U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Inspection No. 50-387/92-21; 50-388/92-21

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: August 10-14, 1992

Inspector: J. Noggle, Radiation Specialist
Facilities Radiation Protection Section — 8/25/92 date

Approved by: W. Pasciak, Chief, Facilities
Radiation Protection Section — 8-28-92 date

Areas Inspected: This inspection was an unannounced safety inspection of the Susquehanna Steam Electric Station radiation control programs. The inspection focused on organization, training and qualifications, and a review of the operations HP group. In addition, review was made of a radwaste resin shipment.

Results: The licensee was preparing for their second refueling and maintenance outage for the year. Due to expanded work scope during the previous outage, the collective station exposure is currently 5% over the original ALARA goal. Adequate radiation protection resources appear to be available for the Unit 2 fifth refueling outage scheduled for September through October 1992. Several enhancements to the operational HP program have been developed for outage implementation. Performance improvement will be measured in a later outage inspection. Also, a discrepancy was noted in a radwaste sampling method.

DETAILS

1.0 Personnel Contacted

1.1 Licensee Personnel

J. Adelsberger, Health Physics Technician, Level II
T. Dalpiaz, Manager, Plant Services
J. Demarinos, Health Physicist, ALARA
D. Dunn, Station Engineer
* D. Hagan, Health Physics Supervisor
R. Hammaker, Health Physics Technician, Level II
J. Hergan, Health Physics Technician, Level I-1
P. Jaeger, Health Physics Radwaste Foreman
K. Kiniry, Health Physics Technician, Level II
J. Lex, Nuclear HP/Chemistry Training Supervisor
* D. McGarry, Industrial Safety Engineer
E. McIlvaine, Health Physics Foreman, ALARA
M. Micca, Health Physics Training Instructor
W. Morrissey, Radiation Operations Supervisor
* M. Peal, Compliance Supervisor
C. Saxton, Environmental Scientist-Nuclear
D. Shane, Health Physics Foreman
* G. Stanley, Superintendent of Plant
R. Sutliff, Health Physics Technician, Level II
L. West, Station Engineer
F. Whurst, Station Maintenance

1.2 NRC Personnel

G. Barber, Senior Resident Inspector
* D. Mannai, Resident Inspector

* Denotes those present at the exit interview on August 14, 1992.

2.0 Purpose

This inspection was an unannounced safety inspection of the Susquehanna Steam Electric Station radiation control programs. The inspection focused on organization, training and qualifications, and a review of the operations HP group. In addition, review was made of a radwaste resin shipment.

3.0 Review of Previously Identified Items

(Closed) Inspector Identified Item (50-387/90-81): The inspector reviewed a finding from the Maintenance Team Inspection Report No. 90-81 in Section 7.3 that identified the storage of clean tools mixed with fixed contaminated tools in the Turbine Building Tool Room. The inspector reviewed the licensee's response to this inspection finding. Maintenance procedure, MI-AD-002, Rev. 5 entitled "Tool Control Program", was revised to require that contaminated tools that are bagged require health physics survey and contamination level markings indicated on the bag. Tool room personnel have been directed to segregate contaminated tools from clean tools in the Turbine Building Tool Room. Health physics has increased periodic surveys of the tool room areas to weekly. The on-the-job training standard for the Tool Control Program, CS-633, has been revised to include instruction to notify HP when placing contaminated tools in a tool box containing clean tools. The combination of the above corrective actions appears to adequately address the concern and this item is considered closed.

(Closed) Violation (50-387/92-12-01): The violation involved the lack of informed workers of radiological conditions in the drywell work areas. The corrective actions contained in the licensee's response letter dated May 22, 1992 were reviewed and verified by the inspector. Worker feedback of radiological condition information is now required prior to entering the drywell. Hanging mobiles indicating radiological conditions will be used on each level of the drywell to reinforce to the worker the radiological hazards in the area. Informational postings will be added to the high radiation area postings to provide dose rate information specific to the posting location. Enlarged color coded maps of the drywell have been developed which indicate sources of radiation in pink and low dose rate waiting areas in green as well as printed general area dose rate indications. These survey maps will be located in the drywell change area, at the drywell HP control point, and on each elevation in the drywell. Additionally, several meetings at different levels were conducted to communicate the worker's responsibility for knowing radiological conditions in the work place. OJT training was developed and in the process of being provided to all station first-line supervisors and radiation workers with a purpose to provide the non-HP personnel with the opportunity to decipher radiological survey maps and contribute some ALARA ideas to a work evolution. The inspector attended one of these one hour classes and considered it to be a good initiative. To reinforce the need for greater communication of radiological conditions to the worker, the licensee has readdressed radiological job coverage training in the latest round of recycle training for station operations HP technicians with emphasis on the pre-job briefing requirements.

The maintenance department has developed a self-assessment grading system of departmental performance. This Maintenance Self Assessment Observation Guide is a current station initiative comprised of 9 functional attributes of maintenance work

performance that are rated on a five-point scale. Radiation Safety performance constitutes one of the rated work performance attributes. Currently, fourteen maintenance supervisors are tasked with providing one 'report card' each month. To date, there has been no indication of weakness in the radiation safety area. Theoretically, these maintenance report cards could indicate a decline in radiological work performance and allow the licensee to mitigate the deficient area. Although the standard of radiological work practices in this case is determined by maintenance supervisors and not the HP staff, this measurement tool is still considered a good initiative.

In addition, there are two other initiatives the licensee was still developing at the time of this inspection. In response to an NRC identified weakness regarding the lack of radiological conditions contained on station RWPs, the licensee is in the process of redesigning the RWP format to include this information and to make the document more decipherable to the general work force. The second initiative under consideration is an attempt to visibly delineate radiation sources in the plant by posting "radiation source" signs on various radioactive piping systems. The licensee plans to pilot this new posting suggestion and determine the effectiveness of this innovation in various plant locations. In principle, identifying the radiation sources in a given area would allow the worker to maintain distance from them and thereby minimize the dose received while working in the area.

In summary, the licensee has responded quickly to the instructions to worker deficiency by pursuing a more aggressive plant posting practice, by educating the workers and HP staff on their responsibilities to know the radiological conditions of the work place, and by implementing a measurement system to alert the licensee to any future decline in radiological safety performance in the work place. Though the effects of these licensee actions have yet to be demonstrated, the corrective actions appear to be thorough and adequately address the violation. This item is considered closed.

(Closed) Inspection Followup Item (50-387/92-12-03): During the previous outage HP inspection[1] the inspector noted that the primary containment work area (a contaminated area) was maintained at a positive atmospheric pressure with respect to the reactor building clean areas during outage maintenance periods. The licensee has evaluated possible alternatives and has elected to modify the containment purge system to correct this positive pressure condition. This system normally supplies an inert nitrogen blanket inside containment during plant operations and supplies an air purge to displace the nitrogen gas prior to manned entries. During open containment maintenance periods this system has historically supplied additional clean air to containment. The current modification involves adding an access door to the existing

[1] Combined Inspection Report Nos. 50-387/92-12 and 50-388/92-12

containment purge ductwork and connecting ductwork to a 6,000 ft^3 filtered air ventilation unit. After plant shutdown and the containment purge system has purged the containment of nitrogen, the air supply would be isolated, the ventilation access door opened, and the ventilation system initiated. The licensee has scheduled the containment purge system modification to occur at the beginning of the next refueling outage for both reactor units. The licensee actions completely address the inspector's concern, therefore this item is closed.

4.0 ALARA Status

As of July 31, 1992, Susquehanna Station had accumulated 446 person-rem based on 420 person-rem expected at this time. The overruns were a result of 26 person-rem additional dose experienced during the past unit 1 outage; 346 person-rem actual versus 320 person-rem estimated. The principal causes for these overruns were increased scope of work for both the snubber reduction program and the feedwater pipe weld overlay work. The ALARA goal for the next refueling outage for unit 2 is 255 person-rem with a final 1992 station ALARA goal of 750 person-rem for this two refueling outage year. Personnel Contamination Reports for the year number 64 for clothing contaminations and 86 for skin contaminations with a total of 264 for the year which has included one refueling outage. Both the collective personnel exposures and personnel contaminations appear to be reasonable levels.

The inspector attended the August 13, 1992 Station ALARA Committee meeting chaired by the Manager of Station Maintenance. The meeting consisted of a report of monthly and yearly exposures to date as compared to estimates. These comparisons were presented in two different categories: by functional department which indicates a responsible station supervisor, and by station work group. As the month of July was a non-outage and non-exposure intensive month, there was little discussion concerning the current station exposure status. Next, the committee discussed the Employee ALARA Concerns open item list. Twelve items were listed as open. Two items were closed and one was added after some discussion. The Radiological Operations Supervisor made a presentation of the new station radiological posting practices to be implemented during the next outage, HP briefing expectations, and announced two pilot projects involving a redesign of the RWP format and the selective use of "radiation source" postings. The committee endorsed the initiatives with the expectation that the maintenance groups reactions be solicited for comment. Additional presentations were made by the station In-Service Inspection (ISI) and snubber reduction program representatives. A new idea was presented whereby the various locations of all ISI and snubber reduction activites inside the drywell were mapped to allow coordination of common support requirements, e.g. scaffolding and insulation removal and replacement. This new initiative will strive to eliminate any unnecessary takedown or insulation replacement work when other ISI or snubber removal work is still scheduled in a particular location and will economize the exposure to the maintenance support groups.

5.0 Organization

Effective August 1992, Deborah L. Hagan became the Health Physics Supervisor. Ms. Hagan was, and remains, the acting Effluents Management Supervisor. She meets the qualification requirements specified in Section 12.5.1.4 of the Station Final Safety Analysis Report (FSAR), and she previously served as the Radiation Protection Supervisor who was responsible for the technical aspects of the Susquehanna HP program. Other than the double duties that Ms. Hagen is currently responsible for, the inspector had no reservations regarding this personnel change.

The current Health Physics organization consists of the HP supervisor with three direct reports: Senior Health Physicist, Dosimetry Management; Radiological Operations Supervisor; and the Radiological Instrumentation Supervisor. The Senior Health Physicist has three Health Physicists, two HP technicians, one records clerk, and two dosimetry clerks for implementing the whole body counting, dosimetry handling, and dose record activities for the station. The Radiological Operations Supervisor has a staff of three foremen direct reports: HP Foreman, ALARA Support; HP Planning Scheduler; and HP Foreman, Plant Support. The ALARA foreman has one HP technician plus a temporary staff of four HP ALARA Specialist to accommodate increased outage ALARA requirements. The HP Planner and Scheduler interfaces directly with the outage planning schedulers and provides advanced Radiation Work Permit (RWP) application information for the ALARA planning effort. The Plant Support HP Foreman has four assistant HP Foremen who direct approximately 30 job coverage HP technicians. The Radiological Instrumentation Supervisor has one Health Physicist and six HP technicians to implement the HP instrument program. The total HP department permanent staff is approximately 63 personnel.

In addition, the licensee has a corporate HP staff which provides oversight and assessment of the station radiation protection program, long range ALARA planning and a Thermoluminescent Dosimeter (TLD) processing service for the station. The corporate radiological group no longer has radwaste oversite responsibility, but now has a radiological engineering support function. The Radiological group consists of a staff of ten: seven HP Specialists, one nuclear engineer, and two dosimetry technicians.

To complement the station HP department during the next refueling outage (unit 2, fifth refueling), the station has contracted for approximately 96 HP technicians comprised of 13 junior HP technicians, 27 two-year senior HP technicians, and 56 three-year senior HP technicians. These contract technicians will be used to help man the six satellite HP control points which will be supervised by eight station senior HP technicians temporarily upgraded to assistant HP foremen for the outage. The four

permanent assistant HP Foremen will assume around-the-clock HP supervision duties throughout the outage period.

6.0 Training and Qualifications

The inspector reviewed various aspects of the HP training program and reviewed the qualifications of various HP staff members with respect to FSAR Section 12.5.3.7 requirements and the training guidelines contained in NUREG 1220.

The inspector reviewed the current HP technician annual retraining program. Approximately every nine weeks, the HP technicians rotate into a week of retraining. The current program consists of 1.5 days reviewing required HP procedures (HP-087), one day of RWP training (HP-092), one-half day of respiratory protection training (HP-136), one day of reactivity control training (HP-137), and one day of HP job coverage review (HP-091). There is a monthly HP Cirriculum Committee meeting held between the HP training group and the station HP supervision to discuss training needs and to provide feedback to the training department. The inspector reviewed minutes from the most recent meeting held on July 2, 1992. A comprehensive review of training topics and qualification exams was evident. The inspector also reviewed the mechanism for student feedback into the training process. To solicit immediate and candid student feedback at the end of a training cycle, an evaluation form is passed out to each student, the instructor is asked to leave the classroom, and an HP assistant foreman requests verbal comments and discussion which is then documented. The HP training program appears to have a strong systems approach to training. One observation was noted which was that the current HP instructors' operations experience is very dated. The HP instructors are not provided with periodic opportunities to participate in current station HP practices.

The inspector selected various operations HP technicians and reviewed their training and qualification records. All records were kept current and complete. It should be noted that although the SSES Technicial Specifications Section 6.3 sets minimum staff qualifications to that specified in ANSI N18.1-1971 which in effect requires two-year experience as a senior HP technician, the station requires three year experience as specified in ANSI 3.1-1981.

Temporary outage contract HP technicians are currently trained and qualified the same as permanent station HP technicians albeit in abbreviated fashion, however, the same examination requirements and job performance measures must be fulfilled. The complete training program for the temporary outage HP workforce varies between five and seven days depending on previous experience. The contract technicians are given three days to complete procedure review and two days to complete the on-the-job training requirements.

7.0 Operational Health Physics

The inspector interviewed several operations HP technicians to ascertain any problem areas. Some common statements were made. Most felt it very easy to request the decontamination of a work area when required. When asked about the availability of additional shielding, the common belief was that shielding required at least a two day lead time and the technician would need a very strong argument to stall a job for two or more days. Apparently the technicians are not generally aware of some of the shielding options available to them. The licensee indicated that the use of the ALARA shielding 'library' would be communicated to the operations HP technicians. The most commonly reported problem stated by HP technicians involved the need to get the work done quickly and efficiently and the delays inherent in radiological safety review and the application of dose mitigating measures. In general, there was a good sense of HP management support for the HP technicians. Regarding protocol, the HP technicians report to one of four assistant HP foremen. Functionally, the technicians report to the HP office lead technician on shift. Due to the shift-rotation of the HP technicians (currently nine different shift rotations), they do not normally work directly for their assigned assistant foreman which precludes direct involvement or coaching of the employee at this level. The day-shift and afternoon-shift HP technicians benefit from shift turnover meetings that are frequently attended by the Radiological Operations Supervisor when job performance expectations are frequently communicated according to the HP technician interviews. The HP technicians indicated that there was a perception that the operations HP technicians are on their own and perform with little incentive to improve, although the inspector did not notice any evidence of poor performance.

In summary, the inspector observed good morale and a good level of performance demonstrated by the operations HP technicians. There does appear to be room for improvement in HP program areas that could provide additional ALARA resources for on the job coverage situations.

8.0 Radwaste Shipment Preparation

The inspector witnessed the preparation of a radwaste shipment containing dewatered spent radwaste bead resins. The 195 ft^3 polyethlene High Integrity Container (HIC) had been sampled using an automatic in-line sampler during the fill operation. An aliquot of this sample was analyzed for gamma emitting radionuclides. These results were input to the RADMAN computer code and a theoretical dose rate was calculated for the HIC. The derived dose rate can then be compared to the actual measured dose rate. This serves to verify the sample and the continued use of existing scaling factors used in the RADMAN program. The results in the case of shipment number 92-121 indicated a derived contact dose rate of 35 mR/hr. Direct survey readings indicated a contact dose rate of 875 mR/hr for a factor of 25 difference between the

two values. According to the May 1983, NRC Waste Classification and Waste Form Technical Position Paper, a target factor of 10 is considered reasonable in determining hard to identify radionuclide concentrations in the waste material. Station procedures specify notification of supervision when discrepancies exist greater than a factor of three. A review of past spent bead resin shipments indicated an average factor discrepancy of 2.2. The licensee canceled the shipment and resampled the HIC using a manual sample process. Upon reanalysis, the calculated dose rate was 128 mR/hr which differed from 875 mR/hr by a factor of 7. This variability is within the accepted tolerance for radionuclide activity determination, however there remains unanswered questions surrounding the automatic in-line sampler operating limitations and establishment of operating parameters to ensure adequate and representative samples are obtained in the future (IFI 92-21-01).

9.0 Exit Meeting

The inspector met with licensee representatives at the conclusion of the inspection on August 14, 1992. The inspector reviewed the purpose and scope of the inspection and discussed the findings.