

ENCLOSURE

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP)

LIMERICK GENERATING STATION UNITS 1 AND 2

REPORT NOS. 50-352/97-99 AND 50-353/97-99

I. BACKGROUND

The SALP Board convened on April 10, 1997, to assess PECO Energy's nuclear safety performance at the Limerick Generating Station during the period April 2, 1995, to March 29, 1997. The Board was conducted pursuant to NRC Management Directive (MD) 8.6, "Systematic Assessment of Licensee Performance." Board members were James T. Wiggins, (Board Chairman), Director, Division of Reactor Safety, NRC Region I (RI), Charles W. Hehl, Director, Division of Reactor Projects, RI, and John F. Stolz, Director, Project Directorate I-2, NRC Office of Nuclear Reactor Regulation. The Board developed this assessment for the approval of the NRC Region I Administrator.

The performance ratings and the functional areas used below are described in NRC MD 8.6 (See NRC Administrative Letter 93-20).

II. PERFORMANCE ANALYSIS - OPERATIONS

Plant management oversight and involvement continued to be a strength as evidenced by excellent day-to-day safety focus and direct oversight of plant activities. Several conservative decisions were made during the Unit 2 maintenance outage in December 1996, and during the Unit 2 refueling outage, in February 1997. For example, restart from the December 1996 outage was delayed to replace the condenser expansion joint to avoid operating for a month with a temporary repair. Also, during a shutdown cooling system outage window in the Unit 2 refueling outage, other activities such as a reactor vessel nozzle weld repair and steam separator assembly replacement were rescheduled to assure focused operator attention to the natural circulation cooling activity. Further, several permanent repairs were made to plant components, such as leaking valves, where temporary leak repairs might have been acceptable.

Operations staff performance was generally good throughout the period. Operator response to plant transients and scrams, including a stuck open safety relief valve, was very good. In particular, conservative operator decisions to trip or shutdown the unit manually prior to automatic protection actuation was noted on several occasions. Operator command and control of planned evolutions were excellent. In addition, performance during the recent refueling outage at Unit 2 was excellent; system restorations and startup activities were well managed and controlled, with very good interfaces maintained among the operators, and engineering and maintenance personnel. However, while some operator errors occurred, substantial management focus throughout the period, along with increased operator attention-to-detail, resulted in a reduction in the overall number and significance of personnel errors.

The number of operator workarounds remained low during the period. They were appropriately tracked by management. Additionally, procedure quality and use were good, with very few errors that resulted in reportable events.

The problem identification and corrective action program was effective, with appropriate thresholds, self critical evaluations, and generally effective actions tracked to completion. Efforts to improve the timeliness and quality of some corrective actions continued. The offsite and onsite review board assessment activities remained strong and effective. A notable example was the assessment provided by the Nuclear Review Board concerning problems encountered during the 1997 Unit 2 refueling outage that focused plant management attention on common contributing causes of schedule changes and emergent work. Additionally, self-assessments, as well as external audits and reviews, continued to be thorough and very critical, with good recommendations and effective management response.

In summary, performance in Operations continued to be strong. Response to plant transients was consistently very good. Increased management attention to several operator errors resulted in significant performance improvement. Audits, self-assessments, and review committee activities were effective.

The Operations area was rated **Category 1**.

III. PERFORMANCE ANALYSIS - MAINTENANCE

Performance in the maintenance area was excellent. Strong management attention and support were evident in the detailed planning and coordination of routine work and outage activities. The maintenance and testing staffs were well-qualified and conducted activities effectively using good procedures. Most test and work activities observed were correctly completed the first time. For example, the coordination and implementation of an alternate rod insertion vent line capping activity and the on-line replacement of a degrading safety-related battery at Unit 2 were excellent. Good interfaces between the various work and support groups during surveillance activities also aided in early resolution of several problems with the emergency diesel generators, and the reactor core isolation cooling and high pressure coolant injection systems.

Increased supervisory presence in the field during maintenance activities contributed to achieving high quality work. In the inservice inspection area, oversight of vendors conducting in-vessel visual inspections was very good. However, oversight of vendors performing other inservice inspection activities during the February 1997 outage had been significantly reduced from that observed during past outages, and instances of poor procedure adherence and testing practices were observed.

The material condition of plant equipment improved throughout the period, thereby contributing to the high availability and reliability of equipment that was achieved. The non-outage corrective maintenance backlog was significantly reduced through consistent management focus and successful planning. The number of control room deficiencies was maintained low. On-line maintenance windows were consistently well-planned and

controlled, and maintenance activities that occurred within those windows were typically performed without error or challenge to safe plant operations. Probabilistic safety assessment type analyses were performed to assure equipment maintenance outages were conducted with appropriate safety risk implications.

Problem identification and resolution in the maintenance area were very good. The threshold for identification of equipment problems was lowered through improved personnel sensitivity to equipment deficiencies and through more specific assignment of accountability for the condition of specific equipment components. Equipment deficiencies were properly prioritized, tracked, and corrected. When recurrent problems such as feedwater heater level control, the material condition of the EDGs and the Unit 2 Division 4 battery low voltage were identified, root cause analyses and corrective actions were rigorously pursued. However, a few exceptions to this excellent performance caused several unnecessary plant challenges. A shutdown of Unit 1 occurred due to a significant leak from the reactor head vent flange, which resulted from poor maintenance practices. Rework on a residual heat removal check valve resulted from inadequate staking of a retaining pin nut. Several surveillances were missed during the period due to programmatic issues. Deficiencies in procedure content and implementation during a main steam isolation valve partial stroke test resulted in a Unit 1 scram from full power. Also, some instances of poor foreign material exclusion practices occurred, including clogged suppression pool strainers at Unit 1 and inadequate protection of the emergency diesel generators (EDGs) during overhaul. Appropriate corrective actions addressed these problems effectively.

In summary, performance of maintenance and surveillance activities was excellent. Strong management support and effective planning contributed to high equipment reliability and availability. Personnel were well-qualified and conducted activities effectively. Equipment performance and material condition of the plant were generally very good. Equipment problems that resulted in several plant challenges, and surveillance scheduling problems were addressed.

The Maintenance area was rated **Category 1**.

IV. PERFORMANCE ANALYSIS - ENGINEERING

Management continued to be involved in engineering activities. As a result, the overall quality of engineering work products remained very good. Engineering activities, particularly those related to design and analysis tasks, were generally of excellent quality. Site management effectively integrated most engineering activities with other operating activities and controlled the backlog of engineering work well. However, the number and nature of plant trips and shutdowns due to equipment problems raised some concerns about the effectiveness of engineering management.

The engineering staff was usually effective in identifying problems requiring engineering actions. The system managers made strong contributions. For example, an engineer found a significant error in the analysis used to show that sufficient pneumatic capacity existed to operate the safety relief valves during a post-fire shutdown. System manager

support of surveillance testing was typically very good as demonstrated by a system manager promptly identifying and correcting the cause of a high pressure coolant injection system turbine overspeed trip that occurred during a surveillance test. In contrast, the engineering staff was slow to identify an inadequacy in the surveillance test procedure for the main control room ventilation system, resulting in operability concerns related to the emergency fresh air system.

Typically, engineering evaluations for the problems found were comprehensive, as demonstrated by the evaluation performed on the excessive wear of an emergency diesel generator (EDG) flexible drive gear and by the evaluation that assessed the safety impact of operation of a main turbine with rotor disc indications. However, the licensee's response to indications of oil leaks associated with the EDGs and its trending of a weak cell in a safety-related battery were not indicative of a comprehensive approach. Further, the review of a vendor procedure associated with use of a fuel element preparation machine failed to identify that operation of the machine per that procedure would result in a reduction in a design margin described in the Updated Final Safety Analysis Report.

A number of plant equipment failures occurred that resulted from failure to follow up on previous indications of problems in a timely manner. The licensee did not correct leaking safety-relief valves (SRVs) until one of them inadvertently lifted during Unit 1 power operation. Also, this event became more significant as a result of a decision made not to clean the Unit 1 suppression pool during two maintenance outages following recognition of the presence of debris in the Unit 2 suppression pool. Debris left in the Unit 1 pool clogged a residual heat removal system suction strainer during the recovery from the SRV lift event. Chronic electro-hydraulic control system problems related to system vibration resulted in several trips of Unit 2. Another Unit 2 trip occurred as a result of a failed scoop tube linkage for a recirculation pump motor-generator set. Management continued to implement initiatives to reduce the scope and length of refueling outages. In the case of a Unit 2 condenser expansion joint, its preventive maintenance replacement should have taken place during the February 1995 refueling outage. The unit had to be shut down due to its failure in December 1996 to replace it.

In summary, site management continued to provide attention to engineering activities. Those activities were performed throughout the period in a generally effective manner. The technical quality of engineering work products continued to be excellent. The system manager approach provided an effective method to address most plant equipment problems. However, a number of plant trips and forced shutdowns resulted from equipment problems.

The Engineering area is rated **Category 2**.

V. PERFORMANCE ANALYSIS - PLANT SUPPORT

The licensee continued to implement effective programs for radiological protection, including the programs for occupational exposure control, radioactive waste management and handling, effluents control and for environmental monitoring. Site management continued to provide the oversight and support for those programs needed to result in a consistently high level of performance. Personnel exposures were maintained as low as reasonably achievable through effective work planning, oversight and control. The radiation protection staff was well-qualified and well-trained. Performance in the area of problem identification, root cause assessment and corrective action was excellent, as indicated by the results of program self-assessments, surveillances and audits. Some minor deficiencies were noted during the period. These included minor radiation worker performance errors and an incomplete submittal related to on-site disposal of low-level radioactive materials.

Performance in the emergency preparedness program area continued to be excellent, as demonstrated by the results of drills and exercises. Site management involvement in the program was excellent. Management assured that very good relationships were maintained with offsite agencies. Emergency response personnel were well-trained and were proficient in carrying out their tasks. Facilities were maintained operational and equipment was readily available. However, some chronic problems with speaker phones in the control room, the technical support center and the emergency operations facility were noted. Problem identification, root cause and corrective action activities were excellent, overall, as a result of a well-defined self-assessment program. Quality assurance audits met requirements of the plan but their effectiveness occasionally suffered due to not always providing for emergency preparedness expertise on the audit team and by a lack of detail in the audit reports.

Management support and attention to the security program were evident. Security force members carried out their assignments professionally and proficiently. Security force response to alarms and to other security challenges demonstrated the effectiveness of security officer training. On the other hand, the licensee identified two noteworthy programmatic deficiencies involving the control of safeguards information and the control of master keys. In both instances, the licensee correctly evaluated the threat posed by the deficiencies and implemented comprehensive corrective actions that assured that the security of the site was not compromised. Regarding the master key issue, the site response was prompt from the time the site was made aware of the issue.

Several implementation weaknesses were identified in the fire protection program this period that reflected some decline in management oversight and control of fire protection activities. The weaknesses included instances of ineffective review of planned hot work activities that contributed to several hot work-related fires over the period and procedures that did not clearly define program responsibilities. Further, some longstanding deficiencies involving emergency lighting continued. Toward the end of the period, the licensee initiated improvements to address these problems.

Housekeeping throughout the station was good. Particularly noteworthy were the conditions maintained in the drywell during the Unit 2 outage.

In summary, performance in the radiation protection area continued to be excellent overall. The radioactive waste processing, handling, storage and transportation programs were well-implemented, although some minor problems were noted. The emergency preparedness program was effectively implemented and was well-supported by management. The emergency response organization performed well during drills and exercises. Security force members carried out their security program responsibilities professionally and proficiently. However the licensee identified some problems with control of safeguards information and master keys. Housekeeping was good throughout the station. In contrast to overall excellent performance in the other of the Plant Support areas, a performance decline was noted in the fire protection program that the licensee began to address late in the period.

The Plant Support area was rated **Category 1**.

PLANNED NRC INSPECTIONS

March 30, 1997 - March 29, 1998

LIMERICK GENERATING STATION UNITS 1 AND 2

IP - NRC Inspection Procedure

Core Procedure - NRC Inspection Program Mandatory Inspection

TBD - To Be Determined

<u>Procedure Number</u>	<u>TITLE</u>	<u>Target Date</u>
IP 82302	Review Exer. Obj. & Scenario	- Core Procedure 04/21/97
IP 82301	Evaluation of EP Exercise	- Core Procedure 06/23/97
IP 83750	Occupational Radiation Exposure (RADCON-Visit 1)	- Core Procedure 08/04/97
IP 84750	Radwaste Treatment & Effluents & Environ. Monitoring (Visit 1)	- Core Procedure 08/11/97
IP 84750	Radwaste Treatment & Effluents & Environ. Monitoring (Visit 2)	- Core Procedure 09/29/97
IP 86750	Radioactive Waste Transportation	- Core Procedure 10/06/97
IP 81700	Physical Security Program (Visit 1)	- Core Procedure 10/20/97
IP 71001	Licensed Operator Requalification Program Evaluation	- Core Procedure 11/03/97
IP 37750	Engineering Focus Inspection (Including Followup to 10 CFR 50.54(f) response commitments)	- Core Procedure 03/98