U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-272/92-15
50-311/92-15
50-354/92-15

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: September 21 - October 2, 1992

Inspector: RL Nimitz 10/30/92
R. L. Nimitz, CHP, Senior Radiation Specialist date

D. G. Mann 10/30/92
D. G. Mann, Health Physicist date

Approved by: W Pasciak 10/30/92
W. Pasciak, Chief date
Facilities Radiation Protection Section

Areas Inspected: This inspection was a routine, unannounced 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 Hope Creek refueling outage. Areas reviewed were organization and staffing, training and qualifications, ALARA, radioactive material and contamination controls, routine radiological controls, Technical Support Center ventilation testing, and plant tours. Previous findings, which involved both the Salem and Hope Creek Stations, were also reviewed.

Findings: The inspection identified that the licensee implemented a very good radiological controls program to support the Hope Creek refueling outage. The radiological controls at the Salem Station were also very good. The licensee implemented commendable planning and preparation for the entry into the Salem Unit 1 containment at power to repair resistance temperature detectors (RTDs). ALARA planning for the Hope Creek refueling outage was very good. The licensee implemented very good efforts to improve quality control of dosimetry device processing. Also, generally very good controls were implemented for radioactive and contaminated material and contamination. An unresolved item opened in a previous inspection was closed. The item was opened because of the identification of several instances of tools or equipment with detectable radioactive contamination outside the radiologically controlled area. Because of the minor safety significance of the contamination involved and because of the extent of your corrective action, we have determined that this should be treated as a license-identified, non-cited violation. No other violations were identified.

DETAILS

1.0 Individuals Contacted

1.1. Public Service Electric and Gas Company

*T. Cellmer, Radiation Protection/Chemistry Manager - Salem
*J. Clancy, Radiation Protection/Chemistry Manager - H.C.
B. Evans, Lead Engineer - RP/Chem Services
*S. Funsten, Maintenance Manager - H.C.
*R. Gary, Sr. Radiation Protection Supervisor - Operations
*M. Gray, Licensing Engineer
*R. Griffith, Sr., Manager Station QA - H.C.
*J. Hagan, General Manager - Hope Creek Operations
*B. Hall, Technical Manager - H.C.
A. Hoornik, Nuclear Technical Support - Chemistry
*R. Hovey, Operations Manager - H.C.
*E. Katzman, Principle Engineer - Rad Pro Services
K. Maza, Chemistry Engineer
*J. Molner, Sr RP/Chemistry Supervisor - Support
*J. O'Neil, Station QA - H.C.
*M. Prystupa, Radiation Protection Engineer
*F. Ricart, Safety Review Engineer - H.C.
M. Simpson, Senior Staff Engineer
S. Smickley, Lead Nuclear Training Coordinator/Supervisor
*D. Smith, Station Licensing Engineer - H.C.
*J. Wray, Radiation Protection Engineer - Salem

1.2 NRC Personnel

*R. Albert, Physical Security Inspector
*T. Johnson, Senior Resident Inspector
*K. Lathrop, Resident Inspector
*R. McBrearty, Reactor Engineer

* Denotes attendance at the exit meeting on October 2, 1992.

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
- ALARA
- radioactive material and contamination control
- routine radiological controls
- testing of the Technical Support Center ventilation
- plant tours

3.0 Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (50-272/91-32-01)
The inspector will review the circumstances and licensee corrective actions (as appropriate) associated with the discovery of contaminated tubing outside the Salem Station radiological controlled area on December 16, 1991. The licensee's radiological controls program prohibits release of material with detectable contamination. The contamination control matters associated with this event and other contaminated material identified outside the Salem Station radiological controlled area (RCA) were reviewed during NRC Combined Inspection Nos. 50-272/92-05; 50-311/92-05; and Nos. 50-354/92-05, and 50-272/92-06; 50-311/92-06; and 50-354/92-07 and also during this inspection.

During the previous inspections, the inspector noted several instances where material with detectable radioactive contamination was identified outside the RCA at both the Salem and Hope Creek stations and that the instances appeared to warrant further review by the licensee. The instances were:

- five contaminated tools found outside the RCA (June 1990)
- a contaminated test gauge was released from the Hope Creek RCA (July 1991)
- contaminated tubing found outside the Salem RCA (December 1991)
- a contaminated pipe wrench found outside the RCA (February 1992)

Another instance involved identification of a spot of contamination outside the Salem Station radwaste facility on August 31, 1992. This example is discussed in Section 7.2 of this report

The inspector noted that the licensee had identified each of the instances as a result of the current contamination control program or enhancements to the contamination control program previously made. The inspector determined that the licensee initiated an independent evaluation of the effectiveness of contamination controls at radiological

controlled area (RCA) boundaries. The inspector reviewed this evaluation and concluded that the licensee implemented a number of contamination control enhancements prior to the identification of the contaminated tubing, pipe wrench and contaminated spot (referenced above) and that the identification was a result of the previous enhancements. The licensee also implemented a number of program enhancements at the Hope Creek station following the identification of the contaminated test gauge. The enhancements made at the stations included:

- improved survey techniques (Salem and Hope Creek)
- development of a supervisory directive regarding frisking practices (Salem)
- requirement that only senior radiological controls technicians free release material (Salem)
- installation of foot switches to control personnel use of small article monitors (Salem)
- restriction of release of material from the radwaste truck bay (Salem)
- initiation of a free release log to record materials cleared for release from the RCA (Salem)
- inclusion of contamination control events into continuing training (Salem and Hope Creek)
- labeling of appropriate gauges for use inside and outside the RCA (Hope Creek)
- re-instruction of personnel in proper survey and frisking methods (Salem and Hope Creek)
- A supervisory directive was issued for the Salem Station on September 16, 1992. The directive provided guidance on release of personnel items, use of small articles monitor, and decision points.

The inspector concluded that the licensee took appropriate actions to address the identified matters. Further, the inspector noted that the methods used to identify the above instances stemmed principally from licensee corrective actions associated with improvements in radioactive material and contamination control initiated as a result of self-identified weaknesses discussed in NRC Combined Inspection No. 50-272/90-19; 50-311/90-19; and 50-354/90-14. The inspector's review did not indicate any apparent repetitive events, which were indicative of inadequate corrective actions. The inspector also noted that the licensee plans to enhance procedures in the area of contamination control at both stations (Salem and Hope Creek) by the end of the year.

The inspector noted that the licensee's procedures preclude release of material with detectable radioactivity from the radiological controlled areas and that the above examples involved identification of material outside the RCA with detectable contamination. Since the licensee had taken a number of corrective actions for self-identified weaknesses in contamination controls, corrective actions were on-going, and the events were self-identified and of minor safety significance, the inspector concluded that the above instances were appropriate to consider as a licensee identified, non-cited violation in accordance with 10 CFR Part 2, Appendix B, Section V.A.

Consequently, the unresolved item is closed for administrative purposes.

3.2 (Open) 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 matter was reviewed during NRC Combined Inspection No. 50-272/92-05; 50-311/92-05; 50-354/92-05. The inspector's review during this inspection indicated the following:

- On September 17, 1992, the licensee established a QA Program procedure that defined responsibilities of personnel within the dosimetry organization.
- The licensee created a new position of QA engineer for the dosimetry group.
- In December 1991, the licensee changed from a quarterly to monthly evaluation of quality control badges. Quality controls included on-site and off-site studies and an analysis of TLD badges spiked with beta radiation.
- The licensee significantly enhanced supervisory review of QA data. Quality control charts are extensively used to evaluate dosimetry processing performance on a daily basis. The inspector reviewed Quality control data from November 1991 through August 1992 and noted generally good overall performance relative to applicable national standards.
- The licensee reviewed comparisons between accumulated personnel exposure values obtained via the integrating pocket dosimeters and the TLD badges worn in conjunction with the integrating pocket dosimeters. The inspector's review of inter-comparison data for the first and second quarter of 1992 indicated good agreement between the pocket dosimeter (integrating alarming dosimeter).
- The licensee performed daily quality controls and in February 1992 added warning bands to control charts. Any anomalies were promptly evaluated and TLD reading suspended pending resolution of the anomalies.

Based on the above review, the inspector concluded that significant improvement in supervisory and management review of quality control data was implemented and that TLD processing results were reflective of actual exposures received and any anomalies in processing were promptly evaluated. As of the date of this inspection, the licensee had several open items remaining to address to complete the enhancement plan developed by the licensee. These were anticipated to be completed by early 1993. This item remains open pending NRC review of the remaining items.

4.0 Organization and Staffing

4.1 General

The inspector reviewed the organization and staffing of the on-site radiological controls organizations. 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.

4.2 Salem Station

The inspector determined that there were no organizational changes since the previous inspection. There was generally very good supervisory and management oversight of work activities.

No violations were identified.

4.3 Hope Creek

The inspector determined that the radiological controls organization was adequately staffed to support on-going work activities. The licensee augmented the staff with appropriately trained and qualified contractor support personnel. A Senior Supervisor-ALARA was recently promoted to another position outside the radiological controls organization. The licensee's radiological controls departmental directives, for outage staffing and organization, provided for oversight of this individual's responsibilities.

During a previous inspection, the job description for the Radiation Protection Supervisor-Radioactive Material appeared to need updating to reflect the actual responsibilities for final disposition of waste from the stations. The licensee clarified the responsibility by revising the station organization procedure, HC.SA-AP.ZZ-0002(Q) - Rev. 17.

During a previous inspection, the inspector noted that the program to rotate supervisors into developmental positions did not specifically identify the procedures for which the supervisor would be responsible and for which additional training may be required. The licensee included as Attachment 6 to the "Qualification Process" procedure, HC.RP-TI.ZZ-0103(Q) - Rev. 2, an itemized list of procedures that includes the responsible functional groups.

No violations were identified.

5.0 Training and Qualification

5.1 General

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.

5.2 Salem

The inspector noted that appropriately qualified radiological controls personnel provided direct oversight of activities associated with planning, preparation, and execution of radiologically significant work activities associated with replacement of a resistance temperature detector in the Salem Unit 1 containment. The inspector noted that the training and qualifications of workers scheduled to perform the work were extensively reviewed by the radiological controls group prior to allowing workers to enter the containment. The work activity was performed with the reactor operating at about 25% power.

No violations were identified.

5.3 Hope Creek

The inspector reviewed a random selection of vendor technicians' resumes, and determined that contractor personnel radiological controls personnel, hired to augment the organization during the outage, met or exceeded the minimum training and experience requirements.

The following observation was made:

Review of Vender Technician Qualifications

Technicians working as Senior Nuclear Technician-Radiation Protection at the Hope Creek station were required to meet the training and experience requirements specified by ANSI/ANS 3.1-1981, "Selection and Training of Nuclear Plant Personnel".

ANSI/ANS 3.1-1981 states in Section 4.5.2, that "technicians shall have three years of working experience in their specialty of which one year should be related technical training". The minimum requirements applied by the licensee for each contractor job classification are described in procedure NC.RC-TI.ZZ-0103(Q), "Radiation Protection/Chemistry Personnel Qualification", and in an internal memorandum dated June 1, 1992 addressing "contractor acceptance criteria". Both documents use a summation of months worked to meet the "three years of working experience" described in ANSI/ANS 3.1-1981.

The inspector noted that in five of the resumes that were reviewed the licensee calculated the number of "effective" months worked by a technician in determining their qualification under ANSI/ANS 3.1-1981. The inspector noted that there are 2000 working hours per year (hr/yr) assuming 40 hr/wk and 50 wk/yr with 2 weeks vacation. Therefore, the "three years of working experience" described in ANSI/ANS 3.1-1981 equates to 6000 working hours. A NRC position paper dated August 26, 1980, recognized that contractor health physics technicians work considerable overtime. Therefore, the 40 hrs/wk assumption may not be appropriate.

In the five cases noted above, the licensee assumed the technicians worked 50 hrs/wk and that there were 4.33 weeks(wks)/mo (52 wks/12 mo = 4.33 wks/mo). Therefore the technicians were credited as having worked 36 "effective" months (6000 hrs) in 27.8 months (27.8 months * 4.33 wks/mo * 50 hrs/wk = 6019 hrs).

The inspector noted that this practice did not appear to be inconsistent with the intent of the ANSI/ANS 3.1 - 1981 guidance and that it appeared to be consistent with the NRC position paper dated August 26, 1980. However, the inspector noted that the licensee did not appear to have a firm basis regarding the assignment of applicable overtime hours worked.

The licensee indicated that this matter would be reviewed and consideration given to establishment of specific criteria for determining "effective" months worked during the next biennial review of the applicable procedures.

No violations were identified.

6.0 ALARA Efforts

6.1 General

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
- NUREG/CR4254, Occupational Dose Reduction and ALARA at Nuclear Power Plants; Study on High-Dose Jobs, Radwaste Handling and ALARA Incentives.

- Electric Power Research Institute (EPRI) Radiation-Field Control Manual-1991 Revision

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.

6.2 Salem

The following ALARA observations relative to the Salem station were made:

- During this inspection, the inspectors had the opportunity to review the licensee's planning and preparation for entry of a work party into the Unit 1 reactor containment at power to repair resistance temperature detectors (RTDs) inserted into the 12 cold leg loop. The loop is located within the biological shield and general area (whole body) radiation dose rates at the work area ranged from about 5-10 R/hr. The inspector attended the pre-briefing for the entry. The inspector noted that the licensee performed extensive planning and preparation to support the activity. In addition to the radiological controls aspects, including ALARA aspects, industrial safety aspects were considered and included in the work planning.

- The licensee developed a method to replace reactor water clean-up filters with a minimum of exposure received by personnel performing the work activity. The filters, with contact readings of up to 100 R/hr, typically resulted in accrued radiation exposures of about 300 millirem when changing out the filters. The licensee's new method results in an accrued exposure of about 3 millirem.

- The licensee continues to use sub-micron filtration in primary water systems (e.g., reactor coolant, seal water, refuel water purification, boric acid evaporator, spent fuel clean-up). The filtration systems appear, per the licensee, to be reducing frequency of detection of hot particles.

- The inspector reviewed ALARA goals and noted them to be reasonable and based on comprehensive evaluation of work scope and prior historical data.

6.3 Hope Creek

The following observations relative to the Hope Creek Station were made:

- The dose projections for the fourth refueling outage (RFO4) were reviewed during the inspection. The licensee projected that <285 person-rem will be expended. Approximately one third of the projected person-rem had been expended at the time of the inspection.

The licensee's goals, and accrued exposure to date, appeared reasonable.

- The inspector reviewed the licensee's ALARA pre-planning packages. The three work evolutions with the highest projected exposure were the most noteworthy: in-service inspection (ISI) examinations of the recirculation piping; refuel bridge evolutions, including fuel movement, and control rod blade (CRB) movement and inspection; and main steam line safety relief valve (SRV) replacement. The licensees exposure projection for these work evolutions was 30.915 person-rem, 10.050 person-rem, and 6.750 person-rem, respectively. Effective planning was noted.

- As part of an overall plant source term reduction effort and to control the exposure rates during RFO4; the licensee instituted an iron and zinc 65 (^{65}Zn) reduction program. The licensee indicated that industry experience has shown that iron deposited in the system redissolves after the initiation of hydrogen water chemistry and was transported to different locations within the system. The result was the potential for rapidly changing exposure rates at unexpected locations within the system.

  The intent for source term reduction was to remove as much iron from the system as possible prior to initiating the hydrogen water chemistry program that was scheduled to begin following RFO4 and to maintain these reduced iron levels. The licensee began by testing in the laboratory approximately 20 different bead resins attempting to increase their iron removal capabilities. Seven of these were subsequently system tested in a year long study using a temporary demineralizer skid. One of the resins demonstrated increased iron removal characteristics from the accepted 60% to approximately 90%, however, the licensee had questions on use of this resin because of potential increased resin breakdown rate that could introduce unwanted sulfates into the reactor vessel.

  The licensee next performed a second year-long study on the one resin; the study failed to show any measurable resin breakdown. As a result of the good test results, the licensee replaced one of seven deep bed demineralizers using this test resin. If this resin continues to demonstrate the desirable characteristics without any unwanted consequences, the licensee planned to replace the resin in the six remaining deep bed demineralizers with the test resin.

- To reduce the refuel floor exposure rates during the outage, the licensee vacuumed the reactor cavity to reduce the iron film deposit. The filters were removed from the vacuum and the waste product was directed into the spent fuel pool clean-up system. This eliminated the need for handling filters with extremely high iron activity that would be concentrated on them by the vacuuming process.

- Another action the licensee used to reduce refuel floor exposure rates was to reduce the zinc concentration in the cavity. This was accomplished by flooding the cavity using plant demineralized water via the condensate storage tank (CST). The use of demineralized water was initially proposed in an attempt to improve water clarity; however, in addition to improving water clarity it effectively diluted the zinc concentration in the water. Also, because the solubility of zinc increases with decreasing pH, the carbon dioxide (CO_2) saturated demineralized water was effective at redissolving zinc. The licensee continued to utilize the reactor water clean-up (RWCU) system during the entire reactor shutdown procedure. This was not the normal practice since the cooling rate difference between the reactor and the RWCU, in the 400° - 200°F temperature region, may cause flashing that would initiate a RWCU isolation. To prevent flashing, the licensee used a minimum flow to RWCU in this temperature region.

  The licensee also used cation resin overlays in the filter demineralizers in the RWCU to increase the zinc removal characteristics. Recognizing that zinc solubility was maximized at approximately 360°F, the licensee implemented "soft shutdown" guidelines recommended by the vendor. This included changing the cool-down rate from approximately 15°F/hr to approximately 90°F/hr in the 400° - 200°F temperature region. The cumulative effect of the above practices resulted in the reduction of refuel bridge exposure rates from the 25-50 mR/hr experienced during RFO3 to 2-20 mR/hr during this outage.

- The licensee intends to continue injecting zinc after RFO4 using depleted zinc. The depleted zinc contains approximately 2% zinc 64 (^{64}Zn) instead of the 48% found in natural zinc. This depleted zinc significantly reduces the production of ^{65}Zn through neutron activation. The licensee projects that the increased cost of depleted zinc will be off-set by exposure reduction to personnel and in lower disposal costs.

- The licensee also aligned the reactor cavity floor plugs on the refueling floor to provide shadow shields for personnel covering control points.

6.4 Conclusions

The licensee was taking effective actions to reduce personnel exposure at the Salem and Hope Creek Nuclear Generating Stations. ALARA planning efforts were effective.

No violations or unacceptable conditions were noted.

7.0 Radioactive Material Control and Contamination Control

7.1 General

The inspector reviewed the control of radioactive material, contaminated material, and contamination. The following areas 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.

7.2 Salem

The inspector noted the following:

- The inspector reviewed the licensee's identification, evaluation and corrective actions associated with the discovery of a small contaminated spot outside the radwaste truck bay on August 31, 1992. The spot measured about 60,000 disintegrations per minute (dpm) on contact and was quickly removed by the licensee and transported back into the radiological controlled area (RCA). The licensee's radiological controls program prohibits release of material with detectable contamination. The licensee issued a radiological occurrence report (ROR) on this matter. The inspector reviewed the ROR package and concluded that the licensee performed an excellent evaluation of this matter.

  The licensee concluded that the spot of contamination most likely was in the location for about 10 months and was inaccessible. The spot had to be chiseled out of the black top. The licensee further concluded that the spot was most likely released prior to initiation of enhanced contamination controls. The licensee resurveyed all areas outside RCA exit points and did not identify any other instances. The licensee was continuing to review this matter for additional corrective actions. This matter is discussed further in Section 3.1 of this report.

- The inspector noted that only about 4.9% of the station's radiological controlled areas were considered contaminated.

- The inspector's review of contamination controls for the recently completed Unit 2 refueling outage indicated that the licensee completed 3,000 person-hours of work on the primary sides of the steam generators and 700 person-hours of work on the secondary sides of the generators without any personnel contaminations. This was considered an excellent effort relative to contamination controls. The inspector did note that there were 70 personnel contaminations identified during the outage, the majority of which were of very low levels. The licensee was reviewing ways to improve this number and was using integrated training techniques, using mock-ups, to improve personnel contamination controls and work practices.

7.3 Hope Creek

The following observations were made:

- The inspector noted that the licensee continues to set challenging contamination goals. The goal for the second refueling outage (RFO2) was <160 contaminations, for RFO3 it was <130, and finally for RFO4 it is <100. The licensee had recorded approximately 43 contaminations at the time of the inspection. The inspector viewed the projections as both reasonable and challenging. The licensee was implementing generally effective personnel contamination control techniques.

  The inspector noted that the licensee's drywell, with the exception of the lower level, exhibited generally very low contamination levels. A recent spill on the lower level, resulted in the lower level being extensively contaminated. The licensee was reviewing the cause of the spill and methods to preclude recurrence.

- The inspector reviewed the licensee's program for releasing uncontaminated material from the Radiological Controlled Area (RCA). The Aggregate Monitoring of Clean Waste (HC.RP-TI.ZZ-0034(Q) - Rev. 3) specifies criteria for determining that material was free of radioactive contamination. The criteria included acceptable levels for background exposure rates. After the material was released from the RCA, it was consolidated into a dumpster. However, the inspector noted that individual bags of trash and piles of metal were separately surveyed in an aggregate prior to placement in a dumpster.

  The Aggregate Monitoring of Clean Waste procedure included instructions to survey the dumpster. However, there were no explicit criteria associated with the dumpster survey and the implicit criteria were both conflicting and confusing. The inspector identified four cases where the implied criteria (10 uR/hr) for the dumpster survey may not have been met. The inspector noted that the background rates were higher due to positioning of the dumpster in proximity to the Condensate Storage Tank.

Although the licensee was providing surveys of aggregate trash and metal for unrestricted release, the licensee agreed to review this procedure and include explicit instructions regarding the purpose of the dumpster survey and the criteria to be used.

8.0 Routine Radiological Controls

8.1 General

The inspector reviewed the adequacy and implementation of the radiological controls programs for the Hope Creek outage. The inspector also reviewed routine radiological controls at the Salem station. The inspector toured selected portions of the radiological controlled areas and reviewed the following elements of the licensee's radiological controls program:

- performance and adequacy of radiological surveys to support pre-planning of work and on-going work
- 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.

8.2 Hope Creek

The inspector made the following observations:

- The inspector's reviews indicated effective exposure controls were implemented.

- The inspector reviewed the licensee's programs for relocating the whole body dosimetry, and extremity monitoring. No discrepancies were noted. The inspector also reviewed the dose conversion factors used by the licensee to calculate personnel exposure due to skin contamination. These factors are based upon the isotopic mix found at the facility. The licensee procedure "Decontamination of Personnel and Skin Dose Assessment", HC.RP-TI.ZZ-0205(Q) requires this isotopic mix to be reevaluated at least annually to determine the appropriateness of the dose conversion factors. The inspector determined that this isotopic mix evaluation is performed on a quarterly basis by the licensee.

- The licensee, at the beginning of the RFO4, changed the respiratory protection fit-test program to utilize the Porta-Count-Plus system instead of the traditional corn-oil booth. The calibration and cleaning of this equipment was performed by the manufacturer. The licensee performed daily quality control checks as recommended by the operators manual; including a tubing visual inspection, a zero check using a HEPA filter, and a maximum fit factor determination. The licensee performed fit-testing using the appropriate exercises for the wearers in accordance with the ANSI/ANS Z88.2-1980.

  The licensee issued respiratory protection equipment from a central location. The computerized access control system was used to verify that the individual requesting a respiratory protection device has the required qualification to wear the device. These qualifications included; a current whole body count, up to date training in respiratory protection, a valid fit-test, and a Radiation Work Permit (RWP) with a respiratory protective equipment requirement. As a back-up system for times when the computerized access control system was unavailable, the licensee printed a paper copy list of individuals that meet the required qualifications on an approximately weekly basis. An individual requesting respiratory protective equipment whose name did not appear on this list could receive the respiratory protective equipment only after their qualifications had been verified by telephone with the appropriate department (eg. training, dosimetry, and Health Physics).

- The inspector reviewed the Radiation Protection Counting Room equipment and associated procedures. The licensee altered the counting time for each instrument during the daily background check to maintain a constant detection efficiency. Appropriate control charts were maintained and radioactive sources used for calibration were traceable to the National Institute of Standards Technology (N.I.S.T.). The licensee utilized chemistry technicians to operate the RP Counting Room equipment during outage periods to supplement the Health Physics staff. The chemistry technicians were qualified in the use of the equipment through the plant qualification process. Prior to each outage, the chemistry technicians were reoriented on the use the this equipment.

- The inspector reviewed the MPC-hour tracking program and noted that the licensee begins tracking at 0.2 MPC-hrs. The primary method of determining exposure to airborne radionuclides was by sampling the air. However, the licensee's program included appropriate feedback to the MPC-hr tracking system for non-routine in-vivo (whole body counting) measurements. The licensee was progressing toward adopting the revised 10 CFR 20 by including derived investigation levels (DILs) in the routine whole body counting program. These DILs were used as a threshold value that when exceeded initiated an investigation.

During a previous inspection, the inspector noted that certain surveys indicated "No beta". The inspector asked what this meant and was informed the beta measurements were made but no beta radiation was detected. Other individuals indicated that no measurements were made. This was considered a survey documentation weakness. The licensee has since reinstructed the technicians to leave the beta measurement blank if no beta measurement was made and to insert 0 mRad if a beta measurements were made but no beta was detected.

Also during a previous inspection, the inspector noted that a candy wrapper and a gum wrapper were found in the radiological controlled area (RCA). The licensee subsequently reemphasized that eating, drinking, smoking, etc were prohibited within the RCA using a pamphlet published prior to each refuelling outage.

No violations were identified.

8.3 Salem

The inspector reviewed the radiological controls provided for personnel entering the Unit 1 reactor containment to repair resistance temperature detectors on the No. 12 steam generator cold leg. The inspector reviewed radiation surveys, airborne radioactivity surveys, previous entries to perform similar tasks, dosimetry provided, neutron measurements, and applicable procedures and radiation work permits. The inspector concluded that the licensee provided effective radiological controls for the work activities.

No violations were identified.

10. Testing of the Technical Support Center (TSC) Ventilation

During a previous inspection, the inspector noted that one of the acceptance criteria, used for evaluating laboratory testing of charcoal for the TSC, was based on a 2" charcoal bed. The TSC charcoal beds are 4". The licensee implemented the Technical Support Center Emergency Exhaust System Functional Test procedure, HC.RP-ST.GR-0001(Q) - Rev. 0, which includes specific acceptance criteria for the 4" charcoal beds.

No violations were identified.

11.0 Plant Tours

The following observations were made during tours of the station:

Salem

The inspector's tours of the station indicated housekeeping was good and improving. The licensee was cleaning, painting and refurbishing areas throughout the station.

Hope Creek

Although a refueling outage was on-going, the inspector's tours, including tours of the drywell, did not identify any apparent concerns associated with housekeeping.

12.0 Exit Meeting

The inspector met with licensee representatives (denoted in Section 1.0) on October 2, 1992. The inspector summarized the purpose, scope and findings of the inspection.