U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Philadelphia Electric Company

LIMERICK GENERATING STATION

January 14, 1985

TABLE OF CONTENTS

I. INTRODUCTION

1.1 Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect the available observations and data on a periodic basis and to evaluate licensee performance based upon this information. SALP is supplemental to normal regulatory processes used to ensure compliance to NRC rules and regulations. SALP is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee's management to promote quality and safety of plant construction and operation.

An NRC SALP Board, composed of the staff members listed below, met on January 14, 1985 to review the collection of performance observations and data and to assess the licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's performance at the Limerick Generating Station for the period December 1, 1983 through November 30, 1984.

1.2 SALP Board:

R. W. Starostecki, Director, Division of Reactor Projects (DRP)
T. T. Martin, Director, Division of Radiation Safety and Safeguards (DRSS)
S. D. Ebneter, Acting Director, Division of Reactor Safety (DRS)
S. J. Collins, Chief, Projects Branch No. 2, DRP
R. M. Gallo, Chief, Reactor Projects Section 2A, DRP
A. Schwencer, Chief, Licensing Branch 3 (LB3), NRR
R. E. Martin, Project Manager, LB3, NRR
J. T. Wiggins, Senior Resident Inspector, Limerick Generating Station, Units 1 and 2

Other NRC Attendees:

R. W. Borchardt, Reactor Engineer, Reactor Projects Section 2A, DRP
J. H. Joyner, Chief, Nuclear Materials Safety and Safeguard Branch, (DRSS)
W. J. Pasciak, Chief, BWR Radiation Protection Section, DRSS
T. Harpster, Chief, Emergency Preparedness Section, DRSS

1.3 Background

Philadelphia Electric Company was issued Construction permits (CPPR-106, CPPR-107) for Limerick Generating Station (Docket Nos. 50-352, 50-353) on June 19, 1974, to build two BWRs of 3293 MWt each. General Electric is the NSSS supplier for both units and Bechtel Construction Inc. is the architect engineer and constructor. The construction completion, as estimated by the licensee is about 100% for Unit 1 and about 30% for Unit 2, as of November 30, 1984. Operating License (NPF-27) was issued on October 26, 1984, authorizing fuel loading and startup operations at power levels less than 5%.

(1) Licensee Activities

For Unit 1, construction completion and preoperational testing activities continued throughout the assessment period. Fuel loading and startup test activities commenced in concert with the issuance of the Operating License. By the end of the period, construction was essentially completed, all preoperational tests had been performed with the last 20 test result packages being reviewed and fuel loading had been completed.

A substantial amount of work was also involved in developing and implementing operating programs in the areas of surveillance testing, maintenance, radiation protection, radwaste control, security, fire protection, quality assurance and emergency preparedness. Further, the closeout of NRC inspection issues involved substantial effort, particularly as the scheduled license issuance date approached.

For Unit 2, the licensee suspended construction activities on January 24, 1984 in response to a Pennsylvania Public Utilities Commission order imposed in December 1983. Only those activities necessary to support Unit 1 operations and to maintain and protect Unit 2 equipment were continued.

(2) Inspection Activities

Two resident inspectors were assigned throughout the assessment period to monitor construction, preoperational and startup activities. Also, effective June 1984, a region-based reactor engineer was temporarily assigned to assist the resident inspectors. A significant amount of effort during the period was devoted to the resolution of open NRC inspection items prior to license issuance.

Several team inspections were performed by region-based inspectors to determine the quality of construction and the licensee's readiness for plant operations. These included the As-Built Inspection on June 11-22, 1984, the Nondestructrive Examination (NDE) Van Inspection on June 25 - July 20, 1984, the Radiological Controls Team Inspection on August 20 - September 14, 1984, the Fire Protection Safe Shutdown Team Inspection on August 27-31, 1984, the Techrical Specifications Implementation Team Inspection on September 13-21, 1984, and the Post Accident Sampling Inspection on October 22-26, 1984. An NRC Emergency Plan Implementation Appraisal was conducted on June 11-22, 1984 and an Emergency Exercise Evaluation was conducted on July 24-27, 1984.

The results of the inspections described above formed the basis for the Functional Area Analyses contained in Section 4 of this report. Furtner, tabulations of inspection activities and resulting enforcement actions are contained in Tables 3, 4 and 5.

II. CRITERIA

The following criteria were used as applicable in evaluation of each functional area:

1. Management involvement in assuring quality.

2. Approach to resolution of technical issues from a safety standpoint.

3. Responsiveness to NRC initiatives.

4. Enforcement history.

5. Reporting and analysis of Licensee Event Reports, 50.55(e) reports and Part 21 items.

6. Staffing (including management).

7. Training effectiveness and qualification.

To provide consistent evaluation of licensee performance, attributes associated with each criterion and describing the characteristics applicable to Category 1, 2 and 3 performance were applied as described in NRC Manual Chapter 0516, Part II and Table 1.

The SALP Board conclusions were categorized as follows:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety or construction is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and are concerned with nuclear safety; licensee resources are adequate and are reasonably effective such that satisfactory performance with respect to operational safety or construction is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appeared strained or not effectively used such that minimally satisfactory performance with respect to operational safety or construction is being achieved.

The SALP Board has also categorized the performance trend over the course of the SALP assessment period. The categorization describes the general or prevailing tendency (the performance gradient) during the SALP period. The performance trends are defined as follows:

Improving: Licensee performance has generally been improving over the course of the SALP assessment period.

Consistent: Licensee performance has remained essentially constant over the course of the SALP assessment period.

Declining: Licensee performance has generally been declining over the course of the SALP assessment period.

III. SUMMARY OF RESULTS

A. Overall Facility Evaluation

During this assessment period, the quality of construction activities remained high. Management involvement was evident, particularly on the part of the Vice President of Engineering and Research who was onsite daily during the latter part of the period. However, weaknesses were found in activities associated with design controls during construction, with instrumentation and control system installation and with the preservice inspection program. The design control weaknesses were similar to those identified in the previous two assessments.

The level of performance of preoperational testing activities improved over that shown in the previous assessment. Some weaknesses were identified in the administrative control of the system turnover process, in preoperational test control and in the level of involvement of the station staff. However, licensee management took adequate corrective actions to address these weaknesses after they were identified by NRC. Particularly noteworthy was the contribution to the overall quality of the program made by the licensee's Test Review Board. This Board reviewed all preoperational test procedures and test results and reviewed the resolutions of all test exceptions. The quality of the Board's activities was amply demonstrated during NRC's programmatic reviews. The level of performance attained by the end of the preoperational phase appears to have carried over into the startup phase.

Regarding preparations for plant operations and development of operational support programs, weaknesses were identified in the level of preplanning for these activities and in management accountability for program effectiveness. Initially, site and corporate management involvement in areas such as radiological controls, emergency preparedness and security was insufficient to assure that these programs were being adequately developed. As a result, initial NRC inspections of these areas found them to be deficient in scope, detail and technical content. NRC inspection findings then provided the bases for licensee corrective action to address program deficiencies. However, about mid-way through the assessment period, the licensee assembled a project completion team composed of senior PECo corporate, and the Bechtel project managers which assumed control of all activities necessary to support the licensing of Unit 1. This team was effective in coordinating the activities of all organizations involved in the project such that acceptable operational programs were eventually attained. However, at the time of licensing, the team was disbanded and another organization or individual to provide integrated oversight of facility activities has not been specifically identified.

Regarding actual plant operations, licensee performance has been good except for a trend in operator and technician errors which appeared to be developing after issuance of the Operating License. Additionally, problems were identified regarding the level of operator awareness regarding the reasons for alarming conditions annunciated in the control room and regarding the number of individuals present in the control room during plant evolutions and shift turnover.

The weakest area of licensee performance noted during the assessment period was Security. The contract guard force was selected late in the project and the physical security systems were not made functionally operable until shortly before fuel load. Licensee control of the guard force was initially inadequate. As a result, guard force personnel did not receive sufficient experience and training in the program and the equipment to allow a thorough understanding of the requirements of their jobs. Additionally, the initial set of guard force supervisors did not exercise the appropriate control over the guard force to make it effective. The licensee implemented various corrective actions to address the weaknesses in this area and its performance improved through the latter part of the assessment period.

B. Facility Performance

Functional Area		Category Last Period (December 1, 1982 to November 30, 1983)	Category This Period (December 1, 1983 to November 30, 1984)	Trend
1.	Construction Activities	1 (Except 2 in Instrumentation and Control and in Engineering/Design Control)	1	Consistent
2.	Preoperational and Startup Testing	2	2	Improving
3.	Operational Readiness and Plant Operations	2	2	Improving
4.	Radiological Controls	Not Assessed	2	Improving
5.	Fire Protection/ Housekeeping	Not Assessed	1	Improving
6.	Emergency Preparedness	Not Assessed	2	Improving
7.	Security and Safeguards	Not Assessed	3	Improving
8.	Licensing	1	1	Consistent

IV. FUNCTIONAL AREA ASSESSMENTS

4.1 Construction Activities

During this assessment period, eleven inspections were conducted by regional specialists in addition to continuing inspections by the resident inspectors. These inspections included routine reviews of areas such as piping, electrical, instrumentation and control, welding, preservice inspection and engineering/design for Unit 1, and storage maintenance for Unit 2. Special team inspections were conducted of the as-built configuration of the plant and of installation practices applied to the Power Generation Control Complex (PGCC). The NRC Nondestructive Examination (NDE) Van was used to evaluate the quality of welding and a special team inspection was conducted at Bechtel Construction's San Francisco office to examine FSAR pipebreak analyses and the use of the RELAP computer code. Further, a substantial amount of inspection effort was expended closing out open inspection items prior to issuance of the Operating License.

The previous SALP assessment evaluated construction areas by disciplines, rating applicable activities as Category 1 except for Instrumentation and Control and Engineering/Design Control which were rated as Category 2. However, the overall conclusions regarding these construction-related disciplines were that the activities were well performed and managed, and that they exhibited good quality.

The licensee maintained good performance throughout this assessment period. Significant amounts of NRC inspection effort bore out the conclusion that the quality of construction was maintained at a high level. The as-built team inspection performed a thorough review of the emergency service water system and the high pressure coolant injection system. The as-built team examined piping layout and installation, pipe supports and welding, electrical power and instrumentation associated with the two systems. The team compared the system configurations to the FSAR descriptions and performed independent measurements of piping and support details. Minor discrepancies were identified associated with 4 pipe supports and several instrument conduits; these discrepancies were suitably addressed by licensee management prior to licensing.

The NDE Van, along with an additional extensive structural welding inspection, independently verified the quality of ASME and AWS welding at Limerick. Included in these two inspections were independent checks of approximately 500 welds of various types and configurations. Further, these and additional inspections of welding and welder qualifications determined that both the licensee and its constructor maintained good control over welding activities.

The involvement of senior PECo corporate and site management continued to be evident. In fact, the involvement of corporate management increased during the latter part of the period with the full time presence of the Vice President of Engineering and Research at the site to lead a project completion team composed of himself, the Superintendent of Nuclear Generation and the Bechtel Project Manager. This team, along with the PECo Project Construction and Field Quality Assurance organizations, greatly enhanced the performance of the licensee, especially regarding completion of licensee punchlist items and preoperational test activities.

Throughout the period, the quality of Quality Assurance (QA) audits and surveillances remained high. The training level of the QA engineers and their knowledge of in-plant systems and specific project engineering and inspection requirements continued to be excellent. Further, the QA organization functioned extremely well as the principal point of contact and coordination for closure of NRC open inspection items.

Licensee performance in the area of preservice inspection was weaker than that in other construction areas. The ASME Section XI preservice inspection (PSI) program implemented by the licensee was found to contain several procedural inadequacies regarding PSI performance, equipment calibration and results review by the licensee and its contractor. Additionally, weld centerlines were not being marked as required by the ASME Code and as a result, evaluations of future ultrasonic examination data could be adversely affected because of the inability to precisely determine the location of the weld and the heat affected zones. The licensee has committed to mark the weld centerlines at the first refueling outage. However, the above inadequacies may adversely impact the usefulness of the PSI data as a baseline for future evaluations. Further, NRC review of PSI data identified several weld defects which were rejectable under the provisions of Section III of the ASME Code but which were initially left unrepaired by the licensee. Rather, the licensee sought exemptions from Section XI of the Code for these defects. After NRC questioned the acceptability of the disposition of these defects, the licensee performed a more careful review. All but one were subsequently found to be non-relevant. These PSI problems indicated that the licensee had not exercised an adequate level of management oversight of its NDE contractor. The PSI/Inservice Inspection (ISI) activities will be evaluated in future SALP assessments in connection with the surveillance testing program.

Regarding storage maintenance in Unit 2, several inspections identified minor problems with the preservation and control of equipment which indicate less than adequate licensee attention to this area.

Additionally, problems in two areas were identified during this period which were similar to issues described in previous assessments. These problems involved instrumentation and control installation activities and design control. An inspection of the PGCC installation identified problems with electrical separation, temporary modification control and cleanliness within the various cabinets. Other inspections identified that the licensee's design change control measures still required improvement. These inspections identified that incomplete post-modification drawing updates had been made for modifications to the reactor enclosure cooling water system, the reactor water cleanup system and the high pressure coolant injection control circuitry and also found that a minor installation error had been made during construction of the main steam isolation valve leakage control system that had resulted from an incorrect isometric drawing. The inspections found that the controls applied to the Human Factors modifications performed in the main control room did not provide for the updating of affected procedures to account for the changes in component identifications implemented by these modifications on the control room panels. Lastly, one instance was identified in which a design change was implemented for the recirculation pipe restraint system using a Startup Work Order instead of one of the established administrative controls. This latter problem was similar to ones identified in the previous two assessments for which licensee corrective actions had not been completely effective.

Conclusion:

Rating: Category 1

Trend: Consistent

Recommendations:

Licensee

Increase attention to design change control, to the analysis of PSI/ISI data control and oversight of the ISI contractor, and to Unit 2 storage maintenance programs.

NRC

Continue periodic inspections of design control and Unit 2 storage maintenance and closely evaluate the licensee's actions regarding the analysis of PSI data.

4.2 Preoperational and Startup Testing

During this assessment period, fourteen inspections of preoperational testing activities and six inspections of startup testing activities were performed by region-based inspectors. The resident inspectors examined these areas on a daily basis. In the previous assessment, startup activities were not evaluated. Preoperational testing was rated as Category 2, with weaknesses found in the preparation of test procedures, in control of system maintenance and in the Quality Assurance program.

Preoperational Test Program

The preoperational test program was completed during this assessment period, with the exception of closing test exceptions. Based on an extensive review of tests and test results by the NRC, it appeared that the test program had been adequately managed to assure satisfactory performance of those plant systems covered by it. Much of the success of the test program was due to the quality, scope and depth of the reviews made by the licensee's Test Review Board which reviewed and approved test procedures and test results, including the closure of all test exceptions.

However, some weaknesses in test control were identified. The number of test change notices (TCNs) and test exceptions (TEs) in many preoperational tests complicated the test results review process and appears to indicate that testing was performed before all needed system components were ready. For example, it appeared from review of test results that the core spray system test had been performed too early in that some relays initially failed to work properly as a result of the licensee not completing post-maintenance checks of these relays prior to starting the preoperational test. Also, the reactor protection system test was started before the associated inputs from the neutron monitoring system were available. Further, a number of tests had to be revised by TCNs to account for instruments which had not been calibrated prior to the start of the test. Also, some TCNs and TEs resulted from test procedures which appeared technically correct when compared to the referenced design drawings but which used test methods that could not be easily performed in the field. For example, the test procedure would require manipulation of a relay or a lead on a relay, but it was found to be difficult to gain access to the relay or the relay was being used as part of another preoperational test. Some test procedures were found incomplete. For example, the Nuclear Steam Supply Shutoff System test did not include timing tests for all containment isolation valves, and, the procedures for testing the diesel generators did not address all the testing requirements described in Regulatory Guide 1.108. Additionally, some personnel errors were made which resulted in running a diesel generator without cooling water flow, in an incomplete test of the control room isolation system and in events in which the reactor vessel was partially drained during testing of HPCI and RCIC.

In June, 1984, NRC discussed, with senior licensee management, the extent of direct involvement in test activities by licensee personnel. NRC believed that problems such as those discussed above would be minimized by an increase in the station operating staff's involvement. Following this discussion, corrective actions were implemented which included steps to minimize test changes and to assign a specifically-identified PECo engineer to each preoperational test which was not yet completed. During subsequent NRC inspections, these corrective actions appeared effective.

Regarding administrative controls effective during the preoperational test phase, weaknesses involving turnover activities were identified. It appeared that the administrative procedures for system turnover from construction to Startup needed clarification to more completely define the responsibilities of the Startup Engineers, as indicated by differences in the perceptions of these responsibilities among individual Startup Engineers, their supervision, the Startup Director and other Senior station and corporate managers. Additionally, the turnover process that applied to building structures, rooms, etc., was not clearly defined in administrative procedures, and as a result some problems were encountered in coordination of facility repairs with system testing activities. For example, testing of the D13 diesel generator was interrupted as a result of rain water leaking through the roof of its enclosure and into the generator end of the machine. The leak had been identified earlier by Startup personnel but the appropriate priority had not been given to the repair of the leak by either the PECo or Bechtel construction organizations.

Throughout this period, QA/QC activities associated with preoperational testing increased and the quality of these activities improved. The Startup QC organization was expanded and the responsibilities of Startup QC, Operations QA, Engineering QA and Bechtel QA and QC were more clearly defined. Additionally, the quality and control of work performed by Bechtel crafts on systems under the Startup organization's control markedly improved.

Startup Test Program

The startup test program at Limerick used information obtained from other licensees with recent startup program experience. The licensee utilized the program from Susquehanna Steam Electric Station as a base upon which to develop its own startup program.

The licensee assigned General Electric (GE) as the lead organization to coordinate and implement the startup program with assistance from Bechtel. PECo personnel were responsible for the operation of the facility during the program in accordance with the facility license. Staffing levels of the licensee and its contractors have been adequate.

Schedules developed correctly displayed the logic necessary to conduct all the startup tests. Procedures reviewed by NRC appeared to be comprehensive and technically adequate. With the exception of startup procedures for the Turbine Trip Test and Loss of Offsite Power Test, all startup test procedures have been issued in accordance with the administrative program.

The interface between the General Electric Startup personnel and Operations personnel was observed to be working well with good coordination. GE startup engineers have been assigned to operating shifts so that continuity between startup and operation personnel can be maintained.

QA/QC coverage of the startup program to date has been acceptable. QC was observed to provide surveillance coverage of the fuel load operation and control rod drive startup tests. Extensive QC coverage and QA audits for the remainder of the program are planned.

The initial fuel load was conducted successfully during the period October 26 to November 13, 1984 with generally good overall control. Although the necessary procedures were in place before October 26, 1984, the licensee did not allocate a sufficient preparation and review period to issue all the fuel load procedures to support the fuel load schedules which were initially given to the NRC. Evidence of prior planning was, however, demonstrated by the extensive dry runs and training provided for fuel load operations.

Conclusion:

Rating: Category 2. (Startup Test Program is a notable strength and, if rated separately, would be Category 1).

Trend: Improving

Recommendations:

Licensee

Maintain the extent and level of direct licensee involvement in Startup testing activities to prevent recurrence of the test control problems similar to those encountered during preoperational testing.

NRC

Continue routine Startup Program inspections.

4.3 Operational Readiness and Plant Operations

During this assessment period, region-based inspectors conducted ten inspections in the operational readiness area. These included reviews of the licensee's readiness for fuel receipt, storage, transfer and inspection; the operations Quality Assurance (QA) program; non-licensed staff training; maintenance and design control programs; and system acceptance by the station staff. Additionally, a special team inspection was conducted to compare the facility's proposed technical specifications to as-built system conditions and to the implemented surveillance test procedures. The resident inspectors and the Peach Bottom senior resident inspector observed initial shift operations. Both region-based and resident inspectors observed shift operations, surveillance testing and maintenance subsequent to issuance of the Low Power Operating License. Further, the Operator Licensing Section conducted three examinations and evaluated the training program for the Shift Advisors.

This area was rated as Category 2 at the last SALP, with weaknesses identified in the station staff's ability to coordinate schedules for their activities with project milestones.

Operational Readiness

Fuel Receipt and Storage

There were three inspections conducted in this area. Two inspections dealt with the initial fuel receipt and storage. The third inspection focused on the licensee's readiness to move new fuel from the outside storage area to the storage racks in the spent fuel pool. At the time of the first inspection, the licensee had not provided adequate priority to assure readiness to perform fuel receipt and storage. As a result, the completion of the licensee's preparations to support this activity were not well coordinated.

At the close of the second inspection, the quality control, fire protection, security and radiation protection organizations had established and implemented adequate procedures to support fuel receipt and storage. Also, appropriate training had been provided to those individuals who would be involved in these activities. Subsequently, it was determined that the licensee was ready to accept fuel. Actual fuel receipt activities were performed well.

Management continued to exhibit improved control in assuring quality and was found to be capable of safely supporting the intended transfer and handling of new fuel on the refueling floor. Various observations by NRC during fuel inspection and channeling verified these activities were adequately controlled and performed in a quality manner.

Staff Training

Non-licensed operator (NLO) training was initially observed to have progressed little toward the development of a formal program. Specifically, during initial NRC review, the program did not include detailed implementing procedures, qualification manuals, detailed lesson plans, examinations, and requalification criteria. The Nuclear Training Section (NTS) had operated for some time utilizing draft administrative procedures pending approval by the PORC. The training records management system appeared to be developing on a low priority basis due to a lack of adequate training staff. Also, a system had not yet been developed for identifying individuals needing retraining or requalification. However, the NLO training program rapidly improved and was adequately completed prior to fuel load.

During 1984 two sets of initial Operator and Senior Operator License examinations and one set of re-examinations have been administered at Limerick.

The following is a summary of weaknesses identified at each exit meeting following the examinations:

1. Additional training was needed in procedure familiarity and use of control room logic prints.

2. Increased training emphasis was needed regarding the knowledge level of methods to cause manual scrams from outside the Control Room.

3. Additional training was needed in the area of fire fighting, portable radiation monitoring equipment and refueling equipment.

4. An overall weakness was identified within the training department regarding not having current (up-to-date) simulator text materials and certain other training material. This problem adversely affected candidates and examiners during all three sets of exams.

Overall knowledge and performance level of candidates taking the Operator and Senior Operator exams significantly improved during the second and third sets of examinations. Plant familiarity and operator knowledge of equipment/component location was good, during all examinations.

A re-qualification program is scheduled to begin in January 1985 for those operators already licensed. Emphasis is being placed on the use of the plant specific simulator to perform additional transient events. This is a valuable step in the right direction and should increase the quality of performance for licensed operators.

Quality Assurance for Operation

The quality assurance (QA) organization was found to be acceptable. However, one weakness identified in the implementation of the Operations Quality Assurance program was the lack of a comprehensive trending analysis effort which considered all existing corrective action systems. The licensee committed to make improvements in this area. Overall, the procedures were well stated and sufficiently explicit to support station safety-related activities.

The implementation of the program has received limited inspection by NRC, mostly in connection with the interfaces between the QA and other organizations. Although the program has not matured, one indicator of a potential problem was identified associated with the qualification of the QA auditors who examined the radiation protection program. This issue is further discussed in the Radiological Controls Section of this SALP.

Maintenance Program and Design Change

The maintenance program was found to be acceptably prescribed by administrative procedures which include provisions for both corrective and preventive maintenance. Initial implementation of the program appeared effective. Further, to support maintenance and operations, the licensee undertook a major spare parts evaluation process by reviewing all original purchase orders, selecting parts, and then performing independent engineering evaluations for safety classification prior to procurement of the spares.

The administrative controls for the design change process in effect during plant operations were well documented. Some exceptions were identified involving controls for minor modifications implemented by the site. These exceptions were subsequently addressed and corrected.

System Turnover to Plant Staff

The transfer of systems from the startup test group to the plant staff was generally conducted in accordance with established procedures. The transfer packages were complete and prepared in accordance with the requirements of the applicable administrative procedures. The plant staff conducted an indepth interdepartmental review of the transfer package and identified exceptions prior to the transfer. The identified exceptions were tracked on the plant systems completion list for prompt closure. QA reviewed this transfer program and noted that the program had been adequately implemented with few exceptions. Appropriate actions were taken to address the identified exceptions.

Technical Specifications

A comparison of the final draft of Technical Specifications (TS) to system as-built conditions and to surveillance test procedures verified that the licensee maintained an adequate program to develop and approve these TSs. Several problems were noted during this review, but the problems referred to minor differences between surveillance procedures and TS surveillance requirements. Most of these differences resulted from late system modifications, changes in system performance parameters indicated by preoperational test results and from the dynamic nature of TSs at the time of the NRC region-based review -- not from inadequacies in the licensee's programs. All identified problems were subsequently corrected by the licensee.

Plant Operations

Approximately one month prior to receipt of the operating license, the station implemented the normal control room shift rotation. Since that time, the normal station operating and administrative procedures were enforced for the control of plant activities. Thus, all system testing, maintenance and modifications were being controlled by these approved procedures. In general, these activities have been performed adequately.

Operator performance has been good, however, some weaknesses have been identified. Initial inspections indicated that shift turnover controls needed improvement to minimize noise levels and to limit the number of non-essential personnel in the control room. Physical measures were installed to limit access but these measures were not being used. Corrective actions were implemented by the Operations Engineer, but added improvements would result if shift supervision would take a more aggressive approach in this area.

The control room operators displayed a professional attitude toward plant operations. Activities such as fuel loading have been performed well. However, shortly after license issuance, NRC noted that more operator vigilance and awareness toward control room annunciators was necessary. Operator knowledge regarding the causes for various alarming conditions was weak and, in one instance, the operators did not recognize that an alarm in existence indicated that one train of the control room emergency ventilation system was out of service. Improvements in this area were significant after licensee management implemented corrective actions, but similar improvements for operators outside the main control room (e.g., radwaste operators) were also found to be necessary.

The licensee has experienced a number of events which have been reportable to the NRC. Aside from the three Licensee Event Reports issued during the assessment period, about 20 notifications per 10 CFR 50.72 were made. Many of these events resulted from either operator or technician errors which caused automatic actuations of the plant's Engineered Safety Feature systems. Some events resulted from problems with the system design (e.g., lack of head chambers on instrumentation racks, broken tape for control room chlorine detectors); others resulted from a combination of personnel error and design. The licensee has been examining the rate of events and personnel errors with the intent to minimize their future occurrence.

Conclusion:

Rating: Category 2

Trend: Improving

Recommendations:

Licensee

Pursue the root causes for events and personnel errors and prescribe corrective actions to reduce their occurrence. Further, continue efforts to update training materials available to license candidates and examiners.

NRC

Continue monitoring routine activities. Further, perform an Operations Assessment Team inspection prior to fuil power licensing and schedule a meeting with the licensee regarding the corrective action evaluation for personnel errors. Continue operator licensing activities with particular emphasis on assuring the needed improvements have been made in the training materials used by the licensee.

4.4 Radiological Controls

There were eleven inspections during the assessment period by region-based inspectors including a radiological controls team inspection with the assistance from a health physicist licensing reviewer, and a post-implementation team inspection of the licensee's post accident sampling and monitoring systems. A management meeting was conducted prior to the start of the inspection program to review the preoperational inspection program and to outline the major aspects of an adequate radiation protection and effluent control program. Certain of these inspections examined various program areas including radiation protection, radioactive waste management, effluent monitoring and control, and preoperational testing of the radwaste effluent process monitoring and ventilation systems.

This is the first assessment of this functional area.

Radiation Protection

The initial inspections of this program area found that the licensee had not established the minimum necessary radiation protection program elements to support fuel receipt, fuel loading, initial criticality and routine operations. As a result, NRC inspections were delayed until program elements to support these milestones were completed. The delay in establishing the necessary program elements can be attributed to the licensee's failure to establish an effective staff radiation protection organization in a timely manner as discussed below.

A review of the corporate radiation protection organization and corporate radiation protection site support found that no clear description of the organization, position responsibilities and authorities, and site support activities were in place. The licensee has initiated action to establish a directive which will address these matters. In addition, disagreements between station and corporate radiation protection management came about when establishing Limerick's contamination control limits, administrative exposure control mechanisms and respiratory protection training program. In general, the station approach was more conservative than the established corporate philosophy. Acceptable resolution was achieved to make the program procedures generic for the licensee's two operating sites, but a significant delay in program implementation was incurred.

The initial review of the site radiation protection organization found that position responsibilities and authorities were not established for all appropriate positions. Further, some personnel selected for positions were not qualified to fill those positions. As a result of corrective actions, the licensee subsequently established and staffed the radiation protection organization in an adequate manner.

Initial examination of the site radiation protection personnel training program found the program to be inadequate to support the plant milestones. For example, no evaluation had been performed to identify the extent of radiation protection procedure initial training needed by each appropriate radiation protection organization member and no uniform evaluation/acceptance criteria had been established to evaluate an individual's knowledge of procedure requirements. Also, no training program had been established for radiation protection supervisory personnel. The licensee subsequently established a staff radiation protection personnel training program which included training procedures and defined training acceptance criteria. These actions were implemented in a timely manner after their need was identified by NRC. The licensee individually qualified each appropriate supervisor and is currently reviewing the need to establish a radiation protection supervisory personnel training program. The licensee has not established a radiation protection personnel retraining and requalification program, however, the general employee radiation protection training program was found to have been well defined with dedicated resources applied.

The licensee's procedure development was initially found to be less than acceptable. The initial review of the licensee's radiation protection procedures to support fuel receipt found the procedures to be technically inadequate. For example, no criteria had been included in the procedures for performing radiological analyses to ensure that results of the analyses met minimum detectable activity requirements. The licensee revised the subject procedures to improve their technical adequacy and also hired a contractor to assist in procedure development. Subsequent NRC reviews indicated that the quality of procedures had improved and the procedures were adequate to support plant operations.

Regarding the licensee audits of the radiation protection program, the licensee hired a contractor to perform these audits and to identify areas needing improvement. Examination of contractor audits indicated they were generally complete and thorough and the licensee implemented contractor recommendations. However, audits of the radiological controls program performed by the licensee's operational QA staff were superficial and ineffective apparently resulting from the lack of qualifications of the individuals performing the audits. After NRC identification, the licensee subsequently committed to utilize qualified personnel to perform future audits.

The licensee's radiation protection facilities and equipment were found adequate to support fuel load and routine operations. With regard to the licensee's post-accident sampling and monitoring capabilities, all systems were installed and adequately preoperational tested. Most test exceptions and minor sample handling problems had

been resolved prior to the NRC post-implementation inspection. Procedures still needed to be revised to ensure adequate sampling and analysis capability. Coordinated efforts between chemistry, corporate engineering and the system vendor have been undertaken to resolve this issue.

A comprehensive review of the completed portion of the licensee's As Low As Reasonably Achievable (ALARA) Program was performed during this assessment period. It was noted that management had made a strong commitment to ALARA. This was determined by interviews with senior PECo management, the station ALARA physicist, and review of system design. Concerning system design and installation, adequate ALARA walkdowns were performed by the licensee. Review of this area found very good separation and shielding of potentially contaminated systems that require high maintenance. The licensee anticipates the ALARA program to be fully established by the first refueling.

In summary, significant NRC effort was needed to ensure the licensee had established adequate program controls to support plant milestones. This effort was primarily as a result of the licensee's failure to establish the radiation protection program elements in a timely manner. When program deficiencies were identified the licensee generally initiated corrective actions in a timely manner.

Radioactive Waste Management and Effluent Monitoring

Eight onsite inspections by Regional Radiation Specialists reviewed the following aspects of the licensee's Radioactive Waste Management and Effluent Monitoring Program:

chemistry organization and staffing
chemistry training and qualifications
chemistry facilities and equipment
chemistry procedures
radiochemical analyses of process and effluent samples
process and effluent monitor preoperational testing and calibration
administrative controls of effluent releases
preoperational testing of radioactive waste treatment systems
performance on NRC spiked samples

The inspections conducted during this period did not identify any major deficiencies in the licensee's program.

The licensee's chemistry laboratory and counting rooms were adequately equipped and all major instrumentation was operational and calibrated. The licensee had adequate chemistry and counting equipment to meet Technical Specification inplant and effluent analyses requirements. The installation and calibration of the laboratory equipment was performed in an expeditious manner which indicated evidence of prior planning and assignment of priorities by the licensee.

The licensee's procedures, in most areas, appeared to be adequate. The exceptions noted by the inspectors as open items were promptly addressed by the licensee.

The staffing of the licensee's chemistry department was adequate to support operation of Unit 1, both at the management and technician level. A review of the chemistry technician personnel selection, qualification, and training program indicated that a defined program was being implemented by the licensee's staff. The licensee was also using contractor technicians in order to meet the requirements of ANSI N18.1 until the licensee's technicians could meet the ANSI N18.1 experience requirements.

The results of the licensee's analyses of all NRC spiked samples submitted were in agreement with the NRC values.

The review of preoperational testing of the radioactive waste process and effluent treatment systems indicated that the licensee was testing these systems consistently with the regulatory requirements and FSAR commitments. The licensee's performance in the area was attributable to the selection and assignment of technically qualified personnel to this area.

Initial review of the licensee's procedures in the effluent monitoring area found these procedures to be inadequate. However, after NRC identification of the problems, adequate procedures were developed and implemented for the control of radioactive effluent releases including sampling and analysis procedures. Personnel have been trained in the use of computer systems which will monitor and evaluate effluent releases. The licensee has also committed to write and implement a procedure for operation of the computer system.

Problems were encountered with the licensee's testing of chlorine and toxic gas monitors for the control structure air intake and with laboratory testing of charcoal for safety related ventilation systems. Regarding chlorine and toxic gas monitors, the licensee was unable to demonstrate that the systems were properly calibrated and that the alarms were properly set to meet technical specification requirements. Also, the licensee was found not to have followed the administrative procedures for the conduct of surveillance testing for the chlorine detectors. The licensee initiated action to correct these problems after NRC identification. The licensee reperformed the chlorine detector surveillance tests and made procedure changes to prevent recurrence. The licensee initiated an evaluation of the alarm setpoints for the toxic gas monitors.

Review of the control room emergency ventilation system found that a number of bolts and nuts were missing from access doors to plenums of the system. The licensee was unable to provide information as to how this occurred. The licensee subsequently replaced and retightened the bolts and performed a review of other ventilation systems.

In summary, the licensee was found to have a generally acceptable radioactive waste management and effluent monitoring program after corrective action was taken to address NRC concerns. The licensee was generally responsive to NRC initiatives and suggestions. The responses have indicated an apparent understanding of the issues by the licensee and the licensee's approaches were viable and sound.

Environmental Monitoring

One onsite inspection by a Regional Radiation Specialist reviewed the following aspects of the licensee's Environmental Monitoring Program:

management controls
quality control of analytical measurements
meteorological monitoring
implementation of the environmental monitoring program

The inspection conducted during this period did not identify any major deficiencies in the licensee's program. The licensee was implementing an adequate environmental monitoring program. administered by the PECo corporate office in conjunction with the environmental monitoring program of the licensee's other nuclear power facility.

Conclusion:

Rating: Category 2

Trend: Improving

Board Recommendation:

Licensee

Improve the corporate-site interface in radiation protection. Prior to Full Power license issuance, complete actions to establish corporate organizational description, to specify responsibilities of the corporate organization and to define its role in site support.

NRC

Maintain normal inspection effort in the area of Radiological Controls.

4.5 Fire Protection/Housekeeping

One team inspection of fire protection and safe shutdown capabilities, and several inspections of the fire protection provisions for new fuel receipt and transfer were conducted by regional inspectors. The resident inspectors routinely assessed plant housekeeping. This functional area was not assessed during the last assessment period.

The inspections performed to assess the licensee's readiness for fuel receipt found that the fire protection program procedural controls were late in development. However, sufficient procedures were subsequently implemented to first allow fuel receipt, then transfer to the refueling floor for inspection and storage. The lack of available fire protection procedures delayed the NRC's routine preoperational program reviews which were eventually conducted during the Safe-Shutdown team inspection.

The Safe-Shutdown team inspection, involving representatives of NRC Region I and NRR, observed and evaluated the installation of fire detection and suppression equipment and the surveillance procedures for the equipment, and reviewed the fire protection program, procedures and training. The team also assessed the quality of those Special Event procedures to be used to bring the plant to hot and cold shutdown conditions during various fire scenarios. The results of the inspection identified no significant hardware concerns. Involvement of the licensee's engineering organizations was judged to be good and the design appeared adequate.

The licensee had installed the fire protection hardware, such as water curtains, fire wraps, and emergency lights and developed administrative procedures, fire fighting strategy procedures and surveillance testing procedures to assure compliance with Appendix R to 10 CFR 50, Technical Specifications and FSAR commitments. However, in the area of fire brigade training, the licensee needed to increase emphasis on the requirements of Appendix R with regard to hands-on training, quarterly drills and meetings of fire brigade members. The licensee's safe shutdown procedures and operator training were generally found adequate, but needed improvement. During a simulated walkdown of a safe shutdown procedure, the operator occasionally had difficulty in locating the safe shutdown equipment identified in the procedure. This indicated deficiencies in the procedure regarding the location of equipment needed for safe shutdown. Procedure revisions were subsequently implemented to address these problems.

Throughout the period, plant housekeeping improved in response to NRC comments and licensee management attention. The loose materials, standing water and excessive dirt normally associated with a construction activity had been mostly removed prior to licensing. However, floor coatings, particularly in the reactor enclosure, still were in need of improvement. Corrective actions for this particular problem have been hampered by the licensee's desire not to adversely impact the iodine adsorptive capabilities of charcoal filters.

Conclusion:

Rating: Category 1

Trend: Improving

Recommendations:

Licensee

Maintain Senior corporate and site management attention toward good housekeeping habits in the plant and seek methods for further improvements in this area. Further, develop a plan to renew the floor coatings throughout the plant.

NRC

Continue routine monitoring of the fire protection program and of plant housekeeping by resident and region-based inspectors.

4.6 Emergency Preparedness

During the assessment period, NRC emergency preparedness activities at Limerick included an emergency preparedness appraisal, two follow-up inspections of items identified during the appraisal (in preparation for fuel load and initial criticality) and observation of the emergency exercise. This area was not assessed during the previous period.

Forty-three findings and six improvement items were identified during the appraisal, indicating that licensee management had not been aggressive in initially implementing the emergency preparedness program. Examples of the findings included:

- the emergency preparedness training program was incomplete. A training coordinator had not been assigned and criteria for qualifying emergency response personnel were not in place. Many personnel had not received training consistent with their responsibilities during emergencies.

- those aspects of emergency response facilities that had been completed were generally satisfactory, but facilities were still in various stages of development. Equipment and supplies were not always in place, nor operationally tested or calibrated.

- deficiencies were identified in the emergency plan implementing procedures including unclear assignment of specific responsibilities. Other emergency procedures were incomplete or lacking.

- a qualified emergency preparedness coordinator had not been assigned.

Between the time of the appraisal in June 1984 and the followup inspections which occurred at the end of the assessment period, licensee management became noticeably more involved and devoted considerable resources to resolving the deficiencies which were identified by the NRC and which affected fuel load and initial criticality. NRC inspections noted effective corporate management participation in the resolution of NRC identified problem areas such as the training program deficiencies. The timely resolution of the items needed to support fuel load and initial criticality has demonstrated management attention and an acceptable assignment of priorities.

Throughout the followup inspections, the licensee's understanding of issues involved in the problem areas was apparent and its approach to solutions was technically sound. Two examples were the licensee's approach to the development of procedures for taking post-accident samples and for managing post-accident liquid wastes. The responsiveness of the licensee was demonstrated by the incorporation of a

new facility, i.e., the onsite medical facility, and by the allocation of greater than average resources (corporate personnel assigned full time to the Limerick site and contractor personnel assigned to assist in the development of procedures) to emergency preparedness areas as needed to resolve the various outstanding items from the appraisal.

The licensee's performance during the emergency exercise was satisfactory. Within the limitations of an exercise scenario, the licensee demonstrated that it was able to implement the Emergency Plan and the Emergency Plan Implementing Procedures in a manner which would adequately provide protective measures for the health and safety of the public.

Conclusion:

Rating: Category 2

Trend: Improving

Recommendations:

Licensee

Continue to apply management attention and involvement to satisfactorily resolve the remaining appraisal items and to assure the program is properly staffed to sustain the high level of performance achieved at the end of the assessment period.

NRC

Continue routine followup of the licensee's activities.

4.7 Security and Safeguards

During the assessment period, there were three preoperational security program reviews designed to monitor the implementation of the physical security program. During the previous assessment period, this area had received preliminary inspection.

During the assessment period, the licensee experienced difficulty with the security force contractor providing training records, certifications and supporting documentation which were accurate and complete, and which adequately reflected the required abilities of individuals that would perform duties as guards, watchpersons and armed response personnel. Preliminary reviews by NRC inspectors revealed that the contractor was not providing effective supervision at all levels of the newly formed security force. The licensee's onsite security management team was inadequately staffed, inexperienced and did not exercise the necessary in-depth administrative and operational oversight of the contractor. In addition, PECo corporate security management was aware of the relative inexperience of its onsite security staff and failed to provide vigorous management oversight of the newly formed organization.

Toward the end of the assessment period, the licensee's onsite staff gained knowledge and experience in monitoring the security organization, provided additional oversight and influenced the contractor to reorganize its supervisory staff and seek more highly qualified supervisors to serve at all levels.

Timely quality assurance audits were conducted of the construction and installation of security systems, facilities and equipment. These audits appeared to be a factor in a relatively problem-free system completion. In addition, when the training and qualification problems were thought to be resolved, the QA group conducted a complete review to ensure that no further discrepancies existed.

Because of the difficulties the licensee experienced in providing accurate training and qualification records, NRC inspectors conducted comprehensive record reviews, required the licensee to revalidate firearms training and proficiency using a new firearms instructor and interviewed a broad cross-section of watchpersons, guards, armed responders and supervisory personnel to verify that training was being administered in accordance with the Training and Qualification Plan and that an adequate level of comprehension was being attained. The difficulties encountered with the training and qualification of the security force overshadowed an otherwise well-planned schedule of construction and installation of a sophisticated security system. During the development of the program, the licensee satisfactorily resolved previous NRC security-related concerns that had been forwarded to operating reactor licensees via Bulletins, Notices and Circulars and incorporated those resolutions in the security program. This effort was carried out in an exemplary manner.

At the end of the assessment period, there was evidence of some stabilization with respect to routine activities. Considering that the licensee had not provided an extensive period for personnel and equipment shakedown prior to receipt of the low power operating license on October 26, 1984, and in light of the late hiring of personnel, some initial problems were expected by Region I.

The licensee experienced a variety of problems associated with implementation of the site security program. The licensee's onsite security management team was inadequately staffed, inexperienced and did not exercise the necessary in-depth administrative and operational oversight of the security force contractor. The contractor, in turn, did not provide training records, certifications and supporting documentation that were accurate and complete and which accurately demonstrated the required abilities of individuals who would perform duties as guards, watch persons and armed responders. Further, NRC inspections revealed that the contractor was not providing effective supervision at all levels of the newly formed security force. PECo corporate security management failed in its responsibility to provide vigorous management oversight of the establishment of the Limerick security organization.

Eight Security Event Reports, prepared pursuant to the requirements of 10 CFR 73.71, were submitted. An onsite review of these events revealed that, with one exception, the licensee correctly implemented NRC requirements for reporting security-related events. Compensatory security measures for these events generally were timely and sound. However, a more detailed description of future events is necessary to more fully assess the cause and corrective action.

Conclusion:

Rating: Category 3

Trend: Improving

Recommendation:

Licensee

Increase oversight and control of the contractor security force to assure improvements in the quality of the guard force supervisors continue to be achieved. Further, improve the scope and depth of security event reports.

NRC

Provide additional monitoring of improvements initiated in the security program and its implementation during the Startup phase and follow the licensee's corrective actions until expected improvements are confirmed.

4.8 Licensing

The basis for this appraisal was the licensee's performance in support of licensing actions that were either completed or had a significant level of activity during the current rating period. These actions included ASLB hearings on safety issues, the publication of an evaluation report on the licensee's probabilistic risk assessment, the resolution of numerous issues as reported in Supplements 2 and 3 to the SER, issuance of the operating license, completion of the ACRS reviews necessary for full power authorization and operation of the plant for 1 month in the startup testing phase of operations. In addition, ASLB hearings on several major environmental issues were held and the FES was issued.

This area was rated as Category 1 during the previous assessment.

The licensee's management participated actively in virtually all licensing activities. This included the attendance of the Senior Vice President for Nuclear Power at several meetings on the probabilistic risk assessment review and at all four ACRS meetings. The Chairman of the Board and at least three Vice Presidents attended the NRR Management Readiness meeting in September 1984. The Vice Presidents for Nuclear Power, Electric Production and Engineering and Research were directly involved in many of the decisions supporting resolution of technical issues during the rating period. The Senior VP for Nuclear Power and the VP for Engineering and Research have also been heavily involved in activities at the plant site during the rating period.

The licensee's management encourages employee involvement in industry-wide technical developments as evidenced by the participation of PECo employees in 25 industry committees (ASME, EEI, AIF, ANS, IEEE, EPRI/NSAC, etc.) and 15 BWR Owners Group subcommittees. This involvement was frequently reflected in the technical knowledge demonstrated by PECo personnel.

The licensee's management consistently exercised firm control over the licensing activities performed by its contractors and maintained effective communications between its contractors, its own staff, the NRR staff and the NRR staff's contractors.

The success of the licensee's effort to assure quality is evident in that the many submittals made during this period have been virtually always submitted in a timely manner, have been complete and thorough (requiring very few revisions for correction of errors) and is reflective of a power plant design that is well controlled and verified by licensee personnel prior to submittal to NRC.

The licensee's management and staff have consistently demonstrated a thorough understanding of technical issues. Participation in a variety of industry working groups contributes to this understanding as does the extensive experience of much of the licensee's staff in operating the Peach Bottom Atomic Power Station for more than a decade. The licensee's strengths in this area were particularly evident in the resolution of power systems, electrical and instrumentation systems, and containment systems issues during the rating period.

On occasions, when the licensee deviated from staff guidance, the licensee has consistently provided good technical justification for such deviations. Examples included several fire protection program issues, seismic/dynamic equipment qualification, lifting of leads for surveillance testing and separation criteria for electrical cable trays, panel meters and terminal blocks. The licensee's response to these and other similar issues was virtually always set forth in a technically sound and thorough manner.

A noteworthy aspect of the licensee's performance in this area has been the lack of hesitation to develop and submit additional information and to support meetings whenever required to resolve issues. The licensee has also cooperated with the staff in response to several inquiries related to generic issues (e.g. USI-A45 Decay Heat Removal).

Regarding the adequacy of staffing levels, corporate staff personnel in Philadelphia are reassigned on an as-needed basis to meet the requirements of revised organization priorities and missions. Nevertheless vacant key positions have been promptly filled. The workload backlog has been reasonable for such an active period and is indicative of ample staffing. Attendance at meetings has been ample to address the issues.

The licensee has staffed a majority of the Limerick Station operating shifts with experienced personnel from the Peach Bottom Station. Therefore shift advisors will be required on only 1 shift to meet the industry/Commission staffing guidelines. The licensee has 21 RO's and 25 SRO's; 12 of each are required to support the planned six operating shifts. Therefore the station is well staffed with operating personnel.

Conclusion:

Rating: Category 1

Trend: Consistent

Recommendations:

Licensee

None.

NRC

None.

V. SUPPORTING DATA AND SUMMARIES

5.1 Investigations and Allegations Review

NRC Region I received and evaluated 20 allegations during the assessment period. The allegations involved various areas including application of coatings onto safety-related components and structures, welding and welder qualifications, quality control practices, engineering and design, startup activities, craft workmanship and security. Inspections were conducted to assess the significance of each allegation. Although some allegations were substantiated, none adversely impacted plant safety.

5.2 Escalated Enforcement Actions

1. Civil Penalties

None

2. Orders

None

3. Confirmatory Action Letters

One Confirmatory Action Letter (CAL 84-24) was issued on November 9, 1984 concerning background investigations of security personnel.

4. Enforcement Conferences

An Enforcement Conference was held at NRC Region I on April 12, 1984 to discuss the licensee's controls applied to system turnovers from the Construction organization to the Startup organization.

5.3 Management Conferences Held During the Assessment Period

1. Management Meeting conducted December 6, 1983 onsite to discuss preoperational inspections of the licensee's radiation protection and radwaste systems programs.

2. SALP Management Meeting at the Limerick Generating Station on February 24, 1984.

3. Management Meeting on August 9, 1984, to discuss results of the preservice inspection program and associated ASME Section XI exemption requests.

4. Licensee's presentation to the Director, Office of Nuclear Reactor Regulation on September 19, 1984 regarding readiness of Unit 1 for licensing.

5. Licensee's presentation to the NRC Region I Administrator on September 24, 1984 regarding the readiness of Unit 1 for licensing.

5.4 Construction Deficiency Reports (CDRs)

Twenty-two CDRs were submitted by the licensee during this assessment period. The CDRs are described in Table 1.

Review of the CDRs identified no causal linkages. Although 16 of the 22 CDRs resulted from design or fabrication errors, they did not appear linked because they related to singular errors made by a number of individual vendors.

5.5 Licensee Event Reports (LERs)

Three LERs were submitted during this assessment period. The LERs are characterized by cause in Table 2. The three appear to be causally-linked in that each resulted from personnel errors.

5.6 Part 21 Reports

The licensee submitted no Part 21 Reports this assessment period.

TABLE 1

CONSTRUCTION DEFICIENCY REPORTS

(12/1/83 - 11/30/84)

LIMERICK GENERATING STATION

CDR No.	Deficiency	Cause Code
83-00-12	Brown Boveri Electric Inc. ITE 480 volt circuit breaker failure	E
83-00-13	COMSIP containment gas monitoring system	B
83-00-14	Check valves in safeguard piping installed backwards	F
84-00-01	Potentially defective limitorque operators on motor-operated valves	B
84-00-02	Misapplication of Westinghouse Kf underfrequency relays in Colt Industries diesel generators	B
84-00-03	Defective Agastat CR0095 relay sockets	B
84-00-04	Possibility that Q-listed commodities are attached to non-Q listed installations	B
84-00-05	Scram discharge volume switches damaged	E
84-00-06	Capstan springs in snubbers	B
84-00-07	Damaged shafts on ITT actuators	B
84-00-08	Defective GE HMA auxiliary relays	B
84-00-09	Restricted swing angle for Pacific Scientific snubber	B
84-00-10	Water contamination of diesel fuel oil storage tanks	A
84-00-11	Insulation damage on Rockbestos cable	B
84-00-12	Damage spray pond sluice gate stems	B
84-00-13	Loose bolts holding charging motor to 4160 volt breaker	F
84-00-14	Discrepancies in design of W. J. Wooley Co. missile doors	B

Table 1

CDR No.	Deficiency	Cause Code
84-00-15	Ma+erial lacking ASME chemical overcheck	B
84-00-16	Deficiency in GE Relay Connection plugs	B
84-00-17	Malfunctioning Buffalo Forge fans	F
84-00-18	Swelling of seals in valve actuators	B
84-00-19	ASCO solenoid valves	B

Cause Codes:

A - Personnel error
B - Design/fabrication error
C - External cause
D - Defective procedures
E - Component failure
F - Site construction error

TABLE 2

TABULAR LISTING OF LERs BY FUNCTIONAL AREA

LIMERICK GENERATING STATION

	Area	Number/Cause Code	Total
1.	Construction Completion	0	0
2.	Preoperational and Startup Testing	0	0
3.	Operational Readiness and Plant Operations	3/A	3
4.	Radiological Controls	0	0
5.	Fire Protection/Housekeeping	0	0
6.	Emergency Preparedness	0	0
7.	Security and Safeguards	0	0
8.	Licensing Activities	0	0
		TOTAL	3

Cause Codes:

A - Personnel Error
B - Design, Manufacturing, Construction, or Installation Error
C - External Cause
D - Defective Procedure
E - Component Failure
X - Other

TABLE 3

VIOLATION SUMMARY (12/1/83 - 11/30/84)

LIMERICK GENERATING STATION

A. NUMBER AND SEVERITY LEVEL OF VIOLATIONS

	Unit 1	Unit 2
Severity Level I	0	0
Severity Level II	0	0
Severity Level III	0	0
Severity Level IV	15	1
Severity Level V	10	0
Deviations	1	0

B. VIOLATION VS FUNCTIONAL AREA

	Severity Level		
	IV	V	DEV.
Functional Area			
1 Construction Completion	10	2	1
2 Preoperational and Startup Testing	5	1	
3 Operational Readiness and Plant Operations		6	
4 Radiological Controls		1	
5 Fire Protection/Housekeeping			
6 Emergency Preparedness			
7 Security and Safeguards	1		
8 Licensing Activities			
Totals	16	10	1

C. SUMMARY

Unit 1

Inspection Report No.	Inspection Date	Severity Level	Functional Area	Violation
84-06	1/30-2/3/84	V	1	Failure to identify, correct and document conditions adverse to quality.
84-12	3/12-23/84	IV	2	Failure to establish checklists and acceptance criteria for preturnover walkdowns and inspections.
84-16	3/28/3/30 4/5, 4/6, 4/9-13/84	IV	2	Failure to adequately control preoperational test.
84-20	4/24, 4/26 - 27/84	V	4	Failure to properly test and calibrate radiation instruments.
84-24	5/1-31/84	IV	1	Failure to correctly translate drawings.
84-25	5/16-25/84	V	2	Failure to tag system components at turnover as required.
84-26	6/1-30/84	IV	2	Failure to adequately implement a preoperational test program for diesel generators, containment isolation NSSSS, and control room isolation.

Unit 1

Inspection Report No.	Inspection Date	Severity Level	Functional Area	Violation
84-26	6/1-30/84	IV	2	Failure to properly calibrate the Primary Containment Vacuum Relief Valve position indicators.
84-27	6/11-22/84	IV	1	Failure of Pipe Supports to meet design drawings.
84-27	6/11-22/84	V	1	Failure to seal instruments against environmental conditions.
84-29	6/25-7/20/84	IV	1	Failure to meet calibration requirements during NDE.
84-29	6/25-7/20/84	IV	1	Failure to disposition nonconforming items in accordance with approved procedures.
84-29	6/25-7/20/84	Dev.	1	Failure to mark weld centerlines in accordance with the ASME Code.
84-49	9/1-30/84	V	3	Failure to properly make temporary changes to Fuel Handling Procedures.
84-49	9/1-30/84	IV	1	Failure to incorporate changes to system design into all applicable drawing.

Unit 1

Inspection Report No.	Inspection Date	Severity Level	Functional Area	Violation
84-53	9/17-21/84	IV	1	Failure to meet separation criteria for channel wiring in PGCC cabinet 10C01.
84-53	9/17-21/84	IV	1	Failure to follow temporary modification controls during installation of communication cables within the PGCC complex.
84-53	9/17-21/84	IV	1	Failure to follow procedures for installation of dust covers on the top of PGCC Cabinet 10C601.
84-57	10/2-31/84	IV	2	Failure to adequately control trouble shooting activities in HVAC System.
84-64	10/15-11/2/84	V	3	Failure to adequately control access to refueling bridge.
84-64	10/15-11/2/84	IV	7	Failure to implement compensatory measures for an unalarmed vital area door.
84-65	11/1-30/84	IV	1	Failure to adequately implement design control measures.

Table 3

Unit 1

Inspection Report No.	Inspection Date	Severity Level	Functional Area	Violation
84-65	11/1-30/84	V	3	Failure to perform required surveillance test prior to recirculation pump startup.
84-65	11/1-30/84	V	3	Failure to follow liquid Radioactive Waste System procedures.
84-65	11/1-30/84	V	3	Failure to properly restore equipment to service.
84-68	11/13-16/84	V	3	Failure to follow administrative requirements for review of surveillance test results.
Unit 2				
84-08	5/1-31/84	IV	1	Failure to adequately protect equipment during construction activities.

TABLE 4

INSPECTION REPORT ACTIVITIES (12/1/83 - 11/30/84)

LIMERICK GENERATING STATION

UNIT 1

Inspection Report No.	Inspection Hours	Areas Inspected
83-21	28	Pre-service inspection activities including program review, procedure review, observation of work in progress.
83-22	10	Initial management meeting for the pre-operational radiation protection program and radioactive waste systems.
83-23	83	Preoperational test procedures review and witnessing, TMI action plan followup, secondary containment integrity (reactor enclosure and refuel floor drain lines), CDR reporting, Nuclear Review Board activities. QA/QC for startup.
84-01	138	Nuclear Review Board Charter, preoperational test program implementation, welder qualification and field welding, GE Quality Control Records, CDR and event followup.
84-02	22	Chemistry and Radioactive effluent control programs (preoperational review).

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-03	42	Radiological environmental monitoring program (preoperational review).
84-04	52	Preoperational test procedure review and verification, test witnessing.
84-05	17	Radiation Protection Program and Radioactive Waste Management Program.
84-06	88	Installation of Instrument Cables and Termination.
84-07	80	Preoperational test witnessing, initial emergency diesel generator testing, preoperational test procedure review.
84-08	75	Onsite/offsite safety committee activity operational staff training, fuel receipt and storage programs.
84-09	24	Welder qualification, welding developmental activities, preparations for inservice inspections, surface condenser corrosion.
84-10	139	Preoperational program review and implementation, witnessing of tests, followup on contaiminated rebar.

Inspection Report No.	Inspection Hours	Areas Inspected
84-11	75	Readiness for fuel receipt with regard to the QA, security, radiation protection and chemistry programs and fire protection/ prevention.
84-12	63	Preoperational test activities, QA/QC coverage of preoperational test activities, allegation followup.
84-13	50	Proposed security program. (preoperational progress review).
84-14	154	Preoperational test procedure review, verification and witnessing, comparison of as-built systems vs. FSAR, temporary loss of three low-level sealed sources, nonconforming welds on recirc. system hangers, diesel generator testing, safety committee reviews, CDR's.
84-15	N/A	Operator Licensee Examinations.
84-16	86	Preoperational test witnessing, emergency diesel generator testing, preoperational test procedure review and verification.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-17	24	Followup on previously identified inspection findings regarding welding and NDE.
84-18	560	Emergency Preparedness Appraisal (evaluation of overall adequacy and effectiveness of licensee onsite emergency preparedness).
84-19	104	Service water system water hammer, new fuel receipt activities, electrical grounding of rotating machinery, drywell and wetwell coatings, preoperational test procedure review verification and witnessing, startup nonconformance reports (NCRs) and diesel generator testing.
84-20	19	Radiation Protection Program and Radioactive Waste System Testing, including preparation and planning for fuel transfer and inspection activities.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-21	114	Readiness for implementation of the Quality Assurance Program for operations in the areas of audits, QA/QC surveillances (monitoring) and QC inspections; document control; procurement control; QA/QC administration; receipt; storage and handling; plant surveillance testing; and test and measuring equipment.
84-22	25	Welding and nondestructive examination of structural welds associated with hangers and supports and building structural members.
84-23	N/A	Operator License Examinations
84-24	85	Standby gas treatment system design, electrical separation criteria, MSIV leakage control system design, and turnover, preoperational test procedure review and test witnessing, qualification of startup engineers, fan grounding & CDR followup.
84-25	74	Preoperational test procedure review and verification, test witnessing, test program implementation, QA/QC interface with startup & CDR followup.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-26	135	Preoperational test procedure review and test witnessing, CDR followup, calibration of primary containment vacuum relief valve position indication system, recirculation valve indication, management meeting on June 26, 1984 regarding implementation of preoperational test program.
84-27	569	"As-built" inspection: reviews of applicable design bases & examination of systems to verify compliance with design.
84-29	635	Mobile NDE Laboratory (Van) Inspection: independent measurements of selected safety-related piping. Weldments fabricated to ASME Code, Section III, Class 1,2,3, Management meeting on August 9, 1984 to discuss resolution of "lack of fusion" indications.
84-30	73	Licensee readiness to transfer new fuel from the outside storage facility to the high density fuel storage racks within the spent fuel pool.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-31	180	Quality assurance records, design changes, tests and experiments.
84-33	143	Previous inspection findings (regarding construction activities) NRC Bulletins and Circulars.
84-34	30	Preoperational testing activites of safety-related heating, ventilation and air-conditioning (HVAC) systems.
84-35	56	Preoperational inspection of chemistry, radioactive effluent control and radiation protection programs.
84-36	205	Followup of outstanding inspector items, IE Bulletins, CDRs & 10 CFR 21 reports; movement of fuel from temporary storage to refueling floor; witnessing of portion of work under startup work orders; review of diesel generator preoperational test results.
84-37	43	Preoperational test witnessing and procedure review; test procedure results evaluation, QA/QC interface with startup.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-38	32	P pared Security F.gram (preoperational progress review).
84-39	30	Non-licensed operational staff training.
84-40	NA	Operator License retake examinations.
84-41	416	Emergency preparedness and emergency exercise on July 25, 1984.
84-42	50	Integrated Leak Rate Test (ILRT) and Structural Integrity Test (SIT) witnessing.
84-43	293	New fuel inspection activities on refueling floor (witnessing); startup work order performance (witnessing); preoperational test procedure review, test witnessing and test results review; previous inspection findings; and technical specifications.
84-44	23	HVAC preoperational test procedure review, test witnessing and test results evaluation.
84-45	365	Radiological Controls Team Inspection.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-46	100	Preoperational test results evaluations Quality Assurance for preoperational and startup testing, and overall Startup Test Program (initial review).
84-47	264	Safe shutdown capability of the plant in the event of a fire (Appendix R review) and fire protection systems.
84-48	200	Structural design and pipe break analysis (allegation followup).
84-49	332	New fuel inspection activities, preoperational test witnessing and test results review, operating shift readiness, design change control and review of previous findings. Management meetings on 9/19/84 and 9/24/84 to discuss readiness for fuel load and low power testing.
84-50	57	Startup test program.
84-51	35	Security program (preoperational progress review).
84-52	235	Technical Specifications implementation verification.
84-53	80	PGCC Instrumentation.
84-54	139	Preoperational Test Results Evaluation.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-55	102	Licensee actions in response to IE Bulletins 79-02, 79-04, 79-07 and 79-14.
84-56	27	Licensee actions in response to previous inspection findings (open items) in the areas of operational QA and training.
84-57	54	Radiation Protection and Rad Waste Systems.
84-58	27	Non-radiolytic chemistry.
84-59	89	Startup Test Program procedures and administration.
84-60	291	Initial fuel load activities, preoperational test result evaluation and test exception resolution, solenoid control valves in CRDHS, followup on allegations, and meeting of ACRS subcommittee.
84-61	20	Followup on Emergency Plan appraisal open items.
84-62	140	Operations and quality assurance, nonlicensed operator training and a review of the plant staff's system acceptance procedures.
84-63	19	Preoperational Security Program.

Table 4

Inspection Report No.	Inspection Hours	Areas Inspected
84-64	298	Startup Test Program and startup and preoperational test activities.
84-65	235	Routine resident inspection of pre-operational and startup testing activities and reviews of plant operation.
84-66	202	Review of implementation of TMI action items II.B.2 (Post Accident Sampling), II.F.1 (Accident Instrumentation) and III.D.3.3 (Inplant monitoring)
84-67	193	Startup testing activities.
70-2988/84-01	15	Material control and accountability organization and operation; measurements and controls; shipping and receiving; storage and internal control; inventory; records and reports; and management of material control system.
84-68	194	Health Physics and Radwaste Systems
84-69	44	Security
84-70	75	Startup Test Activities

Unit 2

Inspection Report No.	Inspection Hours	Areas Inspected
83-08	3	Routine, resident.
84-01	20	Inspection of the radiological environmental monitoring program.
84-02	14	Routine, resident.
84-03	14	Routine, resident.
84-04	4	Routine, resident.
84-05	8	Routine, resident.
84-06	8	Routine, resident.
84-07	55	Inspection of structural welds associated with hangers and supports, and building structural members.
84-08	35	Routine, resident.
84-09	5	Routine, resident.
84-10	7	Routine, resident.
84-11	4	Routine, resident.
84-12	5	Routine, resident.
84-13	3	Routine, resident.
84-14	2	Routine, resident.

TABLE 5

INSPECTION HOURS SUMMARY

LIMERICK GENERATING STATION

UNIT 1

Functional Area	Hours	% of Time
1. Construction Activities	2289	26
2. Preoperational and Startup Testing	2996	33
3. Operational Readiness and Plant Operations	1212	14
4. Radiological Controls	1008	11
5. Fire Protection/Housekeeping	280	3
6. Emergency Preparedness	996	11
7. Security and Safeguards	195	2
8. Licensing	- *	- *
Total	8976	100

*Hours expended in facility licensing activities and operator licensing activities are not included with direct inspection effort statistics.

UNIT 2

Functional Area		
1. Construction Activities	187	100