U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-352/86-08
50-353/86-06

Docket No. 50-352
50-353

License No. NPF-29
CPPR-107

Priority - -

Category C C

Licensee: Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Facility Name: Limerick Generating Station, Units 1 and 2

Inspection At: Limerick, Pennsylvania and Philadelphia, Pennsylvania

Inspection Conducted: March 10-14, 1986

Inspector: Walter J. Pasciak for 4-1-86
Richard K. Struckmeyer, Radiation Specialist date

Approved by: Walter J. Pasciak 4-1-86
Walter J. Pasciak, Chief date
Effluents Radiation Protection Section, EPRPB

Inspection Summary: Inspection on March 10-14, 1986 (Combined Inspection Report Nos. 50-352/86-08; 50-353/86-06

Areas Inspected: Routine, announced inspection of radiological environmental monitoring program, including: management controls for these programs; the licensee's program for quality control of analytical measurements; implementation of the radiological environmental monitoring program and the meteorological monitoring program; and, training and qualifications of personnel involved with these programs.

Results: Within the areas inspected, no violations were found.

1. Individuals Contacted

Philadelphia Electric Company (PECo) Corporate Offices

Engineering and Research Department - Mechanical Engineering Division

*R. Mulford, Engineer in Charge, Nuclear and Environmental Section
*A. Diederich, Supervising Engineer, Environmental Branch
*A. Marie, Senior Engineer, Environmental Branch
*G. Rombold, Engineer, Environmental Branch
J. Elser, Technical Assistant, Environmental Branch

Engineering and Research Department - Quality Assurance Division

W. Baxter, Branch Head, Technical Services Branch, Office Section
J. Evans, Branch Head, Projects Branch, Office Section
*L. Ferraro, Quality Assurance Engineer

Engineering and Research Department - Testing and Laboratories Division

J. Smerke, Senior Engineer, Materials Laboratories Branch
J. Annable, Technical Assistant, Materials Laboratories Branch

Electric Production Department - Quality Assurance Division

*C. Mengers, General Supervisor, Audit Section
V. Lucia, Training Coordinator
*J. Nagle, Licensing

*Denotes those present at the exit meeting on March 14, 1986, at PECo Corporate Office.

Limerick Generating Station (LGS)

**G. Leitch, Plant Manager
C. Endriss, Regulatory Engineer
**L. Perkoski, Sr. Technical Assistant, Testing & Laboratories
**D. Ciarlone, QA Engineer, Engineering & Research Department
**V. Cwietniewicz, I&C Engineer
D. Wahl, Project Scientist, Canberra-RMC
J. Kostige, Consultant, Canberra-RMC

**Denotes those present at the exit meeting on March 10, 1986, at LGS.

2. Management Controls

The inspector reviewed the licensee's management controls for the environmental monitoring program, including assignment of responsibility, program audits, and corrective actions for identified inadequacies and problem areas in the program.

a. Assignment of Responsibility

The inspector reviewed the organization and administration of the environmental monitoring program. The program is administered by a PECo corporate engineer, who has responsibility for review of the contractor's performance of the radiological environmental monitoring program. The engineer reports to the Supervising Engineer, Environmental Branch. This individual reports through the Engineer-in-charge of the Nuclear and Environmental Section, to the Chief Mechanical Engineer of the Mechanical Engineering Division, to the Vice President in charge of the Engineering and Research Department.

Radiological analyses are contracted to Teledyne Isotopes, which, on July 1, 1983, took over the program formerly carried out by Radiation Management Corporation (RMC). RMC continued to provide environmental TLD services until the fourth quarter of 1985, at which time Teledyne Isotopes also assumed responsibility for this program.

b. Audits

The inspector reviewed audits of the Radiological Environmental Monitoring Program, including corporate activities and contractor activities. Audits of the corporate REMP oversight are performed by the Quality Assurance Division of the Electric Production Department. This Department is separate from the Engineering and Research Department, in which the responsibility for the REMP is located. Each Department reports to a different Vice President.

Audits of Teledyne Isotopes are carried out by the Quality Assurance Division of the Engineering and Research Department.

The inspector reviewed the following audits conducted by the QA Division of the Electric Production Department:

- AL 84-76 PL, "Offsite Radiological Environmental Monitoring Program, and LGS Environmental Protection Plan," October 2, 1984 - January 18, 1985

- AL 85-40 HP, "LGS Liquid/Gaseous Effluent Releases," April 29, 1985 - May 16, 1985

- AL 85-62 HPC, "LGS Onsite Radiological Monitoring Program," July 24, 1985 - September 10, 1985

- AL 85-69 HP, "Limerick Offsite Dose Calculation Manual," August 5, 1985 - August 9, 1985

With the exception of audit No. AL 85-40 HP, there were no unacceptable findings identified in these audits. Two deficiencies were noted in AL 85-40 HP, both of which were closed in audit No. AL 85-102 PR, "LGS Corrective Action Program." The inspector found the above referenced audits to be reasonably thorough, and noted that the auditors were qualified per the licensee's procedure QADP-14.

The inspector noted that the LGS Technical Specifications require an audit of the REMP once per 12 months. This is reflected in the licensee's procedure QADP-6, Revision 10, "Quality Assurance Division Audit Program - Preoperational and Operational Phases." The only such audit performed since LGS-1 began commercial operations was performed October 2, 1984 to January 18, 1985, and another audit had not been scheduled to occur within the 12-month period. However, the licensee's Technical Specifications permit an extension not to exceed 25% of the surveillance interval. The licensee stated that an audit of the REMP would be scheduled and performed prior to the end of the extension period. This will be reviewed in a subsequent inspection (352/86-08-01).

The audit of Teledyne Isotopes is performed in accordance with the Engineering and Research Department QA Division procedures. Procedure QAI 18-4 states criteria for the frequency of audit of suppliers, including suppliers of services such as Teledyne Isotopes. The licensee has chosen to audit Teledyne at the minimum frequency (once per 3 years) permitted per its FSAR commitment to USNRC Regulatory Guide 1.144. One audit has been conducted, on February 22-24, 1984, and is documented in Audit Report No. OP-273. The inspector reviewed the audit checklist, audit report, findings, and resolution of unacceptable findings. All of the latter have been closed. The audit was performed by a qualified lead auditor, and appeared to be quite thorough and of sufficient technical depth to adequately assess the contractor's capabilities and performance. Nevertheless, the auditor was not considered to be a technical specialist.

The Environmental Branch (Mechanical Engineering Department) also conducts Technical Reviews of its contractor laboratory; however, these have no specified frequency. A licensee representative stated that these reviews are conducted as necessary to assure itself that the contractor is performing as expected and meeting the requirements of the licensee's purchase order.

The inspector stated that the three-year audit of Teledyne may benefit by including one or more Technical Specialists associated with the REMP, and that this would also ensure a maximum of three years between Technical Reviews.

3. Implementation of the Radiological Environmental Monitoring Program

The inspector reviewed the licensee's commitments pertaining to its operational radiological environmental monitoring program, by discussions with the licensee, by review of reports, and by direct observation. The inspector concluded that an effective program is in place, and that it conforms to the licensee's Technical Specifications.

The inspector examined selected environmental monitoring stations including water sampling stations, air samplers for iodines and particulates, and TLDs for direct radiation measurement. All equipment at these stations was operational at the time of the inspection. The inspector reviewed procedures and records for calibration and maintenance of the air samplers and vacuum gauges, and found that these calibrations were performed regularly and on schedule.

The inspector reviewed the following reports prepared by Teledyne Isotopes for the licensee:

- Preoperational Radiological Environmental Monitoring Program Report, January 1, 1982 through December 21, 1984;
- Regional Radiological Environmental Monitoring Program Report #1, December 22 through December 31, 1984;
- Draft copy of Regional Radiological Environmental Monitoring Report #2, January 1 through December 31, 1985.

These reports provided thorough summaries of the environmental sampling and analyses conducted during the stated periods. Exceptions to the program (e.g., missing data) were noted and explained. The results of Teledyne's participation in the EPA Cross Check program are summarized.

4. Meteorological Monitoring

The inspector examined the licensee's meteorological monitoring system, including the primary and backup meteorological towers, the recorder charts in the equipment houses at each tower, and the charts in the control room.

The inspector also reviewed the Surveillance Test Procedures for calibration of the wind speed, wind direction, temperature, and ΔT sensors on the two towers. The licensee's Technical Specifications require calibration of certain sensors on a semi-annual basis. The inspector reviewed selected records of these calibrations and determined that they had been performed adequately and at the required frequency.

The inspector reviewed procedure ST-2-036-416-0, Revision 2, "Meteorological Monitoring - Wind Direction Tower 2, Elevation 159 Ft. Calibration," performed on November 14, 1985. A note attached to the completed procedure indicated that procedural steps referenced in Table 1 did not exist in the

body of the procedure. However, all the necessary steps were in the procedure; a revision to this and a similar procedure for the wind direction sensor at 304 ft. resulted in a new format for Table 1 that matched the steps of the latter procedure, but not those of the former. There was no indication on the note as to whether it had been written by the technician who performed it, or by a reviewer. The inspector stated that the technician or reviewer should have initiated a Temporary Procedure Change. The licensee acknowledged this oversight, and took correct actions prior to the completion of this inspection. The necessary changes were made to the procedure, and Revision 3 was reviewed and approved on March 11, 1986. In addition, during a meeting of I&C technicians on March 12, 1986, the importance of implementing Temporary Procedure Changes was stressed. Because of the minor nature of the problem and the licensee's prompt corrective actions, no violation was issued.

5. Quality Assurance

The licensee described the methods used by its contractor laboratory, Teledyne Isotopes, to assure the accuracy of its analytical measurements. These include participation in the EPA crosscheck program, an intralaboratory program for analysis of spiked, split, and blank samples, and a program for analysis of duplicate and replicate samples from various locations and sample media within the LGS radiological environmental monitoring program. The quality of environmental TLD measurements is supported by two programs: A study to demonstrate compliance with USNRC Regulatory Guide 4.13 ("Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications"), and periodic participation in the International Environmental Dosimeter Intercomparison Project.

The inspector reviewed selected quality control data submitted to the licensee by its contractor. These data indicate that the contractor's results are for the most part in agreement with the EPA values and that its intralaboratory results are normally in agreement with the actual values. For those instances in which the results did not agree, reasons for the differences were investigated and the discrepancies were resolved. Generally good agreement was noted among the licensee's duplicate and replicate samples.

With regard to the environmental TLDs, the results of the sixth (1982) and seventh (1984) International Environmental Dosimeter Intercomparisons indicated reasonable agreement between Teledyne Isotope's results and the known exposures. The study performed by Teledyne to demonstrate compliance with Regulatory Guide 4.13 resulted in agreement in seven out of eight tests. (The tests are described in ANSI N545-1975, which is referenced by the Regulatory Guide.) The test for "dependence of exposure interpretation on the length of the field cycle" (section 4.3.3 of ANSI N545-1975), requires the testing laboratory to compare the results of TLDs exposed for a period equal to the field cycle (F_1) to TLDs exposed for a period equal to exactly half the field cycle (F_2) under constant exposure-rate conditions. The test is to be performed at the temperature used for

calibration, and at the minimum and maximum temperature conditions expected in the field. At the extreme temperature conditions, the ratio $F_1/(2 \cdot F_2)$ shall not be less than 0.85. The result reported by Teledyne Isotopes for the test conducted at the upper temperature extreme (normally 50°C in the test) was 0.81, which is below the minimum acceptable ratio. At the lower and normal (calibration) temperatures, acceptable results were achieved. The discrepancy was not explained, although the study did note that the temperature had increased to near 70°C near the end of the full cycle. Teledyne Isotopes has committed to retest the TLDs for compliance to ANSI N545-1975, paragraph 4.3.3. The results of this study will be reviewed in a subsequent inspection (352/86-08-02).

6. Training

The inspector discussed with the licensee its training program for personnel involved with the LGS radiological environmental monitoring program. The procedure relevant to this training was reviewed:

NES 2.0 "Procedure for Specification of Qualifications of Personnel in Radiological Environmental Monitoring and Indoctrination and Training"

Revision 3 of this procedure was issued in October 1985. All personnel associated with the LGS REMP are required by this procedure to receive the specified training, which includes reviews of the station Quality Assurance Plan, Technical Specifications, and USNRC Regulatory Guide 4.15.

The records indicated that those individuals requiring this training had received it as of September 1985.

Section 6.2.2 of procedure NES 2.0 requires "Records as shown on Exhibit 2.0-I shall be filed and maintained in the Nuclear Records Management System (NRMS)... It shall be maintained for the life of the plant." Exhibit 2.0-I is a copy of the form used for indicating that Environmental Branch personnel have received the training required by NES 2.0. A licensee representative stated that he did not know for certain whether the form had been sent to the NRMS, but that the current form would be sent, and in the future, the form will be transmitted to the NRMS each year after it is signed by the affected personnel. This will be reviewed in a future inspection (352/86-08-03).

7. Exit Interview

The inspector met with licensee representatives denoted in Detail 1 at the conclusion of the inspection at the LGS site on March 10, 1986, and at the PECo corporate offices on March 14, 1986. The inspector summarized the purpose and scope of the inspection, and discussed the findings. At no time during this inspection was written material provided to the licensee by the inspector.