U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket Nos. 50-387; 50-388

License Nos. NPF-14; NPF-22

Licensee: Pennsylvania Power and Light Company, Units 1 and 2
2 North Ninth Street
Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station

Inspection At: Berwick, Pennsylvania

Inspection Conducted: June 17 - 21, 1991

Inspectors: C O'Neill for J. Noggle, Radiation Specialist, Facilities Radiation Protection Section — 7-1-91 date

C O'Neill for R. Lance, Radiation Specialist Facilities Radiation Protection Section — 7-1-91 date

Approved by: R L Nunty for W. Pasciak, Chief, Facilities Radiation Protection Section, DRSS — 7/1/91 date

Inspection Summary: A routine radiological controls inspection was conducted on June 17 - 21, 1991 (Combined Report Nos. 50-387/91-08 and 50-388/91-08)

Areas Inspected: Areas covered in this inspection included a review of: previously identified items, housekeeping and radiological postings, dosimetry program, air sampling program, whole body counting and instrumentation calibration areas. In addition the inspectors witnessed the volume reduction of control rod blades and the loading of the blades into radwaste liners as part of the licensee's spent fuel pool clean out project.

Results: Within the scope of this inspection, no violations were identified.

DETAILS

1.0 Personnel Contacted

1.1 Licensee Personnel

*P. Capotosto, Quality Assurance Acting Supervisor
*T. Dalpiaz, Manager of Nuclear Plant Services
*T. Debortoli, Nuclear Quality Assurance Project Engineer
*R. Ferentz, Security Operations Supervisor
*J. Fritzen, Radiological Operations Supervisor
*D. Hagan, Effluents Management Supervisor
B. Hoopes, Senior Project Engineer
*D. Marinos, Senior Nuclear Plant Specialist
W. Morrissey, Radiation Protection Supervisor
*L. O'Neil, Supervisor Engineering - Nuclear
*H. Riley, Health Physics - Supervisor
*D. Roth, Senior Compliance Engineer
*G. Stanley, Superintendent of Plant
R. Stotler, Security - Supervisor
P. Wilds, General Clerk
C. Whirl, Assistant Manager - Quality Assurance
*R. Wehry, Compliance Engineer

1.2 NRC Personnel

*G. Barber, Senior Resident Inspector
J. Stair, Resident Inspector

* Denotes those present at the exit interview on June 21, 1991.

Other licensee employees were contacted and interviewed during this inspection.

2.0 Organizational Changes

As a result of the licensee's latest Organization Effectiveness Review (OER), the Rad Waste Department was separated from the Health Physics Department. Procedures are currently being revised to reflect the restructuring. The licensee expects to implement the revised procedures upon implementation of the new organization. Personnel will be qualified and trained, as appropriate, prior to the restructuring. No concerns were identified. The restructuring was considered a good initiative.

3.0 Dosimetry Program

The inspector reviewed the issuance requirements of record dosimetry and the issuance of personnel exposure reports in accordance with 10 CFR 19.13. Station practices are specified in procedures HP-TP-215, Rev. 15,"Issuance and Replacement of the Permanent Whole Body TLD" and HP-TP-217, Rev. 9, "Occupational Radiation Exposure Reports." The licensee normally requires current quarter exposure documentation for record dosimeter issuance. NRC Form 5 reports are required to be issued within 30 days of dose determination or within 90 days of termination of employment. The inspector reviewed all outstanding NRC Form 5 reports. All were within this criteria. No discrepencies in this area were noted.

During the last inspection in this area the licensee agreed to review the Thermoluminescent Dosimeter (TLD) National Voluntary Laboratory Accreditation Program (NVLAP) for Category I applicability. At that time the licensee was accredited in NVLAP Categories II - VII. The licensee currently holds NVLAP accreditation for categories I - VII which was granted on April 1, 1991 for Panasonic TLD Model UD-802-AS1. The licensee is currently nearing completion of becoming accredited in all NVLAP categories (I - VIII).

The inspector reviewed the multiple whole body badge issuance, control and dose assignment program. Individual TLD packages are assigned to personnel as needed. After on site collection and processing in Allentown, dose determinations are made by the on site Dosimetry Specialist. Generally, the highest readings are assigned with reference to the Self Reading Dosimeter (SRD) data in making these determinations.

Extremity dosimetry was provided by a vendor service (ICN Dosimetry Service) which utilizes the Panasonic Model 802 single element TLD ring dosimeter. This dosimetry program was NVLAP accredited in categories I - VII which was renewed on July 1, 1991. Issuance of extremity badges was reviewed by the inspector. Current practice is to assign the highest extremity badge value as the extremity dose of record. Future practice (after September 1991) will be to track each extremity by quadrant and assign the highest quadrant as the final extremity dose.

At Susquehanna Steam Electric Station (SSES), personnel whole body TLDs are stored at the North and South Security Guardhouses when not in use. Personnel

request their security badge and TLD by slot number upon entering the station. The guard waits for name verification and picture badge recognition by the employee prior to badge and TLD issue. When leaving the station, personnel are required to separate their TLD from their security badge to allow for the collection of their security badge by the automatic badge recovery system at the exit turnstiles. The TLD badge is deposited in an open bucket. The guards then retrieve both the TLDs and the security badges and manually rejoin the two for storage in the badge racks.

The inspector observed an employee wearing the wrong TLD with his security badge. The licensee immediately initiated an investigation and found that the employee's TLD had been improperly mixed with another employee's TLD during the rejoining process inside the South Guardhouse. Further investigation indicated that the second employee had also been issued the wrong TLD with his security badge and was wearing it in the plant. A dose evaluation was conducted by the licensee, and it was determined that neither individual had received any radiation exposure during this time period.

The licensee indicated to the inspector that similar problems of this type have occasionally occurred in the past; the most recent documented occurrence was in May 1991. This repetitive manual process of rejoining badges and TLDs has an inherent human error associated with it. To date, the licensee has worked to optimize the effectiveness of this manual badge/TLD collating process, but has not succeeded in erradicating this source of error. The potential for improperly assigned personnel exposures still exists. This appears to be a program weakness.

The licensee indicated that a task force of security and health physics personnel would convene to determine the root cause of this problem and to address this issue.

4.0 Air Sampling Program

The inspectors reviewed the basis for the licensee's air sampling program. The licensee has established air sample activity limits for airborne radioactivity areas at 7.5 E -10 uCi/cc based on 10 CFR 20 Appendix B Note 3 table c Maximum Permissible Concentration (MPC) value of 3 E -9 uCi/cc. The verification of the absence of the transuranics and Strontium 90 nuclides mentioned in this regulation is appropriately met through alpha and beta counting of high activity samples and basing screening criteria on beta to gamma activity ratios.

The MPC determination is made by intrinsic germanium gamma spectroscopy and analysis. The licensee has established a procedural requirement to notify Health Physics supervision for any unidentified gamma spectrum peaks. The station

radionuclide library is adjusted as needed based on analysis of previously unidentified gamma peaks and based on review of the annual 10 CFR 61 waste stream analysis.

The inspectors reviewed an evaluation of minimum volume for lapel air sampler use based on minimum detectable activity and practical counting times of the HP counting room instrumentation. This criteria has been incorporated into procedure HP-TP-720, Rev. 12, "Airborne Concentration Sampling and Evaluation". No discrepancies were noted with regard to the air sampling program.

5.0 Whole Body Counting Program

The inspectors reviewed the whole body counting program with respect to instrument calibrations, action levels, and MPC assessments. During 1991, which includes the latest refueling and maintenance outage, the licensee has assigned MPC-hrs to 19 employees with a maximum of 2.57 MPC-hrs to one individual. Only one individual was assigned MPC-hrs due to a bioassay result (0.1 MPC-hrs). This instance was reviewed to determine whether the air sampling and/or respiratory protection programs had failed. This particular case was initiated by detection of 300 cpm on the person's face when exiting the Radiological Controlled Area (RCA). The individual was sent for an investigative whole body count when 0.1 MPC-hrs was assigned. A review of the air sample data revealed appropriate air sampling was performed and results of 0.05 MPC-hrs were recorded but not assigned due to the low value. Respiratory protection was not required for the job. No deficiency in the respiratory protection or air sampling programs was noted. All other 1991 MPC-hr assignments were based upon air sample results. Station policy conservatively uses the higher MPC-hr determination when both air sample and whole body count analyses are available.

The action levels as indicated in the whole body counting procedure HP-TP-223, Rev. 3, "Whole Body Counting Action Levels and Internal Dose Assessment", were found to be in full accordance with ANSI N343-1978, "American National Standard for Internal Dosimetry for Mixed Fission and Activation Products".

Both station Sodium Iodide whole body counters were moved in early 1990. They were subsequently calibrated on March 28, 1990. Bi-annual energy and efficiency calibration verifications have been conducted since that time, the latest of which was performed on February 16, 1991 and these results were reviewed by the inspectors. No deficiencies were noted.

6.0 Instrument Calibration Program

The inspector reviewed the instrument calibration program for portable survey and

count room instruments. The licensee has a comprehensive instrument inventory list which is maintained to allow for the recall of instruments two weeks prior to calibration due date expiration. This list is forwarded to Health Physics supervision for the timely recall of affected instruments.

The inspector reviewed the calibration of the Sheperd Model 89 instrument calibrator to National Intitute of Science and Technology (NIST) standards. The licensee utilizes three Vicrtoreen Model 570 Condenser-R meters which are calibrated by NIST on a three year rotational basis. The Sheperd 89 calibrator was last calibrated using the instrument standard on July 27, 1990. No discrepencies were noted.

While touring the instrument calibration facility, the inspector noted the open accessibility of calibration source keys. The calibration source rooms were appropriately locked and posted in accordance with Technical Specification 6.12, for high radiation areas, however, control of the keys to one of these rooms and all of the sources was not in accordance with current station practice. The discrepency was identified to Health Physics supervision and immediate temporary corrective actions were taken to transfer the keys to the High Radiation Area key control locker in the Health Physics office. Permanent corrective actions are pending procedure development to implement appropriate calibration source key controls commensurate with the hazards associated with shielded calibration sources. This program weakness was quickly responded to and corrected by the licensee.

7.0 Plant Tours

The inspector toured the Radiologically Controlled Area periodically during the inspection. Housekeeping and radiological postings were generally satisfactory. No discrepencies were noted in this area.

8.0 Spent Fuel Pool Cleanout Project

Due to the planned closing of the Barnwell, South Carolina low level waste burial site in January 1993, the licensee has commenced the clean out of the Unit 1 and Unit 2 spent fuel pools of irradiated reactor vessel components. The components being removed included 72 Local Power Range Monitors(LPRMs), 5 Intermediate Range Monitors (IRMs), 14 Start-up sources, 9 Transversing In-Core Probes(TIPs), and miscellaneous hardware.

The licensee developed a safety evaluation, program, and procedures to perform the processing, packaging, and shipment of this irradiated hardware. The safety analysis addressed the following areas: Area Radiation Monitors (ARMs) on the refuel floor,

maintaining secondary containment during operations, use of the reactor building crane, refueling floor loading, railway bay floor loading, roadway loading, damage to spent fuel from dropped components, refueling platform use, draining of the Cask Storage Pit (CSP), effect on fuel pool water, refuel floor environment, disposal cask design, Process Control Program, vent stack exhaust monitoring system. The safety evaluation was complete for the areas reviewed. Other areas the inspector identified included the need to identify the radiological consequences from release of the control blade contents and the radiological consequences due to less than seven feet of water shielding. During the inspection, these areas were addressed by the licensee. The inspector reviewed the hazards associated with the fuel pool clean out processing phase and in particular the potential for losing water shielding from these high radiation sources. The inspector identified several areas where engineering controls alone could not preclude the actions associated with human error to cause a potential unsafe condition.

As described in the current project program, the handling and processing of irradiated hardware is controlled by vendor personnel. The vendor activities are directed by a refueling floor supervisor. There were no specified program requirements for a second party review to preclude any chance for water loss errors. Although the licensee had some involvement of Quality Assurance (QA) and Quality Control (QC), there was no documented QA/QC objectives or specific plan to address the high safety hazards of this project. The lack of a documented and developed QA/QC function as related to this spent fuel pool project was considered a weakness.

9.0 Exit Meeting

The inspectors met with licensee representatives at the conclusion of this inspection on June 21, 1991. The inspectors reviewed the purpose and scope of the radiological controls inspection and discussed the inspection findings.