U. S. NUCLEAR REGULATORY COMMISSION
REGION 1

Report Nos. 50-352/91-19
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50-353

License Nos. NPF-39 Category C
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Licensee: Philadelphia Electric Company
Correspondence Control Desk
P.O. Box 195
Wayne, Pa 19087-0195

Facility Name: Limerick Generating Station, Units 1 and 2

Inspection At: Limerick, Pennsylvania

Inspection Period: August 26, 1991 thru August 30, 1991

Inspector: David J. Chawaga 9-27-91
D. Chawaga, Radiation Specialist Date
Facilities Radiation Protection Section

Approved by: W. Pasciak 9.27.91
W. Pasciak, Chief, Facilities Radiation Date
Protection Section

Inspection Summary: Inspection on August 26 - 30, 1991 at the Limerick Station (Combined NRC Inspection Report Nos. 50-352/91-19 and 50-353/91-20)

Areas Inspected: The inspection was a routine, unannounced safety inspection of the licensee's radiological controls program. Both reactor units were operating during this inspection. Areas reviewed included a radioactive waste shipping incident, operational health physics activities, self assessments, health physics database implementation, instrument calibration and ALARA.

Results: Within the scope of this inspection, one violation was identified relating to a radioactive waste shipment. Adequate corrective actions were implemented to prevent recurrence of the violation prior to the end of the inspection period. Details regarding the shipment are documented in Section 3 of this report. Good performance was generally

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DETAILS

1.0 Persons Contacted

1.1 Philadelphia Electric Company

* K. Censi, Senior Radwaste Engineer
* A. Coppa, Reactor Services Engineer
* R. Dubiel, Superintendent Plant Services
  J. Fongheiser, Radiological Engineering Supervisor
* L. Hopkins, Operations Superintendent
* G. Leitch, Vice President, LGS
  J. Mallon, Radiological Engineer
* G. Murphy, Senior Health Physicist
* D. Neff, Licensing Engineer
* B. Oliver, Reactor Services Engineer
* J. Phillabaum, Licensing Engineer
  R. Ragland, Radiological Engineer
  D. Shutt, Licensing Technician

1.2 NRC Personnel

* T. Kenney, Senior Resident Inspector
* L. Scholl, Resident Inspector

* Denotes attendance at the exit meeting.

2.0 Purpose

The purpose of this safety inspection was to evaluate the licensee's programs and recent activities related to health physics at Limerick Generating Station (LGS). Areas reviewed included a radioactive waste shipping incident, operational health physics activities, self assessments, health physics database implementation, instrument calibration and ALARA.

3.0 Radioactive Waste Shipment

On June 17, 1991, a LN-153 radioactive waste liner was loaded into a HN-100S3 shipping cask via an isoblock rigging device at LGS. This rigging device does not require slings for lifting. The shipment was sent to the Chem-Nuclear Systems disposal facility in Barnwell, SC on that same day. Upon arrival at the Barnwell facility on June 18, 1991, the shipment was rejected because lifting slings had not been attached to the liner.

The rejected shipment was sent to Scientific Ecology Group (SEG), in Oak Ridge, TN, where slings were shackled to the liner. The shipment was returned to Barnwell, SC where it was accepted for burial by Chem-Nuclear on June 21, 1991.

PECO's failure to provide proper lifting devices was a violation of the Chem-Nuclear's State license and of NRC regulations. Comprehensive corrective actions were completed prior to the start of the inspection period. Actions taken included discontinuing use of the LN-153 liners and changes to the station's shipping procedure. A step was added to RW-222, "Shipment of Radioactive Waste to Barnwell", which stated, "Ensure appropriate rigging is attached to the container with no physical impairments". In addition, Attachment 8.4 to RW-222 was changed to include a sign-off which reads, "Appropriate rigging is attached to the container, with no physical impairments, nor obstructions for loading". Personnel involved in the preparation of shipping packages were interviewed by the inspector. A heightened awareness regarding the attachment of proper lifting devices was evident during those discussions. Corrective actions were reviewed by the inspector and found to be adequate to prevent recurrence of a similar incident. Therefore, response to the Notice of Violation for this incident is not required.

4.0 Operational Health Physics

4.1 HP Field Office

The inspector reviewed several operational aspects of applied health physics practices and procedures at the station. These operations are controlled during power operation from the HP Field Office located in the yard of the facility outside of the power block. Although the HP Field Office is physically removed from the Radiologically Controlled Area (RCA), the inspector found no indication that control efforts were not being performed in accordance with program requirements (with the minor exception of continuous air monitor control problems described in Section 6.4 of this report).

4.2 Feedwater Flow Testing

The inspector reviewed records for feedwater flow testing which was performed since the last inspection period. These tests were performed using a high specific activity Na-24 solution which presents formidable contamination control and external exposure control concerns. Testing was completed with no contamination incidents and ALARA performance was considered good.

Vendor estimates, based on experience at other stations, suggested that testing would cost a total of approximately 2 person-rem for Unit 1 and Unit 2 (4 tests). Complete testing of both units was actually completed for 0.642

person-rem. This amount yields an average of 0.158 person-rem per test, and compares favorable with Limerick's January 1991 test average of 0.435 person-rem. The licensee attributes lower doses to improvements in equipment design, source handling, source shielding, and experience of personnel.

4.3 Contamination Incident

On August 2, 1991, three operators were contaminated when a Reactor Water Clean-Up (RWCU) check valve failed causing the Filter/Demineralizer Precoat Tank to overflow. Three other individuals received minor shoe and clothing contaminations when they responded to the incident. A total of approximately 6,500 square feet of area within the reactor enclosure was contaminated.

The inspector expressed concern about what may have been hasty and imprudent action in response to the incident. The operators immediately entered the area where the resin and contaminated water was spilling from the tank in an attempt to close a valve which they thought might stop the overflow. Health Physics personnel were not yet present to monitor the degraded radiological condition of the area and no protective clothing was worn by the operators. This action resulted in personnel contamination at approximately 40 mrad per hour in close proximity to the skin of the extremities of one worker (as measured by a portable ion chamber). Later analysis indicated that closing the valve had no impact on the overflowing tank.

The Filter/Demineralizer Precoat Tank is normally not highly contaminated and, without full knowledge of the check valve failure, the operators reasonably assumed that the resin and water flowing from the tank constituted little radiological hazard. Similar industry incidents have been documented where such expeditious reactions were taken prior to adequate evaluation of potential hazards. Many of these incidents resulted in unnecessary exposure to personnel.

The inspector toured the area where the spill occurred and determined that proper radiological controls were currently in place. Although contamination tenaciously adhered to the skin after several attempts at personnel decontamination, licensee calculations indicate that no regulatory dose limits were exceeded.

4.4 Program Compliance with Technical Specification (TS) 6.12

The inspector reviewed High Radiation Area (HRA) key control, HP coverage practices and procedures, internal memorandums, Radiation Work Permits (RWPs), and other program aspects related to TS requirements for HRA entry.

A review of the HRA key control program resulted in the finding of several program strengths. HP personnel at the HP Field Office were well versed in their responsibilities relative to HP-109, "High Radiation Area Key Control". HP-109 was clearly written and unambiguous in defining the responsibilities of personnel. The inspector verified that logs were well maintained and that all keys were in their proper location. During tours of the plant, doors locked by radiation protection were found to be well secured without exception. Locking hardware was observed to be in excellent condition. A large yellow tag is attached to TS Locked HRA keys issued by the HP Field Office which contains the following statements:

"THINK SELF-CHECK"

> "You are responsible for the control of this key. You must physically verify the door is locked when leaving the room. You must not leave this door open and unattended. You must not give this key to anyone else except Health Physics."

The Operations Depa tment had a master key to Locked HRA doors which would be used to expedite entry under emergency conditions. However, this key was controlled by the Cperations Shift Manager and had a lead seal fastened to it which verified that it had not been used.

TS 6.12.2, requires, in part, that for areas accessible to personnel where whole body radiation levels exceed 1000 mrems in one hour, either the RWP for that area must specify a maximum allowable stay time or positive exposure control must be provided by an individual qualified in radiation protection procedures for entry to such areas. These requirements apply in addition to the High Radiation Area entry requirements found in TS 6.12.1. Licensee personnel are aware that Alarming Dosimeters can not be used to satisfy the RWP stay time requirement of 6.12.2.

The inspector determined that the station was implementing a strong and effective program in this area.

4.5 Continuous Air Monitors (CAMs)

The inspector reviewed the "as found" alarm setpoints for the four Eberline Model AMS-3 CAMS used within the Radiologically Controlled Area (RCA). Guidance for setting CAM alarm setpoints was found in Station Procedure HP-212, "Airborne Contamination Monitoring - CAMs". A "CAM Alarm Setpoint Calculation" data sheet is incorporated in this procedure as Attachment 8.1. A copy of the data sheet was posted on each CAM with the original available for reference in the Health Physics (HP) Field Office. All

four of the instruments observed in the RCA were adjusted to alarm setpoints which were higher than the value indicated on their corresponding data sheet. In addition, for one CAM the data sheet observed in the field office was not available in the HP Field Office.

Licensee personnel informed the inspector that most of the difficulties seen in the control of CAM setpoints resulted from fluctuating radon and radon progeny levels within the plant. Another contributing factor to confusion may have been related to the ease with which CAM setpoints could have been changed to silence an alarm. Neither licensee personnel nor the inspector could determine if these setpoints had been changed by Health Physics personnel or other plant workers.

Station procedures do not specifically require CAM data sheets to match actual setpoints in the field. HP-212 requires notification of Health Physics Supervision if ALARM setpoints are changed. However, verbal notification is acceptable and documentation is not procedurally required. In addition, HP-212 does not require the CAM's data sheet to be updated. The HP shift log was reviewed and no references to CAM setpoint changes were noted during the period between monthly data sheet updates. Subsequently, if notifications were being made, the information is not logged for shift turnover and for future reference.

The inspector found that under the current program HP personnel in the Field Office could not determine the actual CAM alarm setpoints in the field. The licensee's ability to practically and technically resolve this issue will be reviewed during a future inspection.

5.0 Self Assessment Audit Findings

A comprehensive health physics self-assessment audit was recently performed at the licensee's Peach Bottom Atomic Power Station (PBAPS). The audit was successful in identifying several areas for improvement. The results of the audit were forwarded to the Limerick Generating Station (LGS) for review. During July and August of 1991, the LGS HP Group conducted a self assessment based on PBAPS findings. The assessment consisted of critical evaluations of the Dosimetry, Instrumentation, Respiratory Protection, Radiological Engineering (ALARA) and applied programs. According to licensee findings, the majority of areas identified for improvement at PBAPS were not common to LGS. Common problems included the legibility of radioactive material container labels and control of respiratory protection test equipment. Adequate efforts were underway to strengthen these program areas during the inspection period.

6.0 Health Physics Database Implementation

The inspector reviewed progress in implementation of the health physics module of the Plant Information Management System. During earlier development, adequate resources were allocated to plant specific modification of the system. Since system implementation, these resources had significantly diminished. Although the module provides many capabilities in excess of those previously available with the former system, many valuable sorting and report capabilities are not yet available. Recent system enhancement has been slow. Licensee personnel informed the inspector that additional resources had been allocated to expedite enhancement efforts.

7.0 Instrument Calibration

The inspector toured the instrument calibration facility and interviewed personnel involved in calibration activities. The sample of instrument control records reviewed by the inspector were complete and accurate. Calibration methods were observed and no weaknesses were noted in the process. Certificates for test equipment and radiation sources were appropriate and easily retrieved. Survey instrument traceability to test and repair equipment was efficiently accomplished. All instruments observed in the field were calibrated and in good physical condition. Records indicated that response checks were being performed prior to intermittent use. Overall, within the scope of this inspection, the portable survey instrument calibration and control program was determined to be strong.

8.0 ALARA Performance

The interdepartmental effort to minimize worker radiation exposures has continued to be successful at LGS. Exposure rates at the facility remained low. The 1991 person-rem goal for the station was 155. However, at the current exposure accumulation rate, the 1991 target of 103 person-rem appeared achievable. These 1991 exposure totals included the 1991 major refueling outage of Unit 2.

Although the low dose rates at the facility contributed to success in this area, excellent performance on the part of the HP group has resulted in significant person-rem savings. Noteworthy ALARA practices such as effective use of low dose waiting areas, minimization of work crew size and effective use of shielding were observed by the inspector during the course of this and other inspections. Good HP staff performance was evidenced by low personnel exposures during feedwater flow testing efforts (described in Section 4.2). This testing was performed using comparable levels of the radioactive isotope ^{24}Na to those used at other reactor facilities. Where source terms were comparable, LGS personnel exposure totals were relatively low. Adequate preplanning of radiation work activities was evident in all cases observed.

9.0 Exit Meeting

A meeting was held with licensee representatives at the end of this inspection on August 30, 1991. The findings of the inspection were discussed with licensee representatives.