U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-272/93-10
50-311/93-10
50-354/93-16

Docket Nos. 50-272
50-311
50-354

License Nos. DRP-70
DPR-75
NPF-57

Licensee: Public Service Electric and Gas Company
P. O. Box 236
Hancocks Bridge, New Jersey

Facility Names: Salem Nuclear Generating Station, Units 1 and 2
Hope Creek Nuclear Generating Station

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted: April 5-8, 1993

Inspector: R L Nimitz 5/21/93
R. L. Nimitz, CHP, Senior Radiation Specialist date

Approved by: W. Pasciak 5-24-93
W. Pasciak, Chief date
Facilities Radiation Protection Section

Areas Inspected: Announced inspection of the radiological controls program at the Salem and Hope Creek Nuclear Generating Stations. The inspection principally focused on the adequacy and implementation of the radiological controls program during the Salem Unit 2 refueling outage. The areas reviewed included action on previous inspection findings, organization and staffing, training and qualifications, audits, efforts to maintain radiation exposures as low as is reasonably achievable (ALARA), routine radiological controls, and radioactive material and contamination controls. The inspector also reviewed activities at Salem Unit 1 including the entry of personnel into the containment to perform leak detection activities with the reactor at power. Previous inspection findings applicable to the Hope Creek Station were also reviewed.

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Findings: The inspection revealed that, overall, very good radiological controls were implemented for the Unit 2 outage and the work activities reviewed at Unit 1. Areas that were particularly noteworthy included planning and coordination of work activities, control of radioactive and contaminated material, and radiological controls provided for the repair of the fuel transfer equipment at Unit 2. Several apparent weaknesses in industrial safety were identified and brought to the licensee's attention. One non-cited violation was identified. The violation involved failure to complete dosimetry records at Salem Unit 2 prior to marking dose status as "complete" on a computer. The violation met the criteria for a non-cited violations specified in 10 CFR Part 2, Appendix C.

DETAILS

1.0 Individuals Contacted

1.1. Public Service Electric and Gas Company

*C. Vondra, General Manager, Salem Operations
*J. Wray, Radiation Protection Engineer - Salem
*E. H. Villar, Licensing Engineer
*S. Skabici, Principal Engineer, Quality Assurance
*K. Pike, Technical Manager (Acting)
*R. Antonow, Outage Manager, Unit 2
*V. J. Polizzi, Operations Manager
*M. Shedlock, Maintenance Manager
*M. Prystupa, Radiation Protection Engineer - Hope Creek
*E. Katzman, Supervisor, Radiation Protection Services

1.2 Other Personnel

*P. Duca, Site Representative, Delmarva Power
*D. Turner, Corporate Health Physics Engineer, Southern California Edison

1.3 NRC Personnel

*T. Fish, Resident Inspector
*S. Barr, Resident Inspector

* Denotes attendance at the exit meeting on April 8, 1993.

The inspector also contacted other licensee personnel during the course of the inspection.

2.0 Areas Reviewed

The following areas were reviewed during the inspection:

- action on previous findings
- organization and staffing
- training and qualification
- audits
- ALARA
- radioactive material and contamination control
- routine radiological controls
- station tours

3.0 Licensee Action on Previous Inspection Findings

3.1 (Closed) Unresolved Item (50-272 & 311/91-28-01; 50-354/91-21-01) NRC to review the licensee's efforts to enhance dosimetry program quality controls. This item was extensively reviewed during NRC Combined Inspection Nos. 50-272/92-05; 50-311/92-05; and 50-354/92-05 and NRC Combined Inspection Nos. 50-272/92-15; 50-311/92-15 and 50-354/92-15. The inspector's review during this inspection indicated that the licensee implemented the dosimetry program quality control enhancement plan. The plan included establishment of an improved organization, development of enhanced procedures, and development and implementation of enhanced training for personnel operating the dosimetry processing systems. The inspector noted an improved algorithm was developed for processing dosimetry devices as well as specific guidelines for suspension of dosimetry device processing. The inspector's review indicated that Fourth Quarter 1992 dosimetry processing test results, as well as previous test results, met accreditation criteria specified in 10 CFR 20.202, Personnel Monitoring. The licensee's implementation of the plan significantly enhanced the quality assurance of dosimetry processing. This item is closed.

3.2 (Closed) Unresolved Item (50-272/92-05-03; 50-311/92-05-03; 50-354/92-05-03) NRC review of dosimetry records for personnel supporting the Unit 1 outage indicated that some records appeared to be incomplete or inaccurate. For example, the inspector noted an unsigned NRC Form 4, incorrect work dates, incorrect identification of a female as a male, unverified data, and incorrect logging in the computer of completion of dosimetry records (i.e., all records were shown as complete when they were not). The licensee performed an immediate sampling of dosimetry records and did not identify any apparent widespread programmatic problem and determined that no administrative limits were exceeded.

The licensee corrected the identified concerns and initiated a comprehensive evaluation of dosimetry records. The description of the corrective actions and the results of the on-going licensee evaluation were discussed in NRC Combined Inspection Report Nos. 50-272/92-09; 50-311/92-06; and 50-354/92-07. The corrective actions included conversion of the status of contractor personnel's exposure records to "incomplete" pending individual record review, re-qualification of personnel on dosimetry procedures, re-verification of all dosimetry records prior to authorizing a complete status of personnel dosimetry records, and training of dosimetry personnel on the identified matters.

The inspector was concerned that an individual could receive a dose extension above applicable NRC limits with incomplete records. A subsequent licensee review identified several additional examples of personal dosimetry records indicated as complete when the records were not complete. The licensee's review did not identify any instance where personnel with incomplete records were authorized to receive radiation exposure above NRC limits for personnel with incomplete exposure records.

The inspector noted that Procedure M12-DOI-701, Revision 5, Personnel TLD Issue and Documentation Requirements, requires in Section 5.33, that if an individual has estimated exposure for the current quarter or missing (incomplete) or estimated exposure for other periods, the individuals' dose limit was to be 1000 millirem and his exposure status was to be E (i.e., incomplete or estimated). The inspector's and licensee's review indicated that a number of individuals' records were indicated as C (complete) when they were actually E (incomplete or estimated) as follows:

Individual	Concern
A	The paperwork and computer indicated a complete status but the NRC Form 4 (section on permitted accumulated dose) was not complete.
B	The paperwork and computer indicated a complete status, but the NRC Form 4 was not totaled and the permitted dose was not completed.
C	An NRC Form 4 dated February 1991 refers to an NRC Form 4 dated January 1991 which was never completed.
D	An NRC Form 4 was filled out with an estimate but the record was not requested.

The inspector noted that Technical Specification 6.11 requires that radiation protection procedures be established implemented and maintained and that failure to follow procedure M12-DOI-701, Revision 5, was a violation. The inspector noted that the above individuals did not exceed applicable NRC or licensee administrative limits and the likelihood of exceeding NRC limits was considered remote. Also, the above individuals had not been authorized a dose extension, and dosimetry personnel were informed of errors. In addition, the matters identified were considered isolated instances, no programmatic breakdown was indicated, and the licensee took extensive corrective actions, as discussed above.

In addition, during the current outage at Unit 2, the inspector reviewed dosimetry records for contractor personnel hired to support on-going outage activities and no discrepancies were identified. In light of the above, the inspector concluded that a limited potential existed for personnel to exceed NRC dose limits, that the licensee took appropriate corrective actions and that it was appropriate to consider this matter as an inspector identified non-cited violation as specified in 10 CFR Part 2, Appendix C, Section VII, Exercise of Discretion. This item is closed.

The inspector did note that during the above discussed reviews, the licensee did identify one individual (Individual E) that had exceeded the licensee's lifetime administrative dose limit of 2(N-17) without proper authorizations. The licensee's computer was apparently incorrectly calculating lifetime exposure values and it was not realized that the individual's total accumulated exposure warranted a dose extension. The licensee corrected the records, initiated a review of all appropriate records, and corrected the computer error. No exposures above NRC limits were identified. (Inspector Note: The 10 CFR Part 20 permissible lifetime accumulated exposure value is 5(N-18) where N is the individual's age in years. The licensee's administrative limit provides for an allowable exposure of 43% of the NRC limit.) The inspector will review the circumstances and corrective actions during a subsequent inspection. This matter is considered unresolved. (50-272/93-10-01)

3.3 (Closed) Unresolved Item (50-272 & 311/92-20-01)
NRC to review the training provided to a contractor operating a filter/demineralizer used to process liquid radioactive waste at the Salem Station. The inspector reviewed this matter with respect to the requirements contained in IE Bulletin 79-19, Packaging of Low Level Waste for Transport and Burial, and the licensee's September 25, 1979, response to the bulletin. The inspector's review indicated that the licensee verified that the individual had received appropriate training by the individual's company and that the licensee met commitments specified in the response to the bulletin. This item is closed.

3.4 (Closed Unresolved Item (50-272 & 311/92-20-02)
NRC to review the training of personnel relative to NRC Information Notice No. 92-72, Employee Training and Shipper Registration Requirements for Transporting Radioactive Materials. The inspector's review indicated that the licensee was providing the hazardous material training to the appropriate personnel at the appropriate frequency. This item is closed.

4.0 Organization and Staffing

The inspector reviewed the organization and staffing of the on-site radiological controls organization. The review was with respect to criteria contained in applicable Technical Specifications and licensee administrative documents.

The inspector evaluated licensee performance in this area by review of applicable documentation, discussions with cognizant individuals, and independent observation of on-going work activities during tours of the facility. The inspector also reviewed the Unit 2 Seventh Refueling Outage Schedule for supervisors and evaluated the method of licensee oversight of contracted radiological controls personnel.

The inspector's review indicated that the licensee implemented a well defined outage radiological controls organization. There was generally very good supervisory and management oversight of work activities.

The following observations were made:

- Permanent licensee personnel were placed in supervisor positions to provide oversight of contractor personnel.

- Overtime was tightly controlled.

- Permanent personnel from the Hope Creek Station were used to augment the staff.

No safety concerns or violations were identified.

5.0 Training and Qualification

The inspector reviewed the training and qualification of radiological controls contractor personnel supporting outage work activities. The inspector also reviewed the training and qualification of radiation workers. The review was with respect to applicable Technical Specification requirements and 10 CFR 19, Instructions to Workers.

The evaluation of the licensee's performance in this area was based on discussions with personnel, review of training records and qualification documents, and review of resumes. The inspector also observed personnel performance in the field during tours and observation of on-going work activities.

The inspector reviewed a random selection of vendor technician training and qualification documentation and determined that contractor radiological controls personnel, hired to augment the organization during the outage, met or exceeded the minimum training and experience requirements. The inspector's review of radiation worker training records indicated selected personnel observed in the radiological controlled area had received appropriate radiation worker training. The inspector also noted that the licensee provided procedure training to the Hope Creek Station radiation protection personnel temporarily assigned to the Salem Station to support outage activities.

The following weakness was identified:

- The licensee provides Salem Station radiation protection program specific training to contractors hired to augment the staff during outages. The individuals are provided site specific briefings and training on procedures. The inspector noted that a written exam is provided to the contractors to evaluate their knowledge. A specified passing grade is required prior to certification to work at the station. The inspector's review indicated that the exams were comprehensive. However, the inspector noted that personnel were not provided the answers to questions that they missed on the exams. The inspector noted questions missed by personnel (as determined by inspector review of completed exams), who were certified to work

in the station, included questions on High Radiation Area posting, air sampling, beta radiation surveys, personnel frisking, procedure use, and industrial safety.

Although no violations or concerns were identified relative to the areas covered by the missed questions during inspector tours, the failure to provide the answers to missed questions was considered a weakness.

The licensee indicated that the exams and this matter would be reviewed. The circumstances surrounding this matter and the licensee's corrective actions were considered unresolved. (50-272/93-10-02)

No violations were identified.

6.0 Audits

The inspector reviewed the scope of audits, assessments and surveillances of on-going work activities. The review was with respect to applicable criteria specified in Technical Specifications and station procedures.

The following positive observations were made:

- The licensee used a dedicated radiological assessor to monitor on-going work activities. The individual immediately brought identified concerns to the attention of radiological controls management personnel. This was considered a very good initiative.

- The licensee assigned dedicated personnel to document and evaluate radiological occurrences.

- The licensee's Station QA Surveillance group performed very good surveillances of on-going radiological controls activities.

No safety concerns or violations were noted.

7.0 ALARA Efforts

The inspector reviewed selected aspects of the licensee's ALARA Program. The principal focus of the review was the observation of on-going work activities to determine if work was performed in a manner to maintain personnel radiation exposures as low as reasonably achievable (ALARA). The review was with respect to general guidance and criteria contained in the following:

- Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably

Achievable

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

The evaluation of the licensee's performance was based on discussions with cognizant personnel, independent inspector observations during tours of the station, observations of on-going work activities, and review of documentation.

The inspector independently reviewed the following work activities from an ALARA perspective:

- steam generator and refueling work activities
- repair of the Unit 2 fuel transfer cart
- entry into the Unit 1 containment at power to perform leak detection activities and
- non-destructive examination of reactor fuel.

The following ALARA observations were made:

- ALARA goals were reasonable and based on comprehensive evaluation of work scope and prior historical data.
- Divers were used to repair the fuel transfer cart. The use of divers significantly reduced external radiation exposure.
- Very good initiatives to reduce radiation exposure of personnel working on the steam generator platforms were noted. These included moveable manway and bowl radiation shields and remote radiation monitoring capabilities.

No safety concerns or violations were noted.

8.0 Radioactive Material Control and Contamination Control

The inspector reviewed the control of radioactive material, contaminated material, and contamination. The following matters were reviewed:

- personnel frisking practices
- use of proper contamination control techniques at work locations, including control of hot particles
- posting and labeling (as appropriate) of contaminated and radioactive material
- efforts to reduce the volume of contaminated trash including steps to minimize

introduction of unnecessary material into potentially contaminated areas
- adequacy of contamination surveys to support planning for and support of on-going work.

The following positive observations were made:

- The licensee was effectively controlling radioactive and contaminated material and contamination.

- The inspector noted that the licensee had expended and was continuing to expend considerable effort enhancing the material condition of the station. Extensive painting activities were on-going as well as clean-up and re-configuration of work areas (e.g., hot machine shop).

The following area for enhancement was noted:

- The inspector noted that some radiation surveys indicated levels of radioactive contamination in units of mrad/hr based on measurement of a smear sample with a radiation survey meter. Although this is a common industry practice, the surveys reviewed by the inspector did not always identify the surface area over which the smear sample was collected. The licensee's personnel indicated this matter would be reviewed.

No safety concerns or violations were identified.

9.0 Routine Radiological Controls

The inspector reviewed the adequacy and implementation of radiological controls provided for the Salem Unit 2 outage. The inspector also reviewed routine radiological controls at Salem Unit 1. The inspector toured selected portions of the radiological controlled areas and reviewed the following elements of the radiological controls program:

- performance and adequacy of radiological surveys to support pre-planning of work and on-going work activities
- use of appropriately calibrated instrumentation to measure radiation and contamination
- personnel adherence to radiation protection procedures, radiation work permits and good radiological control practices
- posting, barricading and access control as appropriate, to Radiation, High Radiation, and Airborne Radioactivity Areas
- High Radiation Area access point key control
- use of dosimetry devices
- airborne radioactivity sampling and controls

- installation, use and periodic operability verification of engineering controls to minimize airborne radioactivity
- use of respiratory protection devices including provision of appropriate quality of breathing air for supplied air respiratory protective equipment
- implementation of radiation work permits.

The evaluation of the licensee's performance in this area was based on discussions with cognizant personnel, review of on-going work activities and review of various documents. The inspector also questioned radiation workers and radiation protection personnel to evaluate personnel understanding of radiological conditions and program requirements.

Work activities independently reviewed by the inspector included the following:

- on-going steam generator work activities at Unit 2
- fuel inspection activities at Unit 2
- repair of the Unit 2 underwater fuel transfer cart and
- personnel entry into the Unit 1 containment at power for leak detection activities.

Regarding the leak detection activities at Unit 1, the inspector noted that the licensee had been experiencing increases in readings on the Unit 1 containment air particulate radiation monitor since approximately August 1992. Since December 1992 and as of March 1993, the licensee had experienced 7 engineered safety feature actuations. The alarm of the monitor resulted in, among other signals, a containment purge and pressure relief isolation signal. As a result, the licensee elected to enter the containment at power to identify and correct the problem. The inspector reviewed the radiological controls provided for personnel entering the Unit 1 reactor containment at power including radiation surveys, airborne radioactivity surveys, previous entries to perform similar tasks, dosimetry provided, neutron measurements, training and instructions to workers, and applicable procedures and radiation work permits. The inspector concluded that the licensee provided effective radiological controls for the work activities. Personnel exposure to airborne radioactivity and external radiation exposure was minimized during leak detection activities.

In addition to the above observation, the following general positive observation was made:

- The inspector's reviews indicated effective exposure controls were implemented for all outage tasks reviewed.

No violations or safety concerns were identified.

10.0 Station Tours

The inspector's tours of the station identified very good efforts to improve the material condition of the station. Housekeeping, including inside of the Unit 2 reactor containment was considered good. The licensee was cleaning, painting and refurbishing areas throughout the station.

The following apparent weaknesses in the area of industrial safety were identified and brought to the licensee's attention:

- On April 5, 1993, a floor plug was pulled near the main entrance to the Unit 1 and 2 Auxiliary Building. One side of the opening was not barricaded to preclude a potential fall. The licensee closed the opening and initiated a review of the matter.

- On April 6, 1993, a worker was observed on an uninspected scaffold. A radiation protection supervisor requested the individual to leave the scaffold and informed him of the need for inspection. The licensee's safety personnel also initiated a review of the matter.

- On April 7, 1993, during tours on the Unit 2 reactor coolant pump platform areas in the Unit 2 containment, the inspector observed personnel standing near an opening from the platform to an access ladder. Personnel were apparently using the area as a low dose wait area. The licensee's safety personnel were not aware that personnel were using the area as a low dose wait area and initiated a review of the matter.

11.0 Exit Meeting

The inspector met with licensee representatives (denoted in Section 1.0) on April 8, 1993. The inspector summarized the purpose, scope and findings of the inspection.

The licensee's representatives stated at the exit meeting that the matter regarding personnel training on incorrect answers to exam questions (see Section 5.0) and the matter associated with personnel standing near the opening of the reactor coolant pump platform (see Section 10.0) would be reviewed.