U.S.NUCLEAR REGULATORY COMMISSION
REGION I

REPORT/DOCKET NOS. 50-352/92-30
50-353/92-30

LICENSE NOS. NPF-39
NPF-85

LICENSEE: Philadelphia Electric Company
Post Office Box A
Sanatoga, Pennsylvania 19464

FACILITY NAME: [illegible] Generating Station, Units 1 & 2

INSPECTION AT: [illegible] Sanatoga, Pennsylvania

INSPECTION DATES: November 30 - December 4, 1992

INSPECTOR: E H Gray for J.C 12/30/92
J. E. Carrasco, Reactor Engineer, Date
Materials Section, EB, DRS

APPROVED BY: E H Gray 12/30/92
E. Harold Gray, Chief, Materials Section, Date
Engineering Branch, DRS

Areas Inspected: A safety inspection was conducted to assess the adequacy of the licensee's programs for engineering and technical support of the plant operations including management support, interfaces with internal and external organizations, design modifications, experience and professional proficiency of the engineering staff engaged in the design modifications.

Results: In the above areas, the corporate and site engineering personnel were noted to be providing effective engineering and technical support to the plant. Engineering staffing and training were found to be sufficient to meet engineering and technical support needs of the plant staff.

1.0 PURPOSE OF THE INSPECTION

The purpose of this inspection was to assess the adequacy of the licensee's programs for engineering and technical support of the plant operations including management support, interfaces with internal and external organizations, design modifications, experience and professional proficiency of the engineering staff engaged in the design modifications.

2.0 ENGINEERING ORGANIZATION (Inspection Procedure (IP) 40703)

Engineering and technical support for Limerick Generating Station (LGS) are provided by the Nuclear Engineering Division (NED). NED consists of nine sections or engineering disciplines including Site Engineering.

The inspector interviewed a selected number of section managers to determine the organizational changes/staffing enhancements, plant enhancements and engineering program initiatives. The selected sections were Mechanical Systems, Civil/Mechanics Plant, Electrical Systems, Electrical Plant, Engineering Programs and Standards, and Site Engineering. Major Engineering tasks are performed by the Engineering of Choice (EOC) firm, which is the engineering contractor under the supervision of the cognizant licensee's engineering section.

2.1 Findings

Mechanical Systems

NED is undergoing organizational changes. As a part of the organizational changes, the Mechanical Systems Section transferred the Metallurgy, Erosion/Corrosion and Motor Operated Valve programs to the Civil/Mechanical Plant Section. Currently five engineers have obtained their Senior Reactor Operator (SRO) license and over 25% of the engineering staff in the Mechanical Systems Section has advanced engineering degree.

The Mechanical System Section (MSS) leads several engineering tasks including: the relocation of Control Rod Drive (CRD) system seismic boundary to facilitate maintenance and testing of equipment, design and installation of RHR heat exchanger tube corrosion monitoring system and the installation of orifices in Core Spray Pump discharge piping to minimize pump interaction.

MSS is actively working with NUMARC and EPRI to resolve issues on thermolag (fire protection material) qualification, is coordinating efforts to improve station efficiency and is the lead engineering section for relicensing PB and LGS to higher power levels (105%).

Civil/Mechanics Plant Section

The Structural Branch of the Civil/Mechanics Section has provided the Lead Responsible Engineer for the design and installation/construction of the Limerick Low Level Radwaste Storage Yard as an "insurance plan" in the event that Barnswell should close and/or refuse to receive shipments of low level radwaste. This proactive approach would provide an alternative if there is no facility available to accept radwaste generated beyond the current onsite capabilities.

The Structural Branch engineering designed new equipment to handle, inspect and prepare new fuel for placement into the fuel pool prior the refueling outage. The licensee explained that the configuration of the several components and arrangement of the work area were developed from time-motion study. This has greatly reduced the length of time, and manhours, needed to perform these tasks.

The inspector observed a video tape with a demonstration of the new equipment which includes a gantry crane, a jib crane mounted on a platform, a roller conveyor, and two new fuel inspection/channels stands. The licensee indicated that with this equipment in-place, the reactor building overhead crane is now used only to stock the work area with the new shipping containers prior to the start of inspection activities and to transport individual fuel assemblies to the fuel pool for storage before the outage. The design and installation for this particular task was performed by the licensee without the use of an outside contractor, and is an example of the licensee's efforts to reduce the use of contractors for performing engineering work.

Electrical Plant Section

The Electrical Plant Section is responsible for the Integrated Nuclear Cable Management System (INCMS). The INCMS is a computerized Class I cable data base that would provide the licensee with a comprehensive electrical cable management for safety and non-safety related systems. The licensee stated that this major modification, INCMS, among other functions would perform calculations for review of raceway fill and overfill of cable trays.

This section has the pertinent approvals to proceed with modifications 6112-0, 6112-2 and 6112-1 for LGS. The section has the lead responsible engineer and the project manager and it has allocated the engineering resources and the budget to implement the modifications. The scope of the work for these modification includes: removal of existing inverters, the installation of new inverters with integral transfer switches in the same location as the old units, routing of existing conduits to the new inverters and to perform the pertinent connections of existing cables to the new inverters.

Electric Systems Section

This section is mainly responsible for providing system support in the area of electrical balance of plant (BOP), maintain, and prepare as required, all engineering calculations and design documentation for the electric instrumentation and controls (I&C) aspect of the turbine and heat cycle and chemical and radiological systems at LGS.

This section is reviewing the LGS installed I&C and the NRC's generic concerns regarding challenges to the systems due to I&C failures or during calibrations. The Electrical Systems Section has the responsibility for the I&C review and upgrade. The project has the proper management attention. The steering committee has planned to meet quarterly, to form the working groups and to select contractors for the task.

2.2 Conclusion

Based on the assessment of the Mechanical Systems, Civil/Mechanics, Electrical Plant and Electrical Systems Engineering Sections, the inspector determined that the licensee's nuclear engineering division is providing effective engineering services to the plant. In addition, the licensee is taking the proper steps to improve and enhance performance in several areas of engineering related activities.

3.0 ENGINEERING MODIFICATION PROCESS AND IMPLEMENTATION (IP 37700)

Presently, engineering changes to the plant and/or procedures affecting any structure, system or component are controlled through Nuclear Engineering Division (NED)'s procedures and LGS Procedures.

Proposed design changes or modifications to the plant are evaluated in accordance with NED procedures 3.1 entitled, "Procedure for Handling Modifications," 3.3 entitled "Procedure for Changes to the UFSARs, Completion of the Fire Protection Review Checklist, and review and Approval of 10 CFR 50.59 Reviews," and 3.4 "Procedure for Design Control." These procedures are common for LGS and Peach Bottom. In addition, Limerick Generating Station has developed a customized procedure No. A-14 for control of plant modifications. This procedure is based on NED procedures described above.

The inspector found these procedures acceptable and would adequately support the modification process at LGS. To assess their implementation, the inspector selected modification 6183-1/2 for the Setpoint Change for Reactor Enclosure Blowout Panels and modification 6221-1 for Corrosion Monitoring of RHR Heat Exchanger.

3.1 Setpoint Change For Reactor Enclosure Blowout Panels

Background

On January 7, 1991, LGS experienced an actuation of Reactor Enclosure (RE) blowout panels. The cause of the actuation has been attributed to a trip coil failure which resulted in the failure of the RE supply fan to trip. Licensee Event Report (LER-1-91-001) was issued to report a loss of RE secondary containment integrity due to an RE overpressurization transient that caused a blowout panel to actuate. The LER also reported the failure of reestablishing secondary containment integrity within the four hours required by the Technical Specifications. To correct this situation and to prevent recurrence, the licensee has initiated Unit 1 modification 6183-1 and Unit 2 modification 6183-2 to increase the secondary containment blowout panel actuation setpoints.

Modification Nos. 6183-1 and 6183-2, "Setpoint Change for Reactor Enclosure Blowout Panels"

The inspector selected modifications 6183 Units 1 and 2 as a sample of modification implemented by an outside contractor, to determine whether the modification was accomplished with proper licensee supervision and communication. These modification packages outlined the change of the actuation setpoints for four blowout panels in each of the two Reactor Enclosures that are part of the secondary containment boundary. The blowout panels are used to mitigate the effects of a high-energy line break. These blowout panels have actuation setpoints of 0.25 psid. The set points are to be raised to 0.5 psid which is above the maximum fan discharge pressure to prevent any premature actuation and to improve the overall secondary containment integrity. The increase of blowout panel setpoints was accomplished by replacing existing fasteners with identical fasteners of higher release value.

Findings

The inspector reviewed the Design Input Document (DID) of modification package 6183-1/2 which provides the necessary input for engineering to support Reactor Enclosure (RE) blowout panels actuation setpoint change. This DID indicated that a Licensee Event Report (LER-1-91-001) was issued which reported a loss of RE secondary containment integrity due to an RE overpressurization transient that caused a blowout panel to actuate. The DID also indicate that the LER reported the failure of not establishing secondary containment integrity within the four hours required by the Technical Specifications. The DID added that Engineering concluded that this event resulted in the plant being in an unanalyzed condition.

A review of LER 1-91-001 indicated that the licen commenced an orderly shutdown as required by Technical Specification 3.6.5.1.1 and the NRC was notified as required by 10 CFR 50.72.

The 50.59 determination for modifications 6183-1 and 6183-2 was also reviewed. It was found that the modification was thoroughly analyzed in accordance to screening criteria of the 10 CFR 50.59 and concluded that an unreviewed safety question was not involved. To support the 50.59 safety evaluation's conclusion, the licensee performed pressure-temperature transient analysis for the high energy piping located in the compartment of the RE, the results of these analysis showed that the compartment peak pressures and temperatures did not exceed those given in UFSAR Section 3.6 and Chapter 15. The inspector verified that the licensee has initiated a Licensing Document Change Notice (LDCN) No. L-0348 to change UFSAR figures and pages to reflect the changed blowout panel actuation setpoint from 0.25 psid to 0.5 psid. The licensee indicated that these changes will be incorporated in the UFSAR upon completion of the unit 2 modification.

The inspector, the licensee's responsible engineer and the system manager walked-down the completed modification at Unit 1 labeled as steam venting tunnel to atmosphere, located at wall D, elevation 241, columns 17.6 to 19.4 and 26.6 to 28.4. No abnormal conditions were observed.

Conclusion

Based on the review of the reactor enclosure blowout panel setpoint modification's DID, LER, 10 CFR 50.59, LDCN, walkdown of the modification and discussions with the responsible engineer in the corporate office, the inspector concluded that the licensee engineering was knowledgeable of technical aspects of the modification and has provided the proper contractor overview and the responsible engineer was knowledgeable of the technical implication of the event (LER) and the modification (50.59). The coordination between operations and corporate engineering for the modification was adequate.

3.2 Modification No. 6221-1, "Corrosion Monitoring System For RHR Heat Exchanger"

Background

The licensee's analysis of the results of eddy current testing performed after disassembly and hydrolyzing of the Unit 1 "A" and "B" RHR Heat Exchanger (HXs) (1AE205 & 1BE205) during the previous refueling outage showed indications of pitting of the tube inside diameter. To address this situation, the licensee has initiated Non Conformance Reports (NCRs) 92-188 and 92-207. The disposition of these NCRs required the restoration of RHR Heat Exchanger 1BE205 to operable status. Part of the disposition of the NCRs was the installation of corrosion monitoring systems for both RHR heat exchangers.

Findings

The inspector walked-down the modification along with the corporate responsible engineer and the field responsible system manager. Prior to the walkdown the corporate engineer explained that this corrosion monitoring system expose specimens of 304 L tubing material to similar water chemistry and temperatures that are experienced by the RHR HX. Specimens have pre-machined defects (pits) of different depths. In addition, actual tubes extracted from the RHR HX "A" are also used as specimens. The licensee indicated that the periodic examination of specimens would provide a means to predict the actual corrosion rate and assure a minimum wall thickness of 3 mils for the tubes. This capability is expected to enable the licensee to obtain wall thickness without physically opening these HXs.

During the walkdown, the inspector observed that the design of the monitoring system for each RHR HX was different. The licensee indicated that the monitors were designed different because the conditions experienced by each RHR HX are different. The corrosion monitoring system for RHR HX "A" was designed to monitor it in a wet layup condition; whereas, the system for RHR HX "B" is designed for HX monitoring during normal modes.

The inspector observed the piping and its pertinent connections to be structurally sound. This piping provides RHR service water at plant conditions to the test specimens. The specimens for the monitoring system of the RHR HX "B" are heated to simulate the hottest region of the RHR heat exchanger metal temperature by a high temperature pressurized water loop. The set of electric heaters that generate this temperatures were observed to be properly mounted on its platform.

Conclusion

As a result of the walkdown, the inspector concluded that this RHR test loop modification appears to be technically adequate and the licensee has demonstrated problem solving capability and engineering originality. Based on the discussion with the licensee, the inspector concluded that the licensee's responsible engineer has the proper formal training and experience on this type of design. This enabled the engineering to provide good supervision for the contractor implementing the modification.

4.0 MANAGEMENT MEETINGS

Licensee management was informed of the scope and purpose of the inspection at the beginning of the inspection. The findings of the inspection were discussed with the licensee management at the December 4, 1992 exit meeting. See Attachment 1 for attendance.

ATTACHMENT 1

Persons Contacted

Philadelphia Electric Company

	G. V. Cranston	General Manager
*	R. R. Hess	Manager of Mechanical Systems
*	G. D. Edwards	Manager of Electrical Systems
	W. J. Boyer	Manager of Electrical Plant
*	H. W. Vollmer	Manager of Civil Mechanical Plant
*	W. J. Coyle	Manager of Engineering Programs
*	F. A. Cook	Manager of Site Engineering
	Jay Doering	LGS Plant Manager
	T. G. Szonntag	Branch Head Limerick Mechanical
*	J. J. Gyrath	Branch Head Engineering Assurance
	R. P. Alejnikov	Sr. Engineer Modification Coordinator
	D. B. Neff	LGS Licensing Engineer

U.S. Nuclear Regulatory Commission

	T. Easlick	Resident Inspector

* Denotes those present at the exit meeting