U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-277/84-25
50-278/84-21

Docket Nos. 50-277
50-278

License No. DPR-44
DPR-56 Priority -- Category C

Licensee: Philadelphia Electric Company

2301 Market Street

Philadelphia, Pennsylvania 19101

Facility Name: Peach Bottom Atomic Station, Units 2 and 3

Inspection At: Delta, Pennsylvania

Inspection Conducted: August 20-23, 1984

Inspectors: Bruce H. Carson for
F. Costello, Senior Radiation Specialist — 11/2/84 date

Bruce H. Carson for
J. Jang, Radiation Dosimetry Specialist — 11/2/84 date

John A. Cioffi
J. Cioffi, Radiation Specialist — 11/2/84 date

Bruce H. Carson
B. Carson, Radiation Specialist — 11/2/84 date

Approved by: W. J. Pasciak
W. J. Pasciak, Chief, BWR Radiation Safety Section — 11/2/84 date

Inspection Summary:

Inspection on August 20-23, 1984 (Report Nos. 50-277/84-25 and 50-278/84-21)

Areas Inspected: Routine, unannounced inspection of the licensee's whole body counting program. Areas reviewed included: Organization, training, facilities and equipment, dosimetry processing procedures, quality assurance, documentation and recordkeeping and an independent performance test.

Results: One violation was identified: Failure to adhere to procedure in accordance with Technical Specification 6.11 (two examples); failure to implement procedure to track the loss rate of TLDs by work group (paragraph 5) and failure to develop and apply a TLD correction factor (paragraph 6).

DETAILS

1. Persons Contacted

Licensee Personnel

*A. Hilsmeier, Senior Health Physicist
*D. Smith, Assistant Station Superintendent
*N. Gazda, Applied Health Physics Supervisor
*T. Wilson, Quality Assurance Site Supervisor
W. Knapp, Corporate Radiation Protection Section
W. Preston, Technical Assistant, Dosimetry
D. Barron, Physicist, Technical Support

Other licensee and contractor employees were also contacted or interviewed during this inspection.

2. Organization

The responsibility for the Peach Bottom dosimetry program is assigned to the Health Physics Department. This department provides dosimetry services in support of Unit 2 and Unit 3. Dosimetry of record is provided by an offsite vendor, Eberline Instrumentation Corporation, while the licensee provides supplementary dosimetry for daily exposure control. A physicist in the Technical Support group provides assistance Dosimetry personnel. Dosimetry is staffed by contractor personnel as well as Philadelphia Electric Company employees.

3. Training

The inspector reviewed records pertaining to the qualifications and training of the individuals involved in the processing of personnel dosimetry. The inspector determined that the Technical Assistant, Dosimetry, who is responsible for the daily activities of the dosimetry program, had assumed this position approximately eleven months previously and had received no formal training in external dosimetry. In the licensee's response to the 1980 NRC HP appraisal, the licensee stated that additional formal training in external and internal dosimetry would be provided to dosimetry supervisory personnel. During the course of this inspection and at the exit meeting licensee representatives stated that this formal training would be provided to the T.A., Dosimetry. This matter will be examined in a subsequent inspection. (50-277/84-25-01)

Licensee representatives stated that the personnel who routinely worked in dosimetry were classified as "keypunch operators" and received their training on the job and that there was no formal determination of their competency. Licensee representatives stated that a means would be provided to determine and document the competency of personnel who work in dosimetry and to ensure that these personnel became familiar with changes in dosimetry procedures. These matters will be examined in a subsequent inspection. (50-277/84-25-02)

The inspectors discussed the licensee's dosimetry procedures with the key-punch operators. These discussions indicated that they were generally familiar with these procedures.

4. Facilities and Equipment

The inspector toured the facilities used by the licensee for the processing of personnel dosimetry. The inspector noted that a room was dedicated for this purpose and that bench space and other services appeared adequate. The licensee uses a Model 2271 Harshaw TLD reader to process its daily dosimeters. Dosimetry data is sent through a computer terminal to the licensee's main frame computers at the corporate office in Philadelphia. This reader is used to measure doses to the Harshaw two-element dosimeters which determine personnel dose on a daily basis. The elements of this dosimeter are lithium fluoride. Element one is unshielded and data from this element is not normally used. Element two is shielded and is used to measure gamma doses. Each dosimeter is held in a holder which is color-coded according to the dose limit of the assigned individual.

Self-reading pocket dosimeters are also assigned to workers who use these to monitor their doses during the day. In addition, the data from self-reading dosimeters are recorded on radiation work permits (RWP) and used by the ALARA group to determine the dose received during particular jobs.

The licensee assigns Eberline extremity dosimeters when the health physics personnel preparing the RWP believe that they are required. Licensee personnel stated that they had established no criteria for the assignment of extremity or other supplementary dosimetry such as dosimetry for the head. Licensee personnel stated that they would modify the RWP procedure to incorporate criteria for the assignment of extremity and other supplementary dosimetry. (50-277/84-25-03)

The licensee does not provide personnel neutron dosimetry but rather uses neutron survey meters to establish neutron dose rates. Licensee representatives stated that they possess four Eberline "rem-balls" which have been calibrated by the National Bureau of Standards using a moderated Californium - 252 source. The dose rate measured by these instruments would be multiplied by the stay time to determine dose in the event of neutron exposure.

5. Dosimetry Processing Procedures

The inspector discussed with licensee personnel the procedures for processing of personnel dosimetry. Based on these discussions and a review of the licensee's procedures, the inspectors made the following determinations with respect to routine processing:

- The Harshaw 2271 reader is cleaned and calibrated on a daily basis. The calibration is performed with a strontium-90 source.

- If the reader's response differs from the dose by more than 2% on a given day, the high voltage is adjusted to correct the response of the reader.

- Harshaw TLDs are calibrated on an element-by-element basis prior to first use and after each 50 times the dosimeter is processed.

- The acceptance criteria for Harshaw TLDs require that the residual dose be less than 10 mr, that element sensitivity factors be in the range 0.8-1.2 and that the most recent sensitivity factor be within 10% of the previously measured value.

The licensee's Harshaw dosimeters are processed each day of use while the Eberline dosimeters are normally exchanged on a monthly basis. Workers are given their routine dosimeters at a security checkpoint and leave them there at the end of the day. The inspector discussed with the licensee his methods for identifying and monitoring lost dosimeters. Licensee representatives stated a dose estimate is made prior to the replacement of lost dosimetry but that there was no specification of the qualification of the individuals who can make this dose estimate. Licensee representatives stated that the lost dosimetry procedure (HPO/CO-13B) would be modified to ensure that a dose estimate is made prior to the replacement of lost dosimetry (Harshaw or Eberline) and to specify the qualifications of the individuals who can make this dose estimate. This matter will be examined in a subsequent inspection (50-277/84-25-04)

The inspector reviewed the licensee's program for tracking dosimeter loss rates by work group. The inspector noted that a procedure (HPO/CO-13E) had been developed to perform this function but, according to licensee representatives, this procedure had never been implemented. The inspector stated that this failure to adhere to a procedure for personnel radiation protection as required by Section 6.11 of the Technical Specification was a violation. (50-277/84-25-05)

When the Harshaw dosimeters are processed on a daily basis, the data from the unshielded element is not used to estimate beta dose. The inspector expressed a concern that a significant beta dose might be overlooked if there were no procedure for routinely reviewing the unshielded element data. Licensee representatives stated that a procedure would be developed to ensure that the Harshaw TLD readings are screened to detect possible beta doses and to specify the follow-up action if beta doses are observed. This matter will be examined in a subsequent inspection. (50-277/84-25-06)

6. Quality Assurance

The inspector reviewed the licensee's procedures for assuring the quality of their personnel radiation monitoring. Licensee representatives stated that the site Quality Assurance program includes the dosimetry program as part of its routine audits. The inspector reviewed the results of recent audits of the dosimetry program. The inspector noted instances where deficiencies were identified and subsequently corrected by licensee personnel.

The inspector also noted that audits had been conducted at Eberline, Incorporated, which provides dosimetry of record, and Radiation Management Corporation which provides calibration services. Eberline was last audited in 1982 and Radiation Management Corporation was last audited in 1984.

The inspector reviewed the licensee's procedures for quality control in the dosimetry laboratory. Licensee representatives stated that monthly irradiation of both Harshaw and Eberline TLDs are performed by Radiation Management Corporation as a means of quality control. Based on the results of these irradiations, the licensee calculates correction factors for the Eberline TLD data for that month. The mean Eberline correction factors for the first 6 months of 1984 are listed below.

Month	Eberline Correction Factor
January	1.150
February	1.134
March	1.129
April	1.064
May	1.094
June	1.212

The inspectors noted that these data indicate that the Eberline data was 5-20% lower than the NBS-traceable exposure given by Radiation Management Corporation. The inspector also noted that the licensee was using an acceptance criteria procedure for these quality control irradiations which had been developed for use with counting systems and which was inappropriate for use in dosimetry. Licensee representatives stated that the procedure for personnel dosimetry quality control, HPO/CO-32, would be modified to reflect the ANSI N13.11 acceptance criteria for dosimetry processors. This matter will be examined in a future inspection. (50-277/84-25-07)

Licensee representatives stated that correction factors were not developed and applied to the Harshaw TLDs as required by procedure HPO/CO-32. The inspector stated that this failure to adhere to a radiation protection procedure as required by Section 6.11 of the Technical Specifications was a violation. (50-277/84-25-08)

The inspectors reviewed the licensee's daily calibration data for the Harshaw TLD reader. It was noted that there were instances where the day-to-day variations of the reader response were such that they indicated possible instability of the reader. Licensee representatives stated that they would establish a procedure to monitor the daily Harshaw TLD reader calibration data to detect trends which might indicate degraded or unstable reader performance. Licensee representatives stated that they would consider the use of control charts or tables for this purpose. This matter will be examined in a future inspection. (50-277/84-09)

The inspector reviewed the licensee's program for comparing the results of its Eberline TLD monitoring with those from his daily Harshaw TLD readings. The inspector noted that the licensee investigates discrepancies between the two dosimetry systems which are greater than 25%. The inspector reviewed a selected sample of recent investigations pertaining to discrepancies between Eberline and Harshaw TLD results. The inspectors noted that these investigations appeared to have been performed in a conservative manner. The application of the correction factor to the Eberline data has had the effect of reducing the number of these discrepancies.

The inspector reviewed the licensee's program for ensuring the quality of the beta doses reported by its dosimetry vendor, Eberline Instrument Corporation. The inspector noted that a procedure had been developed to expose test dosimeters to a known dose of a uranium slab and to compare Eberline's results with the known doses. The inspector determined that this procedure (HPO/CO-32A) included no required frequency and was, in fact, not being implemented. Licensee representatives stated that this test of the beta response of its Eberline dosimeters would be performed on a quarterly basis and evaluated using the acceptance criteria of ANSI N13.11. This matter will be examined in a future inspection. (50-277/84-25-10)

7. Documentation and Recordkeeping

The inspector reviewed the licensee's methods for documenting its dosimetry processing, dose assessment, quality control program, and personnel dose histories. Licensee representatives stated that all raw data, dose records of dose assessments, and personnel dose histories will be maintained indefinitely.

The inspector discussed with licensee representatives the methods of distributing personnel dose reports within the site. Licensee representatives stated that a report which includes personnel doses based on the most recent Eberline and Harshaw TLD data was issued daily. The inspectors reviewed selected samples of these reports.

The inspectors reviewed the licensee's program for providing required termination reports for monitored individuals. Selected instances of terminations of contractor and licensee employees were examined and, in each instance, the required termination reports had been provided.

No violations were identified.

8. Independent Performance Test

The inspector arranged to have 50 of the licensee's dosimeters sent to Idaho National Engineering Laboratory for a test of their performance. The results of this performance test will be provided in a future inspection report. (50-277/84-25-11)

9. Exit Interview

The inspector met with the licensee's representatives (denoted in paragraph 1) at the conclusion of the inspection on August 23, 1984. The inspector summarized the purpose and scope of the inspection and identified findings as described in this report.

At no time during this inspection was written material provided to the licensee by the inspectors.