 1990 that two additional SOVs had failed in a manner similar to HV-50-1F005. These valves (HV-49-1F025 and HV-49-1F026) are in the RCIC turbine steam supply drain pot drain line and with their failure PECo declared RCIC inoperable in accordance with Technical Specifications. PECo investigated the problem and determined that all three SOVs had been replaced with ASCO A/C solenoid valves instead of the required ASCO D/C solenoid valves during the scheduled RCIC outage on February 20, 1990. The SOVs were replaced as part of the RCIC system preventive maintenance program in accordance with the preventive maintenance procedure, PMQ-600-023 "Replacement of EQ ASCO Solenoid Valve."

The inspector noted that PMQ-600-023 requires verification that the replacement and the installed solenoid valve name plate data agree to ensure the replacement part is the same or is equivalent to that being removed. Although the ASCO part number for the A/C and D/C solenoid valves are the same (catalog number NP8320A185E) sufficient information is provided on the SOV name plate to distinguish an A/C from a D/C solenoid valve. The failure to follow the preventive maintenance procedure is contrary to Technical Specification 6.8.1. (50-352/90-07-01).

The inspector had additional concerns regarding the control of material used in systems important to safety and material that is environmentally qualified and questioned PECo management about the following:

Procedure PMQ-600-023 has a hold point for Quality Control (QC) verification of valve wire termination points, to facilitate reconnection, following the step for verification of the proper SOV. This QC verification also failed to recognize the wrongly installed

solenoid valve indicating a narrow inspection by the QC inspector. Also, the inspector questioned the system operability during the installation of the improper solenoid valves from an EQ perspective. The SOVs were open during the period and the system was available to perform its intended function, however, the EQ question needs to be answered. These two concerns are unresolved pending PECo review and evaluation. (50-352/90-07-02).

PECo declared the RCIC system operable on March 3, 1990 following replacement of the solenoid for HV-49-1F026 and the installation of an air jumper around the solenoid operated pilot valve for HV-49-1F025 to maintain it open. The solenoids for valves HV-50-1F005 and HV-49-1F025 were subsequently replaced when parts became available. Immediately after determining that A/C SOVs were installed in lieu of D/C SOVs PECo inspected the other safety systems for both units, that may have been compromised in a similar manner, and determined that no other systems were affected. In addition, the maintenance personnel were counseled regarding the incident. PECo is performing a human performance evaluation and further corrective actions will be reviewed as part of the routine resident inspection program during the LER review.

5.0 Review of Periodic and Special Reports (90713)

Upon receipt, the inspector reviewed periodic and special reports. The review included the following: inclusion of information required by the NRC; test results and/or supporting information consistent with design predictions and performance specifications; planned corrective action for resolution of problems; and reportability and validity of report information. The following periodic report was reviewed:

Monthly Operating Report - January 1990

The inspector had no questions regarding this report.

6.0 Licensee Event Report Followup (90712)

The inspector reviewed the following LERs to determine that reportability requirements were fulfilled, that immediate corrective action was taken, and that corrective action to prevent recurrence was accomplished. In accordance with the above inspection modules the inspector considers the following reports closed. The inspector had no further comments or questions except as noted.

LER Number	Subject/Comments
1-90-01	A RCIC system surveillance test was performed late due to

a data entry error associated with the computerized surveillance tracking system. Upon discovery the test was performed and the system operated properly. The computer program has been modified to minimize the possibility of recurrence.

1-90-02 PECo has identified a design condition in the main control room ventilation instrumentation which would prevent a full ventilation isolation with the single failure of a chlorine detection channel. Analysis performed by PECo indicates that the operators would be sufficiently protected even with the present design. The need for any additional corrective actions is under review and will be forwarded via a supplement to this LER.

2-90-01 The reactor enclosure differential pressure isolation instrumentation was unavailable for a time greater than that allowed by the plant technical specifications. The time was exceeded by 14 minutes. However, if a condition requiring an isolation had occurred during this time, a main control room annunciator was available and a manual isolation could have been inserted. The cause of the occurrence was personnel error. The event will be addressed to all operators via the requalification training program and procedure changes have also been implemented to preclude recurrence.

2-90-02 A Unit 2 drywell hydrogen-oxygen analyzer was found to be inoperable due to reversed tubing at the analyzer skid. The problem was discovered during the initial inerting of the Unit 2 drywell. The cause was determined to be improper labeling of tubing connection points by the analyzer vendor. The tubing was subsequently reconfigured to correct the deficiency.

2-90-03 Two Reactor Water Cleanup (RWCU) system isolations occurred due to a system relief valve which had lifted during the pressurization of a filter demineralizer. The cause of the relief valve lift is believed to be more rapid than normal pressurization of the system due to an isolation valve which opened more rapidly than intended. The stroke time was readjusted and the relief valve seat refurnished and the system was returned to normal.

7.0 Plant Procedures Review (42700)

7.1 Inspection Scope and Findings

This inspection was performed to verify the following:

- Overall plant procedures are in accordance with regulatory requirements.
- Temporary procedures and procedure changes were made in accordance with technical specification (TS) requirements.
- The technical adequacy of the reviewed procedures is consistent with desired actions and modes of operation.

During the performance of this inspection the inspector reviewed the references and procedures listed in Attachment 1 to this report. Within the scope of this review the inspector concluded the following:

- PECo utilizes approved procedures to provide instructions and guidance, to station personnel, for operating and maintaining the functional equipment within the systems listed in Regulatory Guide (RG) 1.33, Appendix A and that these procedures utilize vendor manuals, equipment operating and maintenance instructions and approved drawings, as appropriate to aid station personnel in the performance of plant operation and maintenance.
- Where procedures are being performed, in accordance with TS, proper references are used to establish the frame work for compliance with that TS.
- Where required, especially in complex startup and shut-down procedures, guidance is well defined for the stepped sequence in order to prevent operations outside of specified parameters as described in TS.
- Operating valve check lists are comprehensive and provide the operator with a detailed list of the system valves in accordance with approved system drawings.
- Operational procedures are maintained in the control room area and library and are current according to the latest revision of the procedure in order to provide the operators with the latest approved version of the procedure.

The inspector also reviewed the process for implementing changes both temporary and permanent. The inspector concluded that:

- TS changes are incorporated into the necessary procedures in a timely manner utilizing a documented control process.
- Design changes to systems through the 10 CFR 50.59 process are incorporated into the appropriate procedures in a timely manner utilizing a documented control process.

- QA audits are being performed on the procedure change process mentioned above with the discrepancies identified being addressed in a timely manner.
- Temporary procedure changes are controlled, however, the close out process does not designate a responsible party. The final disposition of temporary procedure changes are the responsibility of the originator to finalize them. (Making the change permanent or removing the change because it was a one time event.) This process could cause the temporary procedure changes to be left in the procedure for an indefinite time if the originator becomes incapacitated or resigns from the company.
- There is adequate review by Senior Licenses regarding temporary procedural changes that do and do not change the intent of the procedure. These reviews are performed in accordance with approved NRC guidelines. All temporary procedure changes are reviewed by PORC. Temporary changes that change the intent are reviewed prior to implementation; others that do not change the intent in 14 days.

In accordance with the inspection guidance, the inspector confirmed that there are procedures in place for the exercise of equipment which is normally idle, both installed and in the warehouse. The inspector also confirmed that working files, for all department procedures, are current and in accordance with prescribed distribution lists.

7.2 Conclusions

The inspector identified several areas of concern which were discussed with PECo and are described below:

- Implementation of temporary procedure changes into the procedures as a permanent change is left to the originator, which, in the event the originator is incapacitated or leaves the company could lead to the procedure remaining incomplete. PECo has decided to revise procedure A-3 Procedure for Temporary Change to approved procedures in order to address the inspectors concern. The inspector will review the procedure when implemented. The inspector has no further questions at this time.

- Administrative procedure A-19, "Preparation of Maintenance Procedures," states that the Quality Support Superintendent shall be responsible for review of Maintenance and I&C Procedures of "Q" listed equipment. But, the revision form for changing M/I&C procedures states "QA division approval not needed." PECo has clarified the statement on the revision form

to mean that changes to the form alone need not have QA division approval. However, in order to avoid confusion the next revision to A-19 does not contain the statement since the internal write-up within A-19 clearly directs the individual as to the proper method of QA review. The inspector has reviewed the intended revision and has no further questions.

7.7 The inspector found the implementing procedures for writing control and changing maintenance and operating procedures in accordance with NRC Regulations. However, the inspector also found the Administrative Procedures very cumbersome and difficult to read through and utilize with the first reading. Discussions with PECo management revealed that, in some cases, there were interpretation guides for the user to better understand the Administration Procedures. The inspector questioned the need for this practice and asked why the procedures could not be rewritten to make them more "user friendly." PECo indicated a task force, "Nuclear Group Procedures Committee," has been established, and has met on several occasions in order to evaluate and reconstruct, as necessary, all procedures used by the Nuclear Group both at headquarters and the Nuclear Power Plants. The task force is made up of members from Limerick, Peach Bottom, and Corporate. To date the task force has determined that a tiered procedure method will be incorporated. The first tier will be policies, the second directives, the third admin/implementing, and the fourth instructional/guidelines. The master plan is due for completion in August 1990. The resident inspector will continue to monitor the progress of the task force and the procedure changes as they occur as part of the routine inspection program.

8.0 Records Retention Program (39701)

The inspector began a review of the licensee's Record Retention Program to verify that appropriate records are being retained, controls for records storage have been established, and stored records are readily retrievable.

The inspection was ongoing at the end of this report period. The inspection will continue and the results will be reported in NRC Inspection Reports 50-352/90-13 and 50-353/90-10.

9.0 Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, deviations or violations. One unresolved item was identified and discussed in paragraph 4.1.

10.0 Exit Interview (30703)

The NRC resident inspectors discussed the issues in this report with the licensee throughout the inspection period, and summarized the findings at an exit meeting held with the site Vice President, Mr. G. M. Leitch and the plant manager, Mr. M. J. McCormick, Jr.; on March 2, 1990. No written inspection material was provided to licensee representatives during the inspection period.