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
2 North Ninth Street
Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station, Units 1 & 2

Inspection At: Berwick, Pennsylvania

Inspection Conducted: October 28-31, 1991

Inspector: James D. Noggle 11/25/91
J. Noggle, Radiation Specialist date
Facilities Radiation Protection Section

Approved by: W. Pasciak 12-1-91
W. Pasciak, Chief, Facilities date
Radiation Protection Section

Areas Inspected: Areas covered in this inspection included a review of: previously identified items, organization changes, Nuclear Quality Assurance (NQA) audits and surveillances and Quality Control (QC) inspection reports, training, solid radwaste processing, shipping radioactivity determinations, shipping records, and the adequacy of on site storage of radwastes.

Results: The licensee has reorganized the radwaste/transportation functions within one group. This has eliminated the previous interfaces with three station departments to carry out the radwaste processing and shipping functions. Procedures remain to be revised to reflect this reorganization. The QA/QC audits and inspections are strong. Radwaste shipping records were complete and accurate. The Low Level Radioactive Waste Handling Facility is not yet prepared for on site radwaste storage. In general, the station has a solid radwaste/transportation program. Within the scope of the inspection, no violations were identified. One unresolved item (91-20-01) was identified relative to the radioactive release criteria used for the release of processed contaminated oil for unrestricted used.

DETAILS

1.0 Personnel Contacted

1.1 Licensee Personnel

*P. Capotosto, NQA Surveillance Specialist
*E. Figard, Manager, Nuclear Maintenance
*J. Fritzen, Radiological Operations Supervisor
*D. Hagan, Effluents Management Supervisor
*H. Palmer, Manager, Nuclear Operations
*R. Peal, Compliance Supervisor
*B. Rhoads, Chemistry Laboratory Supervisor
*H. Riley, Health Physics Supervisor
*C. Saxton, Enviornmental Scientist
*G. Stanley, Superintendent of Plant
*R. Wehry, Compliance Engineer

1.2 NRC Personnel

*G. Barber, Senior Resident Inspector
*W. Pasciak, Chief, Facilities Radiation Protection Section

1.3 Pennsylvania Department of Enviornmental Resources

*D. Ney, Inspector

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

Other licensee employees were contacted and interviewed during this inspection.

2.0 Purpose

The purpose of this routine inspection was to review the licensee's programs for radioactive waste collection, handling, and storage and for the proper preparation, packaging, and shipment of licensed radioactive material.

3.0 Review of Previously Identified Items

3.1 (Closed) Unresolved Item (50-387/89-28-03): The filters on the A train of the Control Room emergency air supply system appeared to be coming apart and

appeared to be repaired with duct tape. The inspector was concerned that filter debris could partially disable the train via clogging. The licensee identified the subject filters as temporary filters inadvertently left in from startup testing. The temporary filters were removed and a partial surveillance, SE-030-009, was performed to demonstrate that there was no bypass leakage in the system. The NRC inspector confirmed removal of the temporary filters. This item is closed.

3.2 (Closed) Violation (50-387/90-16-01): From 1984 until 1990 the licensee sampled and determined radwaste shipment activity levels from a spent resin waste stream from a resin/water mixture. The final shipment waste form was in a dewatered form. As a result, the activity levels for most isotopes in the resulting shipments were under-reported. The licensee reviewed all radioactive waste streams to ensure appropriate samples were taken. Reactor Water Clean-Up (RWCU) filter media was the only waste stream where sampling error was identified. Procedures were developed to specify laboratory dewatering of the undewatered spent resin samples with cross checks built in to verify appropriate final samples by shipment weight and density comparisons. A historical review of previous RWCU filter media shipments was made and no mischaracterization of waste class or shipment type were identified. Also, due to the roughly annual nature of a RWCU filter media shipment, the routine 10 CFR 61 laboratory analysis for this waste stream was rescheduled to coincide with each RWCU spent resin shipment. This item is closed.

3.3 (Closed) Unresolved Item (50-387/90-16-02): In June of 1990, the licensee discovered the presence of methane generating microorganisms in the liquid radwaste spent resin system, causing the generation of methane gas in dewatered High Integrity Containers (HICs) which is the final waste form ready for shipment and burial. Microbiological testing confirmed that most of the microbes were eliminated when subjected to 150 degree F temperature. The licensee has since provided heat tracing of the liquid radwaste filter media waste stream system to limit the methane generating microbe population. Also, a non-hazardous biotocin, glutaraldehyde, was prescribed to provide a chemical poison to be used when residual methane is detected in a filled HIC prior to shipment. The use of this chemical agent has been approved for burial by the State of South Carolina and Chem Nuclear Systems, Inc. operator of the Barnwell low level waste disposal site. This item is closed.

3.4 (Closed) Unresolved Item (50-387/90-16-03): Susquehanna SES possesses a partially completed on site radwaste storage facility, the Low Level Radioactive Waste Holding Facility (LLRWHF), which was designed to hold at least five years of plant generated waste. The original design specifically prohibited the storage of wet or dewatered

radwastes. At the present time, Susquehanna processes all of their spent radwaste resins as dewatered resins and ships these wastes to a low level radioactive waste burial site for disposal. The licensee has not used the LLRWHF for storage of dewatered resins and will continue to dispose of these wastes until burial site closure at the end of 1992. The licensee acknowledges the need for a 10 CFR 50.59 safety evaluation to address the ramifications of dewatered resins in the LLRWHF. A LLRWHF team has been organized tasked with all aspects associated with bringing the facility into an operating condition by January 1993. A 10 CFR 50.59 safety review of dewatered resin storage is one of the action items assigned to this team. This item is closed.

4.0 Transportation and Radwaste

Since the last routine radwaste/transportation inspection, the plant has gone through a significant reorganization in this area. Previously, station operations, chemistry, and health physics provided the functional roles of processing solid radwaste, sampling and analysis, and shipping activities, respectively. A new Effluents Management Group has been formed utilizing many of the same personnel, but reorganized into one focused group. This is viewed as a significant licensee initiative designed to strengthen this functional area. Currently, the station is operating under the old procedures while revising them to reflect the new organization. No safety significance was identified with this transition.

4.1 Quality Assurance / Quality control

The Quality Assurance (QA) and Quality Control (QC) programs at Susquehanna involved biennial QA audits of the Process Control Program (PCP) and biennial audits of all radwaste vendors, occasional QA surveillances, and QC inspections of all radwaste or radioactive material shipments leaving the station. The last PCP QA audit was NQA Audit No. 89-027 performed on October 30 - November 20, 1989. This audit was reviewed on a previous inspection (50-387/90-16; 50-388/90-16). The following radwaste vendor audits were reviewed.

NQA Audit No. 89-024 reviewed the effectiveness of Alaron Corporation to provide metal decontamination and reclamation services. This audit was conducted on January 24 - 25, 1990 and resulted in two findings. The audit found a lack of implementing procedures for their QA manual, and a lack of training procedures for the various levels of health physics staff.

NQA Audit No. 91-002 reviewed the effectiveness of Science Applications International Corporation (SAIC) in providing laboratory radioanalysis and portable gamma spectroscopy services. This audit was conducted on January 17 - 18, 1991 and resulted in four findings which resulted in the suspension of on site portable radwaste gamma spectroscopy services until certain calibration and performance check issues were resolved. Other findings included the laboratory use of expired reagents and lack of complete training for the vendor staff.

NQA Audit No. 91-017 reviewed the effectiveness of Chem-Nuclear Systems, Incorporated (CNSI) to provide radwaste shipping services. This audit was conducted on May 28 - 31, 1991 and resulted in five findings. These included the lack of certain sub-vendor services having QA approval when required, and a weld on a Type B cask liner was not shown on a design drawing and therefore no resultant requirement for weld inspection.

NQA Audit No. 91-047 reviewed the effectiveness of Scientific Ecology Group, Incorporated (SEG) for providing on site resin dewatering services and off site Dry Active Waste (DAW) sorting, compaction or incineration, and disposal. This audit was conducted on August 19 - 23, 1991 and resulted in seven findings. These findings included a weak commercial grade parts dedication program, weaknesses in weld process controls, the annual SEG design control audit had not been completed, training records incomplete for two employees, a driver had not received any training, and HP instrument calibrations were not proceduralized.

Four QA surveillances were reviewed for the period from October 1990 through June 1991. These surveillances covered radwaste resin transfer operations, solid radwaste processing, laboratory sample analysis, and processed solid radwaste solidification testing. No significant problems were identified.

The QC radwaste/radioactive material shipment inspections were in the form of checklists and specific procedure signoff steps which generally accompany the shipping records. In general, the QA and QC audit and inspection activities are very comprehensive and well implemented.

4.2 Transportation

As part of this inspection, the following radioactive material shipment records were reviewed.

Shipment Number	Volume (ft^3)	Activity (Ci)	Type
91-022	177.3	1.41E+0	Resin
91-062	177.3	4.22E+0	Resin
91-121	73.4	1.68E+3	RWCU Resin
91-132	57.4	1.68E+4	Irrad Metal
91-137	57.4	1.73E+4	Irrad Metal
91-138	57.4	1.83E+5	Irrad Metal
91-139	57.4	1.78E+4	Irrad Metal
91-163	57.4	2.54E+4	Irrad Metal
91-164	57.4	2.13E+4	Irrad Metal

All records were found to be complete, and to accurately classify the material in accordance with 10 CFR 71 and 49 CFR Parts 100 - 179. In addition, fourteen destination licenses were verified and Certificates of Compliance were verified for registered shipping casks utilized by the licensee. No discrepancies were noted.

In addition, the inspector reviewed the following transportation procedures.

HP-TP-800, Rev. 16, "Shipment of Radioactive Waste"

HP-TP-801, Rev. 10, "General Shipment of Radioactive Material"

HP-TP-851, Rev. 13, "Radwaste Curie Calculations"

HP-TP-852, Rev. 1, "Use of the SEG 14 - 215 Shipping Package"

HP-TP-880, Rev. 1, "Operation and use of the WasteTrak Code"

These procedures were determined to be complete (except for the previously mentioned organization changes and resulting procedure responsibility changes yet to be made) and to accurately reflect current transportation operations.

4.3 Solid Radwaste

Since December 1988, Susquehanna has not used the waste evaporator for processing of solid radwastes. The evaporator system was flushed out, drained, and isolated. Since then, resin demineralizer systems have replaced this function. Resin filtering

and dewatering has been the method of choice for liquid radwaste solidification. There were five liquid radwaste waste streams producing spent resins that were individually characterized for radionuclide content as follows.

1. Sump Sludge was sampled and characterized on February 5, 1990
2. Ultrasonic Resin Cleaner (URC) Sludge was characterized on August 26, 1990
3. Bead Resin was sampled and characterized on October 19, 1990
4. Liquid Radwaste Filter Media was characterized on October 31, 1990
5. Reactor Water Clean-Up (RWCU) media was characterized on March 12, 1991

In addition to these spent resin waste streams, a tritium analysis was determined on October 31, 1990 and DAW characterization was last made on November 17, 1990. These waste stream analyses provide the basis for radioactivity determinations for all radioactive material shipments using a three year averaging of waste stream sample data from each waste stream. Each radwaste shipment was sampled and a gamma isotopic analysis yielded quantitative results of the gamma producing radionuclides. Using the Cobalt-60 results, the non-gamma emmitting radionuclides produced by activation were estimated by correlation with the appropriate characterized waste stream. The gamma isotopic analysis results for Cesium-137 were used with appropriate waste stream correlation factors to estimate the non-gamma emmitting radionuclides produced through fission events. Class A wastes are recharacterized approximately annually and Class B wastes and above are characterized biennially. The tritium content of radwastes is determined from reactor water analysis and correlated to each waste according to water content. The sampling frequency and radionuclide correlation methodology is consistent and meets the criteria established by the NRC Branch Technical Position for Waste Classification.

In addition, the inspector reviewed the following solid radwaste procedures.

AD-00-770, Rev. 6, "LLRWHF Materials Storage, Control, and Inventory"

AD-QA-311, Rev. 11, "Solid Radioactive Waste Process Control Program"

AD-QA-765, Rev. 12, "Solid Radwaste Program"

CH-TP-055, Rev. 2, "Solid Radwaste 10 CFR 61 Correlation Factor Determination"

HP-TP-602, Rev. 11, "Survey and Release of Tools, Equipment, and Material"

HP-TP-650, Rev. 10, "Surveys for Receipt and Shipment of Radioactive Materials"

HP043, Rev. 3, "Radwaste Worker Training"

MT-GM-067, Rev. 1, "Maintenance Services Drum and Tanker Issuance, Processing and Tracking"

NTP-QA-42.3, Rev. 4, "Radwaste Worker Training"

No discrepancies were noted.

The on site storage of solid radwaste was reviewed. There were approximately 35, 55 gallon drums of high radiation radwastes appropriately stored in the radwaste building. The licensee has set a goal of mid-1992 to dispose of these drums. Additionally, there were less than 100 waste drums accumulated in and around the station. The licensee maintained an inventory and had disposition plans for these wastes. Inside the LLRWHF the inspector identified reusable outage equipment which includes ten trailers containing scaffolding and three large turbine rotors in storage. The only wastes stored in this facility were five 55 gallon drums of contaminated/cement solidified lead, which constitutes mixed waste.

The release of paper and plastic wastes was observed at the DAW sorting, shredding, and monitoring station in the radwaste building. The station utilizes an automatic conveyor system that shredds the manually fed DAW waste, rolls the material flat on the conveyor belt, surveys the top surface with a beta sensitive gas flow proportional detector and a gamma sensitive scintillation detector. If the material successfully passes the survey instrument setpoints, the waste is flipped over and the backside is counted by a gas flow proportional counter. If the material successfully passes all three detectors at a count rate corresponding to 5,000 dpm/100 cm^2 then the material is disposed of as clean waste for public landfill disposal. The inspector requested the licensee provide a 100 cm^2 flat source of approximately 5,000 dpm to test the detectors setpoints. Both gas flow proportional detectors alarmed, but the sodium iodide detector failed to alarm. Technically, the two gas flow proportional detector instruments fulfill the surveying requirements, however the backup gamma monitor which is used to detect contamination that may be blocked by other shredded material, should be reevaluated and an appropriate set point for this instrument established.

Contaminated waste oil was reprocessed by an on site vendor, Plymouth Diversified Services, using a centrifugation technique. The resulting oil was sampled and

released to an oil refinery reprocessing company based on the effluent technical specification Lower Limit of Detection (LLD) for water of 5.0 X 10^{-7} uCi/ml. Since the off site release of waste oil was not one of the effluent release pathways specified in the licensee's final safety analysis report, the NRC has questioned the appropriateness of using this technical specification criteria. This item remains an unresolved item pending further NRC evaluation (91-20-01).

5.0 Exit Meeting

The inspectors met with licensee representative at the conclusion of this inspection, on October 31, 1991. The inspector reviewed the purpose and scope of the inspection and reported the inspection findings.