

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-352/90-28
50-353/90-28

Docket No. 50-352
50-353

License No. NPF-39 Category C
NPF-85 C

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 and the
NRC regional office

Inspection Period: December 3, 1990 thru January 3, 1991

Inspector: *D. Chawaga* 1-12-91
D. Chawaga, Radiation Specialist, Date
Facilities Radiation Protection Section

Approved by: *W. Pasciak* 1-12-91
W. Pasciak, Chief, Facilities Radiation Date
Protection Section

Inspection Summary: Inspection on December 3 -7, 1990 at the Limerick station. A review of licensee prepared documents continued at the regional office until January 3, 1991 (Report No. 50-352/90-28, 50-353/90-28)

Areas Inspected: The inspection was a routine, unannounced radiological safety inspection of the licensee's radiological controls program with respect to the following elements: radioactive waste surveys, Radiological Occurrence Reports, radioactive waste survey practices, respiratory protection, ALARA performance, Locked High Radiation Area (LHRA) controls and other general radiation protection program elements.

Results: Within the scope of this inspection, one violation was identified. Details are described in Section 5.0 of this report.

DETAILS

1.0 Persons Contacted

1.1 Philadelphia Electric Company

- * M. McCormick, Jr., Plant Manager
- R. Dubiel, Superintendent Plant Services
- G. Murphy, Senior Health Physicist
- * M. Christinziano, Technical Support Health Physicist Supervisor
- J. Fongheiser, Radiological Engineering Supervisor
- S. Levine, Radiological Engineer
- * D. Neff, Licensing Engineer
- T. Dougherty, Training Supervisor
- J. Mallon, Radiological Engineer
- * G. Madsen, Regulatory Engineer

1.2 NRC Personnel

- M. Evans, Resident Inspector
- T. Kenney, Senior Resident Inspector
- L. Scholl, Resident Inspector
- J. Noggle, Qualification Specialist
- J. Turia, Senior Radiation Specialist

* Denotes attendance at the exit meeting.

2.0 Purpose

The purpose of this inspection was to evaluate the licensee's programs for radioactive waste surveys, Radiological Occurrence Reports (RORs), "Green is Clean" trash recovery, respiratory protection, ALARA performance, Locked High Radiation Area (LHRA) control and other radiation protection controls in the field.

3.0 Radwaste Survey Practices

On November 8, 1990, a PECO Health Physics (HP) Technician performed a survey on an outgoing vehicle transporting radioactive waste (shipment number 90-71). The survey results indicated that exposure rates inside the cab (standing and seating area) were less than 0.5 mR/hour. Upon arrival to the Quadrex facility in Oak Ridge, TN, a Quadrex HP Technician surveyed the vehicle and found dose rates inside the cab to be 4.5 to 5.0 mR/hour. The HP Technician who performed the survey at Limerick could not recall whether the error was made when the meter was read (perhaps wrong scale observed) or if a documentation error was made in completing the survey information on Attachment 8.1 to HP-715. PECO Procedure HP-715 establishes an administrative limit for dose equivalent rate inside the cab of 1.6 mrem/hour (milliroentgen (mR) and millirem (mrem) are

considered equivalent units in this case). Further, this event has been classified as a violation of Technical Specification 6.11, "Radiation Protection Program" which requires, in part, that procedures for personnel radiation protection shall be maintained and adhered to for all operations involving personnel exposure. Other details and instructions regarding this violation are described in Appendix A, "Notice of Violation", to this report.

4.0 Radiological Occurrence Reports (RORs) and Compliance with Station Radiation Protection Procedures

The inspector reviewed a sampling of RORs for the year of 1990. In general, the RORs documented isolated incidents resulting in minor impact on radiological controls at the station. However, a review of some RORs suggests that areas of program weakness may exist. The inspector noted instances where HP personnel failed to comply with station HP procedures. The RORs also suggest that practices for posting and control of radioactive material could be improved (see Section 5.0 for details).

ROR Number 90-034, initiated on October 10, 1990, noted weakness in adherence to procedures for a worker who was internally contaminated while handling radioactive material inside the Radiologically Controlled Area (RCA). There were two examples associated with the incidents involving procedure failure.

- 1) The worker's Radiation Work Permit (RWP) required continuous HP coverage. The HP Technician covering the job failed to provide continuous coverage as described in station Procedure HP-310. Continuous job coverage may have prevented an intake of contamination by the worker.
- 2) As the above mentioned worker exited the RCA, contamination was discovered in his nasal passages and facial area. The individual was decontaminated and whole body counted in accordance with station Procedure, HP-818. Later that day, the worker entered the same area and upon exit from the RCA was again found to have contamination in the nasal area. At this point, HP-818 was violated when no whole body count was provided and no Personnel Contamination Report (PCR) was initiated. HP-818, Step 6.6.6 states, "Following contamination of the nasal passages, arrange a whole body count as soon as practical" and step 6.4 states, in part, that "The Health Physics Technician shall initiate a 'Personnel Contamination Report' (Attachment 8.1) for each personnel and/or clothing contamination event...". Licensee personnel assumed that

contamination from the first entry had been dislodged from the nasal passages or that the facial area had been touched with a contaminated hand. At this point, station personnel assumed that the intake had already been adequately accounted for by the previous whole body count and PCR. However, HP-818 does not, and perhaps should not, allow discretion to be used when determining the need for a whole body count and PCR after nasal contamination is discovered.

This incident has been extensively reviewed by licensee personnel. The documentation and review process has involved generation of an ROR and Human Performance Evaluation (HPES). The evaluation included behavioral factor analysis, causal factor analysis, and situational analysis. PECO personnel collected bioassay samples to support organ dose and MPC-hour calculations. The worker has been supplied with extensive literature regarding radiation exposure risk and has discussed this incident with the radiation protection professionals at the site. The Health Physics Technicians involved in mishandling the incident have been counseled by PECO management personnel.

Compliance with Radiation Protection Procedures is required by Technical Specification 6.11. These examples of non-compliance with station procedure have been categorized together as one non-cited violation in accordance with 10 CFR 2, Appendix C, V.G., "Exercise of Discretion" for the following reasons:

- a. The incidents were identified by the licensee;
- b. The incidents constitute a Severity Level IV violation;
- c. NRC reporting criteria was not violated;
- d. Prompt and effective measures have been taken to prevent similar recurrence; and,
- e. It was not a willful violation or one which could reasonably be expected to have been prevented by corrective actions from a previous violation.

The dose to the individual was estimated to be far below regulatory limits and does not warrant NRC concern regarding the exposure risk to the worker or any other individual. However, continued occurrence of HP personnel failing to follow station procedures may be considered a programmatic weakness worthy of increased regulatory attention. Performance in this area will be the subject of future inspections.

In addition, the HPES stated that the worker was contaminated with a "pure beta emitting isotope" which could not be detected by the whole body counter. Such isotopes are not typically found in the power reactor environment and

contradict the worker's bioassay results. The inspector will review this issue further during future inspections.

5.0 Survey of "Green is Clean" Material Exiting the RCA

On a tour of the facility, the inspector noted that clear plastic bags containing "Green is Clean" trash from within the RCA were stored in the yard without labeling or controls. The material is released to the yard after technicians survey the outside of the bags for detectable radiation using a "pancake" shaped Geiger-Mueller (GM) detector. The bags are eventually shipped to a radioactive waste segregation and incineration facility. The inspector requested health physics personnel to provide the analytical basis for use of this external survey method. Calculations were performed the next day. The results indicate that the method, at best, marginally assures the ability to meet the requirements for labeling and control of radioactive material (10 CFR 20.203(f)). The inspector observed bags containing smear samples, articles of yellow protective clothing and other items typically used in contaminated areas of the RCA. Workers are instructed to place only uncontaminated material in these bags. However, several instances were documented in RORs where radioactive material was mishandled or improperly labeled. Two of these instances involved the discovery of contaminated material in "Green is Clean" trash bags.

The inspector did not observe a violation in this area. However, the potential for inadequate labeling and control, or mishandling of bags during interim storage exists. Licensee personnel stated that the "Green is Clean" survey process will receive further review and that applicable changes will be made, if needed, to ensure that adequate control, labeling and shipping requirements are satisfied. The inspector will discuss this issue with licensee personnel during future inspections.

6.0 Respiratory Protection

Several respiratory protection procedures were undergoing revisions during the inspection period. A sample review of these procedures resulted in no findings regarding regulatory compliance issues. Further review of the respiratory protection program will be performed during future inspections.

7.0 ALARA Program Performance

The 1990 personnel exposure total for Limerick Generating Station is approximately 165 person-rem. Approximately 108 person-rem may be attributed to the Unit 1 refueling outage.

This total is far below yearly person-rem total typically recorded for reactors in the United States of similar capacity and design. The 1990 Unit 1 outage was performed well below PECO estimates. Good performance was largely due to effective drywell shielding and ALARA planning efforts. Reduction in outage work scope also contributed to some degree toward exposure savings. In addition to maintaining a relatively low source term within plant systems, Fuel Pool Cooling Water Heat Exchanger and Reactor Water Clean Up system shielding assisted with exposure reductions during operation. The licensee implemented practical factors training for the all craft workers which included workshops with HP Technicians and HP professionals. Licensee personnel also attribute successful ALARA results to good cooperation with work groups and managements willingness to slow work for ALARA concerns. The early goal for the year of 1991 is estimated to be 160 person-rem. Work in 1991 is expected to include a Unit II refueling outage and a Unit I midcycle outage. This estimate is subject to change with changing work scope projections. The inspector noted that PECO continues to be strong in overall worker exposure reduction at the Limerick station.

8.0 Handling of a Contaminated Individual Requiring Immediate Medical Attention

On October 17, 1990, an Unusual Event was declared as a result of an incident where a radiation worker suffered symptoms of a heart attack in the "under vessel" area of the primary containment structure. Licensee records of the event were reviewed by the inspector. Records indicate that prompt and appropriate actions were taken on the part of the health physics staff in response to the incident. Transport of the individual was not delayed due to background radiation at the power plant which interfered with attempts to extensively survey the individual for low level contamination on exit from the RCA. Health Physics personnel accompanied the individual to the hospital to provide continued contamination control support. Medical treatment of the individual was not delayed by the relatively minor contamination control concern. Later surveys performed at the hospital indicated that the individual was free of detectable contamination. The inspector noted that HP-715 needed revision to update the telephone numbers and company currently contracted for medical assistance for contaminated individuals. Overall performance in this area was very good.

9.0 General Radiological Controls

Some recent program enhancements were noted during the course of this inspection. Postings are now being used

which state, "This Component is a Source of Radiation, Do Not Linger in this Area". The telephone extension for the Radiological Engineering Group is included on the posting. PECO expects to realize increased worker awareness to sources of exposure by making this information available in the field. Another new initiative includes adding this precaution to all applicable maintenance procedures, "Lapping/Grinding on stellite hard faced valve seats can introduce significant amounts of cobalt into reactor systems. Extreme care should be taken to limit the input of cobalt and other debris into systems during valve maintenance, AND to thoroughly clean-out all dust and debris from valves after maintenance".

10.0 Exit Meeting

A meeting was held with licensee representatives at the end of this inspection on December 7, 1990. The purpose and scope of the inspection were reviewed and the findings of the inspection were discussed.