U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-387/87-19
50-388/87-19

Docket Nos. 50-387
50-388

License Nos. NPF-14
NPF-22

Priority -- / --

Category C / C

Licensee: Pennsylvania Power and Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station, Unit 1 and 2

Inspection At: Berwick, Pennsylvania

Inspection Conducted: October 13-16, 1987

Inspectors: R. L. Nimitz, Senior Radiation Specialist — 11/25/87 date

M. T. Markley, Radiation Specialist — 11/25/87 date

Approved by: M. M. Shanbaky, Chief, Facilities Radiation Protection Section — 11/25/87 date

Inspection Summary: Combined Inspection Nos. 50-387/87-19 and 50-388/87-19

Areas Inspected: Routine, unannounced radiological controls inspection during the outage. Areas reviewed were: organization and staffing; training and qualifications, ALARA, external exposure controls, internal exposure controls and radioactive and contaminated material control. Several incidents were also reviewed.

Results: One apparent violation was identified (Failure to use qualified personnel - details Section 4).

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DETAILS

1.0 Individuals Contacted

1.1 Pennsylvania Power and Light

H. Keiser, Vice-President
*R. Byram, Plant Superintendent
*J. Blakeslee, Assistant Plant Superintendent
*N. Pitcher, Construction Superintendent
*H. Riley, Health Physics/Chemistry Supervisor
*J. Graham, Senior Compliance Engineer
*C. Kalter, Radiological Group Supervisor
*J. Fritzen, Radiological Operations Supervisor

1.2 NRC

*L. Plisco, Senior Resident Inspector, Susquehanna
*F. Young, Senior Resident Inspector, Beaver Valley 1
J. Stair, Resident Inspector, Susquehanna

* Denotes those individuals attending the exit meeting on October 16, 1987.

The inspector also contacted other individuals.

2. Purpose of Inspection

The inspection was a routine, unannounced Radiological Controls Inspection during the outage. Areas reviewed were as follows:

- organization and staffing
- training and qualifications
- ALARA
- external exposure controls
- internal exposure controls
- radioactive and contaminated material control
- several licensee events.

3. Organization and Staffing

The inspector reviewed the Radiological Controls Organization and Staffing Levels with respect to criteria contained in applicable Technical Specifications. Evaluation of licensee performance in this area was based on discussions with cognizant personnel, review of documentation, and observations by the inspector.

Findings

Within the scope of this review, no violations were identified. The following observations were discussed with cognizant licensee personnel:

- Over the last two years, the licensee has rotated managers and supervisors of the Radiological Controls Organization to positions internal to and external to the organization. This was done to provide for personnel development, improve management oversight where needed, and fill some vacant positions. The following personnel rotations were noted:

  - The position of Radiation Protection/Chemistry Supervisor has been filled by at least three different individuals in the last two years.

  - The position of Radiological Operations Supervisor has been filled by at least three different individuals in the past two years. One of the individuals rotated through the position twice resulting in the position responsibilities being reassigned four times. In addition, the individual currently filling the position does not appear to meet the Technical Specification qualification requirements for the position (See Section 4 of this report).

  - The position of Radiation Protection Supervisor has been filled by two different individuals in the past two years. During this time the position was also vacant for about 8 months. The position responsibilities were not clearly assigned to any one individual.

  The inspector discussed the changes and rotation with licensee personnel and indicated that the numerous re-assignment of position responsibilities appears to have affected the quality of some aspects of the Radiological Controls Program. One example of this was the unnoticed expiration of administrative procedures for high radiation area access control.

  Licensee personnel acknowledged the inspector's comments and indicated that the personnel changes made were temporary pending certification of several individuals in the plant certification program and assignment of these personnel to positions within the Radiological Controls Organization.

4. Training and Qualification

The inspector reviewed the training and qualification of selected radiological controls personnel with respect to criteria contained in applicable Technical Specification requirements.

The inspector also reviewed the training and qualification of workers relative to criteria contained in 10 CFR 19.12, Instructions to Workers.

Evaluations of licensee performances in this area was based on:

- discussions with supervisory and technician level personnel
- discussions with workers
- review of resumes
- review of training records.

Findings

Within the scope of this review, the following observations were discussed with cognizant licensee personnel:

- The resume of one contractor radiological controls technician (individual A) was not sufficiently descriptive to allow assessment of the work he performed during an 18 month work period. This assessment was necessary in order to determine if the individual possessed the needed minimum experience for the position. It was not apparent that the individual met minimum qualification requirements. In response, the licensee consulted with the individual and determined that he possessed sufficient qualifications for the position he filled (Senior Radiation Protection Technician). The licensee indicated the matter would be reviewed.

Within the scope of this review, the following apparent violation was identified: (50-387/87-19-01)

In January 1987, the licensee assigned an individual to the position of Radiological Operations Supervisor. Because of training commitments and position familiarization requirements, the individual did not fully assume responsibility for the position until June, 1987. The individual in the position of Radiological Operations Supervisor oversees in-plant radiation protection activities, radwaste shipping activities, and ALARA activities. The licensee's Technical Specification 6.3 requires that supervisors possess a minimum of four years of experience in the craft or discipline they supervise. The inspector noted that the individual's qualifications were reviewed by licensee management. The individuals qualifications for the position were approved by management on September 21, 1987. The licensee concluded that the individual was qualified for the position despite his possessing only 8 months of applicable radiation protection experience.

The inspector indicated that the individual did not possess the four years experience required by the Technical Specifications and that assignment of the individual to the position of Radiological Operations Supervisor is an apparent violation of Technical Specification 6.3.

The inspector noted that the individual's responsibilities for overseeing his assigned program areas were not limited in any manner in consideration of his possessing limited experience.

5. ALARA

The licensee's ALARA program was evaluated against criteria contained in the following:

- Regulatory Guide 8.8, "Information Relevant To Ensuring The Occupational Radiation Exposures At Nuclear Power Stations Will Be As Low As Is Reasonably Achievable (ALARA);"

- Regulatory Guide 8.10, "Operating Philosophy For Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable;"

- Regulatory Guide 8.19, "Occupational Radiation Dose Assessment In Light-Water Reactor Power Plants·Design Stage Man-Rem Estimates."

Licensee performance relative to these criteria was evaluated by:

- discussions with cognizant personnel;
- tours of radiologically controlled areas;
- review of station ALARA goals;
- review of Station ALARA Committee meeting minutes;
- review of ALARA briefing and RWP packages;
- review of departmental exposure tracking;
- review of station procedures.

Findings

Within the scope of this review, no violations were identified: The licensee was implementing a generally effective ALARA program.

The following observations were discussed with licensee personnel:

- The licensee is within the established 1987 person-rem goal and is performing exposure tracking and trending. Monthly Station ALARA Committee meetings are being held. Monthly and weekly reports are prepared and distributed by the ALARA staff. Daily person-hour and exposure printouts are maintained and used to assess ALARA Program effectiveness.

- Several items indicating good licensee ALARA initiatives were noted:

  - The steam dryer was repaired underwater to minimize personnel exposure. (Approximately 100 person-rem was saved by performing the repair underwater.)

  - The licensee developed and used Control Rod Drive flange shields. Use of the shields resulted in about a 50% reduction in total personnel exposure for removal and reinstallation of drives as compared to the previous outage.

- The licensee installed additional permanent shielding support braces in the Drywell for use with reuseable shielding. The braces will reduce shield installation time and thus personnel aggregate exposure during future Drywell work.

The following areas for improvement were discussed:

° The licensee's ALARA Program provides for briefing of workers on the ALARA controls established for particular work activities. However, the ALARA Program procedures did not clearly assign responsibility to any particular individual (e.g. job supervisor or ALARA engineer) for ensuring that the briefing of all workers occurs. Licensee personnel indicated this matter will be reviewed.

° The licensee's procedures do not clearly describe the program elements for performing on-going job ALARA reviews. Such reviews typically are used to quickly identify performance weaknesses or other concerns resulting in increased or unnecessary personnel exposure. Licensee personnel indicated this matter would be reviewed. (Note: Inspector review did not identify any apparent examples of personnel receiving unnecessary exposure).

6.0 External Exposure Control

The inspector reviewed the following elements of the licensee's external exposure control program:

° adequacy and implementation of radiation work permits;
° adequacy of radiation surveys to support work activities;
° use and placement of personnel dosimetry devices;
° adequacy and implementation of high radiation area access controls;
° posting and labeling of radiation and high radiation areas.

The review was with respect to applicable criteria contained in 10 CFR 20, Technical Specifications, and licensee procedures.

Evaluation of licensee performance in this area was based on:

° observations of ongoing work and access control during plant tours;
° discussions with licensee personnel;
° performance of independent surveys;
° review of documentation.

Findings

Within the scope of this review, no violations were identified. The following observations were discussed with cognizant licensee personnel:

- A licensee administrative procedure states that high radiation area keys are controlled by radiological controls personnel.

- The licensee had allowed an implementing procedure for control of high radiation area access keys to expire. The procedure, HP-HI-008, Work Instruction for Key Control, had expired about two months ago (licensee estimate). The procedure provided detailed guidance for issuance, return and audits of high radiation area access keys. No current inventory of keys was available. Consequently it was not apparent whether all keys were present.

The licensee immediately reissued the procedure and initiated a formal audit of the status and inventory of all high radiation area access keys. All keys were found present and accounted for.

The licensee's procedures for the control of high radiation area keys is considered an unresolved item (50-387/87-19-03).

- Several inconsistencies in posting of the access points to the Refuel Cavity (Pool Area) were brought to the licensee's attention. The licensee immediately initiated action to correct this matter.

The following positive observations were made:

- radiation surveys were adequate to assess radiological conditions;

- personnel dosimetry was used as specified on applicable radiation work permits;

- up-to-date radiological surveys were posted for personnel information;

- personnel exposure reports were updated and distributed in a timely manner.

7.0 Hot Particle Exposure Control Program

The inspector reviewed the status of the licensee's "hot particle" exposure control program with respect to criteria contained in the following:

- 10 CFR 20, "Standards for Protection Against Radiation;"
- Information Notice (IN) 86-23, "Excessive Skin Exposures Due to Contamination with Hot Particles;" dated April 9, 1986;
- Information Notice (IN) 87-39, "Control of Hot Particle Contamination at Nuclear Power Plants," dated August 21, 1987.

Evaluation of licensee performance was based on:

- discussion with supervisory and technician-level personnel;
- review of station procedures.

Findings

The licensee has not yet established and implemented a program to control personnel exposure to hot particles. The licensee has not established the program procedures. Also, personnel are not trained in the radiological hazards of hot particles.

Current licensee personnel contamination monitoring practices are considered less than adequate to effectively monitor for hot particles.

Licensee action on the area of hot particles is considered not timely in that licensees were initially notified of problems with hot particles via an April 1986 NRC Information Notice. As of October 1987, no hot particle program is in place at Susquehanna Station.

The licensee is currently developing a hot particle exposure control program.

8.0 Internal Exposure Control and Assessment

General

The licensee's program for control of internal exposure was reviewed against criteria contained in 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;"

The licensee's performance was determined by:

- discussions with cognizant personnel;
- review of whole body counting (WBC) records;
- inspection of the WBC facility;
- review of radiation work permit (RWP) records;
- review of respiratory issuance records and user qualifications; and
- review of exposure reports for terminated workers.

Findings

The following observations were discussed with cognizant licensee personnel:

- Licensee job specific real time airborne radioactivity monitoring inside the Drywell was limited. The licensee's airborne radioactivity monitoring/analysis techniques did not provide for real time or "quick sort" methods of analysis of samples to identify increased airborne activity in a timely fashion.

- The responsibility for periodic verification of acceptable operation of HEPA ventilation systems was not clearly assigned.

- Inspector discussions with Radiation Protection Foremen who issue Radiation Work Permits, indicated a lack of knowledge of some regulatory requirements regarding the issuance of respiratory protection equipment. Specifically, personnel were unaware of requirements prohibiting the selection and use of respiratory protection equipment for airborne concentrations that would exceed the equipment's Protection Factor (PF).

The inspector noted that one Radiation Work Permit, for entry into the Reactor Water Heat Exchanger, allowed individual entry with a full face respirator (protection factor 50) with floor contamination levels of up to about 120 millirad/hour removable contamination. Such contamination, if dry, could result in high airborne activity due to resuspension. Initial entry was however made into the room with airline respirators (PF 1000).

Licensee personnel indicated these matters would be reviewed.

The following positive observations were made:

° whole body count and respiratory protection equipment use personnel qualification records were well maintained and readily available;

° whole body counting instrumentation was calibrated with sources traceable to the National Bureau of Standards;

° the licensee was making extensive use of engineering controls to minimize airborne radioactivity. High efficiency particulate air (HEPA) filtration systems and containment systems were extensively used.

9.0 Radioactive and Contaminated Material Control

The inspector toured the controlled areas and reviewed licensee control of radioactive and contaminated material. Personnel frisking practices and housekeeping were also reviewed.

The review of this area was with respect to applicable regulatory requirements and licensee procedures.

Evaluation of licensee performance was based on observations during plant tours, independent radiation surveys performed by the inspector, and discussions with cognizant personnel.

Findings

Within the scope of this review, no violations were identified. The following were discussed with cognizant licensee personnel:

° Personnel exiting the Drywell were observed performing improper frisking. Individuals were moving the frisker probe rapidly over their bodies. This was considered a poor practice in that no other whole body frisks were required to be performed prior to exiting the station. Although individuals do pass through whole body portal monitors prior to exiting the station, the sensitivity of these monitors is limited.

° The inspector noted there were about 4 radiation protection technicians at the Drywell control point. Their oversight of frisking practices was considered poor. The licensee immediately initiated action to correct poor frisking practices at that location. A technician was assigned to monitor frisking practices. Also, frisking instructions were posted at the frisking station.

° Personnel involved in removing equipment from the Steam Dryer Storage Pool demonstrated poor contamination control practices as follows:

- Personnel in close proximity to each other wore different types of protective clothing. Some wore full plastic suits while others wore cloth coveralls.

- As equipment was removed from the water, water dripped on the pool railing and floor. The floor was not covered to contain the contaminated water. Also personnel with cloth coveralls leaned on the railings at the location.

- A radiation protection technician was observing the activity and did not correct the situation, indicating poor technician oversight of work activities,

- The radiation work permit did not provide effective contamination controls to prevent contamination of personnel, equipment and facilities for the work activity.

- Health physics technicians were observed entering the Unit 1 Health Physics Office via a door posted "Use Portal Monitor Prior to Entry" without using the Portal Monitor prior to entering the door. This indicated lack of regard for contamination control.

The licensee initiated a review of the above matters.

10.0 Radiological Events

The inspector reviewed the circumstances, licensee evaluations, licensee corrective actions, and personnel exposures associated with several radiological incidents which recently occurred.

The licensee had issued a Significant Operating Occurrence Report (SOOR) for each of the events. However, the SOORs have not yet been closed.

The events reviewed and inspector findings are as follows:

Event 1

The Waste Mixing Tank overflowed on October 5, 1987 (SOOR No. 1-87-279) resulting in floor contamination of 646' elevation of the Radwaste Building.

Findings

The floor was decontaminated in a timely manner. No internal exposures or personnel contamination occurred. An area contamination report (ACR) was also issued. The licensee attributed the spill to an improperly positioned valve.

The onsite NRC resident staff is reviewing the operational aspects of this matter.

The SOOR has not been closed by the licensee.

Event 2

The Refuel Floor (elevation 818') was contaminated due to exfitration of contaminated air from a tent enclosure on September 5, 1987. (SOOR No. 1-87-238)

Findings

The floor was decontaminated in a timely manner. No internal exposures or personnel contamination of the skin occurred. The occurrence was identified via review following identification of shoe contamination.

The licensee's review indicated the suction dampers of the High Efficiency Particulate Air (HEPA) filter drawing suction on the tent had been closed by unknown persons.

The licensee had established a long term corrective action plan to provide for better control and operability of HEPA filter units. However, no short term corrective actions were identified.

The inspector noted that no clear assignment of responsibility for periodically checking operability of HEPA units during a work activity was apparent.

The licensee initiated a review of this matter.

Event 3

Contaminated air dischared from a hose on September 30, 1987 (SOOR No. 1-87-276) resulting in floor contamination of the 719' elevation of the Reactor Building and external contamination of several individuals.

Findings

The floor area was decontaminated in a timely manner. The licensee was unable to determine how the hose became contaminated internally. All airline hoses in the Drywell were replaced with new hoses. Several personnel sustained limited contamination of their skin. An Area Contamination Report (ACR) was issued. No personnel intake of radioactive material was identified.

The SOOR has not yet been closed. The licensee plans to review and enhance the control of hoses.

Event 4

Identification of three contaminated rags, outside of the Radiological Control Area.

- Instance 1, April 8, 1987 (SOOR No. 1-87-103), Oil soaked brown rag found in the Waste Accumulation Area.

- Instance 2, September 23, 1987, (SOOR No. 1-87-267), Brown rag found in the Waste Accumulation Area.

- Instance 3, October 2, 1987 (SOOR No. 1- 87-277) Brown rag found at exit of Unit 2.

Findings

The licensee closed the initial SOOR (April 8, 1987). The licensee attributed the removal of the rags from the radiological control area (Instance 1) (RCA) to weaknessess in frisking of material to be released as "clean trash". No other examples were found. Personnel were retrained in proper trash frisking techniques following the event. The licensee reviewed all exit points from the RCA and concluded that no change in the exits from the RCA was needed.

The licensee is currently reviewing the second and third instances.

Regarding Instance 2 the licensee issued a SOOR for the event. The licensee believes the second instance resulted from an individual removing the rag from the RCA without properly monitoring the rag. All unnecessary RCA exits were closed to normal personnel traffic. The licensee also halted all trash sorting operations.

The licensee has initiated action to provide tighter controls over the "brown rags" used for general cleaning purposes in the RCA. The licensee has labeled containers for their storage. Also the licensee is phasing the "brown" rags out and is considering using "yellow" rags.

Inspector review of these events indicated the following weaknesses:

- The licensee assumed the cause of the first instance was inadequate monitoring of trash being sorted for disposal. A contaminated rag was included with "clean" chemical waste for disposal. It was not apparent that this was the cause of the event.

- The licensee's corrective action for the first occurrence included sending all surveyed "clean" trash through portal monitors as a final "check" of the material prior to removal from the RCA. The licensee had not evaluated the sensitivity of the monitors for this purpose. It was not apparent that the monitors were adequate for this purpose.

- The licensee did not strenghten control of release of material from secondary exits from the RCA following the first instance. The licensee concluded the second instance occurred due to removal of material via a secondary exit.

The licensee's action on the control of radioactive contaminated rags/material is unresolved and will be reviewed during a subsequent inspection. (50-387/87-19-02)

Event 5

At about 6:00 p.m. on October 12, 1987 several workers received skin contamination while installing shielding on the 719' elevation of the Drywell. The contamination was identified when the individuals identified "dust" dropping on them from a higher elevation. This dust was subsequently determined to be contaminated. Licensee review indicated two workers, wearing full face respiratory protection equipment, were removing contaminated insulation on the 730' elevation directly above the workers. The insulation had apparently "disintegrated" into dust when handled.

Findings

The licensee evacuated the Drywell and decontaminated the workers. Airborne radioactivity samples indicated no significant airborne radioactivity. Workers in the area were whole body counted. No intake of radioactive material was identified.

Inspector review indicated that as of October 14, 1987 no significant corrective actions were taken to control removal of contaminated insulation to prevent a recurrence of the event. The licensee had not provided any guidance to radiation protection personnel regarding this operation. The licensee immediately generated a work instruction covering this matter and provided it to appropriate personnel. The licensee is reviewing the problem with this type of insulation and is considering replacing it.

General Observation of Radiological Events

The licensee generated significant operating occurrence reports (SOORs), personnel contamination reports (PCRs) and area contamination reports (ACRs) as appropriate for the events. The following was noted:

- The licensee issued 119 PCRs as of August 31, 1987. Of the number, 75(i.e 63%) were issued as of September 2, 1987 (Start of Outage). There is no review of PCRs to identify generic concerns associated with the personnel contamination events.

- The licensee issued 67 ACRs as of August 31, 1987. Of the number, 42 (i.e 62%) are attributed to operations concerns. There is no review of ACRs to identify generic concerns associated with the area contamination events.

- There does not appear to be an effective method of documenting radiological incidents or events which: 1) are not significant enough to be addressed by the SOOR process, and 2) are neither ACRs or PCRs. Consequently, it was not apparent that a method for documenting, and tracking to resolution, radiological controls concerns (e.g. procedure violations) was in place.

The above matters were discussed with licensee personnel who acknowleded the inspectors comments. The licensee indicated the above matters would be reviewed.

11.0 Exit Meeting

The inspector meet with licensee personnel, denoted in section 1 of this report, at the conclusion of the inspection on October 16, 1987. The inspector summarized the purpose, scope and findings of the inspection. No written material was provided to the licensee.