U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-334/78-22

Docket No. 50-334

License No. DPR-66 Priority _____ Category C

Licensee: Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Facility Name: Beaver Valley Power Station, Unit No. 1

Inspection at: Shippingport, Pennsylvania

Inspection conducted: ~~August 30~~ - September 1, 1978

Inspectors: _____ 9/21/78
J. R. White, Radiation Specialist date signed

_____ date signed

_____ date signed

Approved by: _____ 9-22-78
P. J. Knapp, Chief, Radiation Support Section date signed

Inspection Summary:

Inspection on August 30-September 1, 1978 (Report No. 50-334/78-22)
Areas Inspected: Special, unannounced inspection by one NRC regional based inspector of the Radiation Protection Program activities relating to the current outage. Areas examined included radiation protection procedures, pla ing and preparation, exposure control, posting, labeling and control, respiratory p ection, and surveys. Upon arrival at the plant, a tour of the containment work areas was made to review the implementation of the radiation protection program. The inspection involved 20 inspector-hours on site by one NRC regional based inspector.
Results: Of the six areas inspected, one item of noncompliance was found in the following area (infraction - failure to control high radiation areas in accordance with Technical Specification 6.13, Paragraph 7).

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DETAILS

1. Persons Contacted

*Mr. J. A. Werling, Station Superintendent
*Mr. J. W. Wenkhous, Radiation and Chemistry Engineer
*Mr. J. A. Kosmal, Radiation Protection Manager (Acting)
Mr. E. A. Schnell, Radiation Protection Foreman
Mr. D. L. Arnold, Radiation Protection Foreman
*Mr. J. A. Hrivnak, Quality Assurance Representative
Mr. J. M. Featherston, Technical Engineer
Mr. J. V. Vassello, Training Supervisor
*Mr. J. J. Maracek, Safety Engineer
Mr. S. Lacey, Shift Supervisor
*Mr. H. P. Williams, Chief Engineer
*Mr. R. L. Hansen, Quality Control Engineer
*Mr. S. C. Fenner, Quality Assurance Engineer
*Mr. F. J. Lipchick, Quality Assurance Representative
*Mr. L. G. Schad, Operations Supervisor
*Mr. R. M. Malfrice, Results Coordinator

* denotes those individuals attending the exit interview.

The inspector interviewed several other licensee employees including members of the Radiation Safety and Chemistry staff.

2. Licensee Action on Previous Inspection Findings

References:

(a) Notice of Violation (Inspection Report 78-11), dated May 18, 1978

(b) Licensee's Response Letter to Inspection Report 78-11, dated June 12, 1978

(c) NRC Reply Letter, dated June 28, 1978

(Closed) Noncompliance (334/78-11-01): Failure to audit the conformance of facility operation to Technical Specifications as required by Technical Specification 6.5.2.8. The inspector examined the licensee's corrective action as described by reference (b). The audit was initiated on May 10, 1978; and the licensee has completed 25% of the requirement as of this inspection. Expected completion date is May 9, 1979, as noted in reference (c).

3. Licensee Action on IE Bulletins

References:

(a) IE Bulletin No. 78-07, "Protection Afforded by Air-Line Respirators and Supplied Air Hoods", dated June 12, 1978

(b) Licensee's Response to IE Bulletin 78-07, dated August 8, 1978

(c) IE Bulletin No. 78-08, "Radiation Levels from Fuel Element Transfer Tubes", dated June 12, 1978

(d) Licensee's Response to IE Bulletin 78-08, dated August 7, 1978

(Closed) IE Bulletin (334/78-BU-07): The licensee's response (b) to reference (a) stated that air-line respiratory equipment operated in the demand mode is not used at the station. In regards to air-supplied hood equipment, the licensee has performed calibration of equipment used to supply air to the hoods in order to determine pressure and flow rate values. The equipment is operated in accordance with the recommendations of reference (a). A procedure will be developed to provide periodic calibration of the air-supply to hood equipment.

(Closed) IE Bulletin (334/78-BU-08): The licensee's response (d) to reference (c) was reviewed. The licensee has identified eight potential high radiation areas which may develop when fuel elements are transferred in the fuel transfer tube. Design and engineering evaluations are in progress to determine the additional safety and shielding requirements necessary to assure adequate control during fuel transfer operations. Special radiation surveys are planned to determine the extent of radiation intensity when the transfer tube is utilized during the first refueling outage scheduled in March 1979.

Input from the review and analysis of Unit I will be provided to amend as necessary the configuration of the Unit II transfer tube, now under construction.

4. Planning and Preparation

The planning and preparation for Steam Generator In-Service Inspection (ISI), Eddy Current Testing was reviewed with regard to the radiation protection aspects of the work.

The following was noted:

1. The Westinghouse personnel performing the testing had been previously trained for the function by the vendor. The training included both technical and radiation protection considerations associated with the testing. The licensee further trained personnel in plant-specific considerations prior to performance of work.

2. Containment tents were erected for each Steam Generator to assure that contamination and airborne radioactivity would be effectively controlled for the duration of the work.

3. Ventilation equipment was set-up for each Steam Generator being tested in order to minimize exposure of personnel to airborne radioactivity. The configuration used by the licensee (ventilation suction established on the cold leg plenum so as to cause an inward draft through the hot leg plenum was noted by the inspector as sufficient to cause a reduction in the concentration of airborne radioactivity by a factor of at least 100 through the majority of the operation.

4. A full-time decontamination crew was assigned to assure that loose surface contamination was effectively eliminated before significant build-up could occur.

5. Continuous Health Physics coverage was provided for the duration of Steam Generator testing by technicians qualified in accordance with ANSI-N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel."

The inspector also reviewed the preparations in progress for replacing the piston seals on certain Bergan-Patterson snubber installations. Due to high dose rates measured at some work locations, the licensee is evaluating the installation of temporary shielding to support the snubber maintenance.

No items of noncompliance were noted in this area.

5. Exposure Control; Surveys

The licensee's system of exposure control for those personnel entering the Steam Generator plenums in support of ISI was reviewed against the following requirements:

10 CFR 20.103, "Exposure of individuals to concentrations of radioactive materials in restricted areas";

10 CFR 20.201, "Surveys";

10 CFR 20.202, "Personnel Monitoring"

Surveys of both Steam Generators indicated that whole-body penetrating radiation is approximately 12 rem per hour on contact with the tubesheets; and approximately 10 rem per hour in most general areas of the plenums (hot leg).

The licensee's evaluation of non-penetrating radiation (i.e., beta; soft gamma) indicated that such exposure is negligible due to the shielding effected by the protective clothing required for Steam Generator entries. This was verified by the TLD values from subsequent personnel who had entered the steam generators.

Personnel Monitoring was accomplished by providing TLD dosimetry devices for head, chest and extremities; and controlling personnel exposure as determined by the highest indicated value exhibited by either the head or chest TLD and extremity TLD's.

Monitoring of airborne concentrations of radioactivity was accomplished by locating air sample filter holders, attached to a low volume air pump, in the representative breathing zone of the personnel making entry to steam generators. With the ventilation system operating, air samples generally indicated 5×10^{-9} uC/ml, I-131; and 1×10^{-8} uC/ml, particulate. Personnel exposures, considering the protection afforded by the respiratory protective equipment (atmosphere supplying, full-face, continuous flow respirator) were noted by the inspector as being generally less than 1 MPC-hour per day.

No items of noncompliance were noted in this area.

6. Radiation Protection Procedures

The following procedures implemented as necessary to the support the current outage were reviewed against the requirements of Technical Specification 6.11, Radiation Protection Program.

Radiological Control Manual, Chapter 3, Procedure No.	Title
2.1	Area Entry Requirements
*2.4	Area Posting
7.1	Area Contamination Survey
7.2	Area Radiation Survey
7.3	Airborne Particulate Sampling
8.1	Radiological Work Permit
10.1	Respiratory Equipment
10.2	Respiratory Equipment: Training, Fitting and Testing

* See Paragraph 7

No items of noncompliance were noted in this area.

7. Posting, Labeling and Control

On August 30 and 31, 1978, the inspector toured the reactor containment building to review control of restricted areas and radioactive material against the following requirements:

-- 10 CFR 20.103, "Caution signs, labels, signals and controls";

-- Technical Specification 6.13, "High Radiation Areas".

Technical Specification 6.13.1.a states, "In lieu of the "control device" or "alarm signal" required by paragraph 20.203(c)(2) of 10 CFR 20 ... Each High Radiation Area in which the intensity of radiation is greater than 100 mrem/hr but less than 1000 mrem/hr shall be barricaded and conspicuously posted as a High Radiation Area and entrance thereto shall be controlled by issuance of a Radiation Work Permit and any individual or group of individuals permitted to enter such areas shall be provided with a radiation monitoring device which continuously indicates the radiation dose rate in the area."

The inspector noted that this requirement is implemented by the Radiological Control Manual, Chapter 3, Procedure 2.4, "Area Posting", Section 3.2, High Radiation Area Posting, which requires the licensee to post any area in which there exists radiation at such levels that a major portion of the body could receive a dose rate of 100 mR/hr and is accessible to personnel as a HIGH RADIATION AREA and to confirm the area has a barrier posted with HIGH RADIATION AREA warning sign and the current radiological code.

On August 31, 1978, the inspector ascended the circular stairway from elevation 692 to elevation 767. In normal operating conditions, this stairway is barricaded, posted and controlled as an Exclusion Area due to the high radiation intensity in the vicinity common to reactor operation. At this time it was noted by the inspector that the stairway was accessible to personnel; and the normal postings and barricades were not in place to prevent use of the stairway.

At elevation 718, the stairway provided access to the Pressurizer Relief tank (RC-TK-2) and various Pressurizer Relief valves. In this vicinity, general area, dose rates were measured by the inspector and noted to be as high as 140 mrem per hour. All other access to this area, excepting the stairway, was posted, barricaded and controlled in accordance with the technical specification. However, it was possible to enter a 140 mrem/hour field without passing through a barricade or observing any posting signs.

The inspector noted that failure to fully post and barricade this high radiation area constituted noncompliance with Technical Specification 6.13. (334/78-22-01)

8. Respiratory Protection Program; Internal Exposure Control

a. The inspector established through questioning licensee representatives and reviewing records that the licensee makes allowance for the use of respiratory protective equipment in limiting the inhalation of airborne radioactive material. The inspector reviewed the licensee's respiratory protection program against the following:

-- 10 CFR 20.103, "Exposure of individuals to concentrations of radioactive materials in air in restricted areas."

-- Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection.

-- NUREG-0041, Manual of Respiratory Protection Against Airborne Radioactive Materials

Regulatory Guide 8.15, which augments the regulatory requirements of 10 CFR 20.103, states in Section C.8.a, "Respirable air of approved quality and quantity is to be provided and oxygen deficiency is to be avoided (NUREG-0041, Sections ... 9.8)."

NUREG-0041, Section 9.8, "Maintenance of Air and Oxygen Supplies," requires that procedures for the maintenance of a supply of respirable air or oxygen are included as part of the respiratory protection equipment program and that compressor supplied air systems are to be maintained and used in accord with appropriate standards and recommendations.

The inspector further noted that 29 CFR 1910.134(d), "Occupational Safety and Health Standards, Respiratory protection; Air quality", states, "Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration shall be of high purity ... Breathing air shall meet at least the requirements of the specification for Grade 'D' breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966."

Compressed Gas Commodity Specification on (CGS) G-7.1-1966 (also designated as ANSI.Z86.1-1972) is also referenced in NUREG-0041, Chapter 5, Classification, Description, and Limitations of Respirators.

NUREG-0041 also recommends that compressed air for breathing purposes meet Grade "E" specifications; that as recommended in ANSI Z88.2-1969, "Practices for Respiratory Protection", Grade "D" air should be regarded as the limit for air of deteriorating quality.

On August 31, 1978, the inspector noted that the licensee's breathing air supply, utilized to support Steam Generator ISI Eddy Current Testing, was obtained from the station's Instrument Air System. The licensee's representative indicated that since the compressors used for this system are "oil-less" (i.e., electrically driven with teflon shaft seals) and the air intakes are located in a non-radiologically controlled area, it was assumed that the air quality was acceptable without demonstrating the specifications of CGS G-7.1-1966. Consequently, the licensee could not provide assurance that the air quality was maintained in accord with the appropriate standards and recommendations.

The inspector noted that the contention regarding the design of the compressors used to supply breathing air would be evaluated to determine if there was sufficient bases for exempting the licensee from actually demonstrating the quality of the breathing air; and indicated that this item would be unresolved pending this evaluation. (334/78-22-02)

b. The inspector reviewed the personnel exposure records of 10 individuals against the regulatory requirements of 10 CFR 20.103 pertaining to internal deposition of airborne radioactivity.

No items of noncompliance were identified.

9. Exit Interview

The inspector met with licensee management representatives (denoted in Paragraph 1) at the conclusion of the inspection on September 1, 1978. The inspector summarized the purpose and scope of the inspection and the findings. The licensee's representatives made the following remarks in response to certain of the items discussed by the inspector.

-- Indicated that action would be taken to control the high radiation area in the vicinity of the pressurizer relief valves in accord with Technical Specification 6.13.

-- Contended that the requirements specified by the inspector were not applicable to the station's air system used to supply breathing air, since the air compressors were of an "oil-less" design.