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 NUCLEAR REGULATORY COMMISSION  
 REGION II  
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 ATLANTA, GEORGIA 30323-0199

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Report Nos.: 50-325/94-01 and 50-324/94-01

Licensee: Carolina Power and Light Company  
 P. O. Box 1551  
 Raleigh, NC 27602

Docket Nos.: 50-325 and 50-324

License Nos.: DPR-71 and DPR-62

Facility Name: Brunswick 1 and 2

Inspection Conducted: January 3-7, and January 21-25, 1994

Inspectors: <u>E. D. Testa, P.E.</u>	<u>2/23/94</u>
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SUMMARY

Scope:

This routine, unannounced inspection of the licensee's radiation control (RC) program involved a review of health physics (HP) activities including organization and staffing; training and qualifications; internal and external exposure controls; control of radioactive material; ALARA; audits and appraisals and changes to the program since the last inspection.

In addition to the routine inspection performed, a reactive inspection related to an inadvertent spread of contamination was conducted and details of this reactive inspection are included in this report.

Results:

Based on observations, interviews with licensee management, supervision, personnel from station departments, and records review, the inspector found the licensee's program for occupational radiation safety was functioning

adequately to protect the health and safety of the radiation workers. Improvements were noted in the plant physical appearance. Painting and floor resurfacing continued in Unit 1. The inspector noted a positive attitude of the health physics workers and considers this a program strength. The ALARA program was successfully working to reduce personnel exposure and reduce out of core radiation source terms. The successful clean-up of the Reactor Water Cleanup (RWCU) Phase Separator Room using robots was noted as a practical positive demonstration of the ALARA program. The inspector noted the health physics challenges associated with Unit 1 start-up, Unit 2 refueling and ALARA challenges associated with resumption of hydrogen water chemistry. In the areas inspected, two violations were identified. One violation was identified as a failure to establish adequate procedure(s) specifying engineering and work controls necessary to effectively control radiological work as required by Technical Specification 6.8.1. (Paragraph 8.). A second violation was identified as a violation of 10 CFR 20.1501(a)(2)(ii)(iii) for failure to perform adequate surveys to evaluate the concentrations or quantities of radioactive material; and the potential radiological hazards that could be present (Paragraph 8.).

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- +K. Ahern, Manager, Work Control
- +L. Aielle, General Electric
- +\*R. Anderson, Vice President, Brunswick Nuclear Plant
- +\*H. Beane, Manager, Quality Control
- +M. Bradley, Manager, Nuclear Assessment Department
- +\*J. Cowan, Plant Manager, Unit 1
- +\*J. Ferguson, Manager, ALARA
- +R. Grazio, Manager, Nuclear Engineering Department
- \*J. Harness, Manager, Nuclear Assessment Department
- +J. Heffley, Maintenance Manager, Unit 2
- +G. Hicks, Manager, Training
- +\*G. Honma, Manager, Licensing
- +\*T. Jones, Senior Specialist Investigator
- +\*W. Levis, Manager, Regulatory Affairs
- +G. Miller, Manager, Technical Support
- +\*C. Robertson, Manager, Environmental and Radiation Control
- +\*R. Smith, Manager, Radiation Control
- +S. Tabor, Senior Specialist Investigator
- +J. Titrington, Operations Manager, Unit 2
- +\*P. Snead, Corporate Director, Radwaste and Environmental
- +\*C. Warren, Manager, Unit 2
- +G. Warriner, Manager, Control and Administration
- +K. Williamson, Manager, Nuclear Engineering Department

Other licensee employees contacted included engineers, technicians, and office personnel.

#### Nuclear Regulatory Commission

- +\*R. Prevatte, Senior Resident Inspector

- \*Attended January 7, 1994 Exit Meeting

- +Attended January 25, 1994 Exit Meeting

### 2. Organization and Staffing (83750)

The inspector reviewed and discussed with licensee representatives changes made to the Radiation Control (RC) organization since the last inspection of this area conducted October 4-8, 1993, and documented in Inspection Report (IR) 50-325/93-46 and 50-324/93-46. As a result of realignment of corporate support, the site added several new positions. Two Senior Specialists have been added, one specialist to coordinate training for the Environmental and Radiation Control (E&RC) Staff and the other to provide professional support for the health physics (HP) program. These positions have been filled by former corporate support personnel. Seven additional RC technicians positions have been added and three have been filled. One additional RC Supervisor has been added to

supervise the seven additional technicians. At the time of the inspection the selection process for this position was in progress. One Manager, Radiation Control was in the process of transferring to the corporate office and his successor had been appointed at the conclusion of this inspection. The E&RC Unit permanent approved staffing level was 120 personnel.

The licensee continued to maintain an experienced core technician staff of junior and senior technicians. The technician staff included senior technicians, junior technicians, and HP clerks. The inspector noted a positive worker attitude and considered this to be a program strength.

Based on discussions with licensee representatives and observations of activities in progress, no concerns were identified regarding the licensee's organization and staffing. The staffing level appeared adequate to support the activities associated with the operation of one unit and the ongoing and planned activities for start-up of the other unit.

No violations or deviations were identified in this area.

### 3. Self Assessment Programs (83750)

#### a. Quality Assurance (QA) Audits

The inspector reviewed the licensee's self assessment program for identification and correction of radiological deficiencies. Since the last NRC inspection of this area in May 1993, one QA audit related to the Environmental and Radiation Control function had been performed by the Nuclear Assessment Department (NAD): Report File Number B-ERC-9301, conducted November 29 through December 7, 1993. The inspector reviewed the audit report and discussed selected findings with licensee staff personnel. The audit appeared adequate in scope to address the major program areas and included procedure and documentation review and field evaluations. During the course of this audit the licensee QA auditors reviewed documents to include: Plant Operating Procedures, the Radiation Control and Protection Manual, Technical Specifications, and the Off-Site Dose Calculation Manual. The NAD Team interviewed management personnel, supervisors, and technicians. The QA auditors reportedly conducted a tour of all accessible areas of the RCA, offices, facilities, and laboratories observing housekeeping, chemical control, material condition, work on the Unit 1 Refueling Floor, preparation of radioactive shipments, performance of radioactive surveys and analyzing samples, ALARA practices, use of dosimetry, Radiation Work Permit (RWP) practices, posting of areas, and dose rate information.

The QA audit identified the weaknesses to be issues that require management attention and interdepartmental cooperation. The QA audit addressed the current actions currently being developed and implemented with the HP Supervisor. The audit also discussed corrective actions which had been implemented to close issues/findings identified during previous audits.

The inspector reviewed the findings of a Site Investigation Team (SIT) which was established to investigate the root causes of the contamination event discussed in Paragraph 8 which resulted in an inadvertant spread of contamination. The inspector reviewed the SIT findings for licensee self-assessment of root cause analysis which appeared to be a program strength.

b. Radiological Awareness Reports (RARs)

The inspector also reviewed selected RARs for 1993. These included procedural violations, Radiation Work Permit (RWP) violations, and poor work practices resulting in personnel and/or area contamination. During reviews of the selected RARs, the inspector noted thorough investigations, appropriate and comprehensive corrective actions, as well as visibility with the responsible department manager.

In general, the inspector found the licensee's Self Assessment Program to be adequate for self-identification of radiological findings. In addition, corrective action to findings noted were accomplished in a timely manner.

No violations or deviations were identified in this area.

4. Planning and Preparation (83750)

The inspector discussed with licensee representatives the planning and preparation for the expected restart of Unit 1 which included HP staffing, training, equipment, dose reduction methods to be employed, decontamination efforts, radwaste reduction and work scope sequencing. The inspector also discussed the planning and preparation for the upcoming Unit 2 refueling outage.

The licensee has a plan to transport several more rail cars of spent fuel prior to the end of the calendar year. The inspector reviewed the radiation surveys on two rail cars used for shipment in December and found no problems.

In general, the inspector did not determine problems with planning and preparation with exception to the planning for Unit 1, Cavity Seal Ring Work, as discussed in Paragraph 8.

No violations or deviations were identified in this area.

## 5. Radiation Protection Training (83750)

10 CFR 19.12 requires, in part, that the licensee instruct all individuals working in or frequenting any portion of a restricted area in the health protection aspects associated with exposure to radioactive material or radiation; in precautions or procedures to minimize exposure; in the purpose and function of protection devices employed; in the applicable provisions of the Commission regulations; in the individual's responsibilities; and in the availability of radiation exposure data.

The inspector discussed with training representatives the Health Physics Continuing Training Program and determined that continuing training is conducted quarterly. The inspector attended a Health Physics Continuing Training Session which was mandatory for all HP personnel. The training session was interactive and addressed issues of substance. The training instructor solicited feedback from the students and discussed feedback from previous sessions. The Radiation Protection Manager and his supervisory staff also attended the training sessions. The inspector reviewed the student handouts and licensee lesson plan TP-RR934AB-1, Revision 0 which was used by the instructor in the training session. The training was five hours in length and included the following objectives:

- Contrast the old R&P philosophy/ methodology to the new RWP philosophy/methodology.
- Discuss the HP technician, supervisor, and planner responsibilities in the planning package process.
- Identify the 10CFR20 requirements for access control of High Radiation Areas (HRAs).
- Describe acceptable methods for implementation of access control for HRAs and Very High Radiation Areas (VHRAs) described in Regulatory Guide 8.38.
- Describe the BSEP alternate method for controlling access to HRAs described in licensee Technical Specification (TS) 6.12 and 10 CFR 20.1008.
- Identify the requirements for control and support of site radiography activities in accordance with E&RC-0290, including:
  - Dosimetry
  - Personnel Monitoring
  - Postings
  - Communication

In follow-up to the training observed and the contamination event discussed in Paragraph 8, the inspector observed briefings conducted by HP personnel for workers prior to entering the radiologically controlled

area (RCA) for work evolutions which required pre-job briefings and also observed a briefing conducted for workers continuing work evolutions following the contamination event. The briefings included reviews of current radiation surveys with emphasis on high dose areas and low dose waiting areas. Workers were also informed about the locations of hot spots in an overall work area and cautioned not to work six feet or in the overhead without notifying HP. The interaction between HP and the workers entering the RCA, in this regard, was considered adequate.

The licensee has recently installed computer access terminals at the RCA control point to be used by workers logging into the RCA on an RWP. The inspector observed the use of the terminals by workers logging into the RCA, to determine the effectiveness of training. The inspector discussed various RWP requirements with HP technicians and also discussed exposure tracking capabilities of the system. At the time of the inspection, the licensee was preparing training plans and software to implement a new Digital Alarming Dosimeter (DAD). The inspector also discussed features of the new system to preclude unauthorized access to the RCA by unqualified workers as well as the training to be provided to qualified workers.

Based on the above, the inspector concluded the licensee was effectively performing continuing training for HP technicians.

No violations or deviations were identified.

6. External and Internal Exposure Controls (83750)

10 CFR 20.1201(a),(b),(c),(d),(e), and (f) requires that the licensee shall control the occupational dose to individual adults to annual limits specified.

a. Personnel Dosimetry

10 CFR 20.1502(a) requires each licensee to supply appropriate monitoring equipment to specific individuals and requires the use of such equipment.

10 CFR 20.1501(c) requires that dosimeters used to comply with 10 CFR 20.1502(a) shall be processed and evaluated by a processor accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the types of radiation for which the individual is monitored.

The inspector selectively reviewed the licensee's dosimetry program to ensure the licensee was meeting the monitoring requirements of revised 10 CFR Part 20. During tours of the plant, the inspector observed proper use of thermoluminescent dosimeters (TLDs) and self reading dosimeters (SRDs).

No violations or deviations were identified in this area.

b. Whole Body Exposure

The inspector discussed the cumulative whole body exposures for plant and contractor employees. The 1993 goal of 850 person/rem was exceeded. The licensee determined the person/rem cumulative total for the year to be about 872. Several work activities contributed to the overage. Unanticipated repair work for the Unit 1 shroud of approximately 26.7 person/rem and the extensive Unit 1 painting and coatings campaign for the reactor and turbine building added an additional 33.8 person/rem. Unit 1 remained in extended outage for the entire year and Unit 2 for a small portion of the year. There was however a carryover to the 1994 dose budget of an estimated 35 person/rem associated with the Unit 1 Rx Reassembly and an additional 96 person/rem for continued painting in the Reactor and Turbine Buildings and an additional 20 person/rem associated with Unit 2 torus restoration. The five year business plan had estimated a dose goal for 1994 of 550 person/rem. The additional unanticipated exposure of about 151 person/rem would total about 700 person/rem. The original goal of 550 person/rem was based on 11 outage weeks allowing for 34 person/rem/week. Additional work activities for the outage include ISI, maintenance, and modifications. The operational dose estimates for both units for the remainder of the year were estimated at 2.4 person/rem/week/unit (223 person/rem). The challenge level person/rem goal was requested to be 650 based on the carryover and added work scope.

Licensee representatives stated and the inspector independently confirmed that all whole body exposures assigned since the previous NRC inspection of this area were within 10 CFR Part 20 limits. The inspector independently verified the licensee dose assessments for the nine positive wholebody counts for the calendar year and determined that the internal doses were small percentages of applicable regulatory limits.

No violations or deviations were identified in this area.

c. Notices to Workers

10 CFR 19.11(a) and (b) require, in part, that the licensee post current copies of 10 CFR 19, 20, the license, license conditions, documents incorporated into the license, license amendments and operating procedures, or that a licensee post a notice describing these documents and where they may be examined.

10 CFR 19.11(d) requires that a licensee post NRC Form-3, Notice to Employees. Sufficient copies of the required forms are to be posted to permit licensee workers to observe them on their way to or from licensee activity locations.



During the inspection, the inspector verified that NRC Form-3 was posted properly at various plant locations permitting adequate worker access. In addition, notices were posted referencing the location where the license, procedures, and supporting documents could be reviewed.

No violations or deviations were identified in this area.

d. Breathing Air Quality

30 CFR 11.121 requires that compressed, gaseous breathing air meet the applicable minimum grade requirements for Type 1 gaseous air set forth in the Compressed Gas Association (CGA) Commodity Specification for Air, G-7.1 (Grade D or higher quality).

The inspector reviewed licensee procedure O-E&RC-0135, Sampling Of Breathing Air To Meet Grade D Air Specifications, Revision 4 and discussed with the licensee representatives the program for testing and qualifying breathing air as Grade D. Review of breathing air testing records verified that the licensee was calibrating in-line carbon monoxide monitors and sampling in-use breathing air systems for certification in accordance with procedural requirements. For the tests reviewed, breathing air met Grade D requirements with the exception of one breathing line sampled in Unit 2 Reactor Building on the 50 foot level at location 2 SAV 148, which indicated levels of Carbon Dioxide to be 1000 to 1500 ppm. Records reviewed indicated the breathing line was secured from use and resampled on November 29, 1993. The later sample indicated carbon dioxide levels to be 800 ppm which was an acceptable carbon dioxide levels for meeting Grade D air specifications.

No violations or deviations were identified.

7. Control of Radioactive Material and Contamination, Surveys, and Monitoring (83750)

10 CFR 20.1501(a) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations and (2) are reasonable under the circumstances to evaluate the extent of radiological hazards that may be present.

a. Posting and Labeling

10 CFR 20.1904(a) requires, in part, each container of licensed material containing greater than Appendix C quantities to bear a durable, clearly visible label identifying the radioactive contents and providing sufficient information to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures. During tours of the Unit 1 and Unit 2 Reactor Building, Unit 1 Turbine Building, Radioactive Waste Processing

Building and various radioactive material storage locations, the inspector independently verified that selected radioactive material areas were appropriately posted and that selected containers were labeled consistent with regulatory requirements.

No violations or deviations were identified in this area.

b. Personnel and Area Contamination

Unit 1 has undergone and continues to undergo a major painting and coating campaign. Surface preparation for the dados, pumps and pipes and subsequent painting provided a tough challenge to keep the number of PCEs controlled. The plant looks extremely clean and the new surfaces increased the brightness in the areas for worker safety and the coatings provide a surface more easily decontaminated.

During plant tours, the inspector observed adequate housekeeping and contamination control practices. The inspector observed handling, packaging, and surveying of contaminated equipment for movement and judged the work evaluations satisfactory.

No violations or deviations were identified in this area.

c. High Radiation Areas

TS 6.12.1 required, in part, that each HRA with radiation levels greater than or equal to 100 mRem/hr but less than or equal to 1000 mRem/hr be barricaded and conspicuously posted as a HRA. In addition, any individual or group of individuals permitted to enter such areas are to be provided with or accompanied by a radiation monitoring device which continuously indicates the radiation dose rate in the area or a radiation monitoring device which continuously integrates the dose rate in the area, or an individual qualified in radiation protection procedures with a radiation dose rate monitoring device.

During tours of the Unit 1 and Unit 2 Reactor Building, Turbine Building, and Radioactive Waste Processing Building, the inspector noted that all HRAs and locked HRAs were locked and/or posted, as required. Independent surveys performed by the inspector concluded the licensee had been successful in their efforts to reduce general area radiation levels in various areas by hydrolazing numerous clogged floor drains.

The inspector reviewed Procedure OE&RC-0040, Revision 11, dated November 17, 1993, titled High Radiation Area Key Control and performed an independent inventory check of selected Locked High Radiation Keys. The inventory check found no problems. All were properly signed out per the procedure and/or accounted for. The

licensee performed a 100 percent verification check of the keys and the lock cores to insure operability. The check also included the emergency keys located in the Control Room. All keys were found compatible with the lock cores.

No violations or deviations were identified in this area.

d. Independent Surveys

During facility tours, the inspector independently verified radiation and/or contamination levels in Unit 1 and Unit 2 Reactor Building, Turbine Building, Radioactive Waste Processing Building areas, and other radioactive material storage areas including the Low Level Waste Handling Building. The inspector also performed radiation surveys of selected HRA boundaries including posted Hot Spots. The inspector reviewed the Hot Spot Engineering Data Report, the hot spots being tracked and the priorities assigned to work on the hot spots for dose reduction. The licensee has contact and 30 cm. survey readings for each of the identified spots and an action plan to reduce the dose associated with the spots. This plan includes but is not limited to the following: flush, cut out, shield or make the area inaccessible workers are made aware of hot spots during RWP briefings.

The inspector reviewed Procedure AI-112, Revision 5C dated February 23, 1993, titled Control of Materials in the Spent Fuel Pools. Activities associated with the refueling of Unit 1 were observed by the inspector. In response to several clarification questions posed by the inspector the Radiation Control Group certified that all work activities during the Unit 1 outage including the shroud project were performed in accordance with this procedure.

No violations or deviations were identified in this area.

8. Contamination Event of January 19, 1994

a. Initial Conditions

Unit 2 was operating at 100 percent power. Unit 1 was in cold shutdown. The reactor vessel head had been previously installed on Unit 1 and a reactor vessel hydro was in progress which was causing heat from piping below the reactor cavity to rise through penetration openings to the inside of the reactor cavity seal ring. The heat increase upward from the reactor cavity created a chimney effect moving hot air from the seal ring up to the refueling floor. A portable worksite ventilation duct was located in the reactor cavity at the time of the event to control airborne contamination during work evolutions in the cavity but appeared to be inadequate to control airborne radioactivity during the work scope performed.

## b. Description of Event

On the evening of January 19, 1994, the licensee scheduled work activities in the Unit 1 Reactor Cavity area to include removing the old gasket from the seal ring flange area, cleaning the seal ring flange, installing a new gasket, and seating/installing the Dome on the reactor seal flange. Contract workers met with HP personnel on the Unit 1 refueling floor to obtain a briefing on radiological work controls prior to entering the reactor cavity to perform scheduled work. After being briefed by HP on radiation controls to be implemented and protective clothing (including full-face respirators) to be worn, the workers entered the Reactor Cavity area to perform work at approximately 2115 hours.

Subsequent to the work being performed, an HP technician in conversation with the contractors and the Refueling Floor Technical Manager decided shielding of the bellows area should be performed to reduce radiation exposure to the workers. The HP used a hose to fill the bellows area of the cavity outside the seal ring flange with water to cover the highly contaminated bellows area for the purpose of providing the shielding. Approximately six to eight inches of water was added to the bellows area by the HP.

The first two flange protectors removed by the workers were brought to the top of the cavity before HP and the decontamination personnel were ready to receive the protectors. Surveys determined contamination levels on the flange protectors were 100/200 mrad smearable. The decision was made by HP to place the protectors in the lay down area and temporarily cover them with herculite. The next set of smears indicated approximately 500 mrad smearable. During the work evolution, HP required that the remaining highly contaminated flange protectors be bagged in the cavity area prior to movement to the refueling floor lay down area. After removing the flange protectors, workers began removing and bagging the old gasket and proceeded to clean the dry, highly contaminated flange with abrasive material which included scotch-brite pads and wire brushes. Licensee procedure OSPP-RPV502, Revision 8C, dated October 6, 1993, was the procedure used by the contractors which provided instructions for the work evolutions being performed. The procedure addressed the use of cloths, scotch brite pads, water and/or alcohol to clean and prepare the flange for installing the new gasket and seating the Dome. The procedure did not specify the use of wire brushes for cleaning; however the procedure stated the tool list was recommended and not all inclusive.

At approximately 2135 hours HP determined personnel exiting the refuel floor had contamination on their shoes. Followup contamination surveys indicated contamination had been spread beyond the contaminated area to the uncontaminated area of the Unit 1 refueling floor (117 foot level). Immediate radiological

casualty control efforts were initiated by HPs on the refueling floor which included taking gross wipes to determine the possible spread of contamination and high volume air samples to determine air quality. The HPs working the floor detected high levels of contamination on the previously uncontaminated side of the refueling floor in front of the contamination boundary step off pad. Survey results in front of step off pad indicated approximately 200,000 disintegrations per minute (DPM) on a gross wipe. During the clean area investigation of the 117 foot level, the first investigative high volume air sample indicated approximately  $2.9E-9$  uCi/cc or .217 Derived Air Concentration (DAC). The following backup high volume air samples indicated a rapid decrease in airborne radioactivity as a result of contamination settling out or being removed by building ventilation. The maximum DAC on the 117 foot level during the peak performance of work could not be determined because, no representative air sampling was performed as determined by the licensee during the licensee's investigation and verified by the inspector.

As a result of the initial surveys being performed, operations was notified that work on the refueling floor 117 foot level was shut down and personnel were removed from the floor.

In all, the personnel contamination events determined seven shoe contaminations, and two facial contaminations. Personnel with skin contamination were decontaminated and nasal smears on individuals with skin contamination were determined by the licensee to be negative.

c. Recovery

Efforts to contain the contamination once detected began immediately. Gross wipes were performed in previously uncontaminated areas of the Reactor Building to detect any possible spread of contamination to previously uncontaminated areas. Areas in which any activity above background was detected based on wipes over large areas, were roped off, posted as contaminated areas, and controlled until more detailed surveys could be performed. Surveys indicated contamination had passed through an open equipment hatch to lower elevations of the Unit 1 Reactor Building. Potential contamination was detected in areas of the Unit 1 Reactor Building to include the 117 foot clean area, the 98 foot elevation, the 80 foot east and 80 foot west elevations, and the 20 foot elevation near the elevator. These areas were decontaminated and detailed surveys performed to dis-establish contaminated area postings. The decontamination effort was completed during the onsite inspection.

The licensee reviewed security records to determine any individuals logged into the reactor building during the time of the event. The licensee recalled all of these individuals to be

whole body counted. The inspector reviewed the whole body survey results which determined no positive uptakes of radioactivity for any individual in the Unit 1 Reactor Building during the event.

d. Inspector Followup

During the inspection, the inspector reviewed procedures, reviewed records, and interviewed selected personnel including personnel involved with work evolutions on the refuel floor that evening to assess potential root causes of the event. As a result of the inspector's followup to this event, the inspector identified several potential root causes of which any one or a combination thereof, may have contributed to the inadvertent spread of contamination beyond posted contamination barriers. The potential root causes identified included the following:

- The licensee's technical procedure being used by contractors performing the work had not formally been reviewed or concurred on by HP personnel. The procedure did not address any radiological engineering controls for this work evolution, nor were any other procedures available or prepared to address radiological engineering/work controls for the specific work being performed. A license procedure, Desk-Top Guide for Radiation Control Technicians, Revision 0, dated June 4, 1993, described the performance of surveys to be performed when the potential for changing conditions occurred which included the use of high volume air samples to provide early indication of airborne radioactivity; however, this instruction was not applied to this work evolution by HP personnel, nor did this desk instruction address engineering controls applicable to this work evolution.
- RP personnel responsible for work being performed in the Unit 1 Reactor Cavity did not attend the technical briefing, conducted by contract personnel, which was held on the evening of the 19th to discuss the procedural evolutions to be performed in the reactor cavity that evening as described above. Interviews with personnel involved in the briefing, determined that RP was not informed of the briefing.
- An inadequate turnover among HP refueling floor supervision failed to adequately inform the on-coming evening shift HPs of the work scope to be performed in the Reactor Cavity. The Desk-Top Guide included a section on Job Coverage Turnover which also addressed the possibility of areas likely to go airborne. This Desk-Top Guide was not applied in regards to questioning the potential for areas going airborne outside of the Reactor Cavity, such as the refueling floor and other levels of the Reactor Building.

- The HP briefing conducted on the refueling floor for contract workers entering the reactor cavity did not adequately discuss the scope of the work being performed. The briefing addressed the radiation controls and the personnel contamination clothing to be worn; however, work scope, contamination controls, and any special engineering controls were not discussed with the workers entering the reactor cavity. Statements provided by the HPs following the event determined that they were not aware of the total scope of work being performed. An ALARA plan had not been prepared by the licensee to aid in briefing workers on radiological controls for this specific work evolution; however ALARA plans have been used by HP on other evolutions involving high levels of contamination with airborne potential.
- The HPs providing work coverage in the Reactor Vessel Cavity area did not stop work, to question the adequacy of work controls, when the scope of the work extended beyond what the HPs initially understood it to be.
- The necessary in process surveys were not performed to determine potential changing radiological conditions commensurate with the engineering controls, environmental conditions that existed at the time, and work scope being observed by HPs.

The inspector discussed with licensee managers and reviewed actions by the licensee to continue work on the Unit 1 refueling floor and in the refueling cavity area to complete the seal ring flange area preparations and install the Dome. These actions were accomplished by the licensee without any radiological consequences. The licensee prepared specific ALARA plans to effectively provide guidance to HPs and contractors performing work, to ensure workers were adequately briefed on contamination control, and to ensure HPs performed the necessary surveys to respond to any changing conditions that might occur while performing highly contaminated work. Engineering controls were used, which included wetting down of the flange area, to control airborne radioactivity. The inspector had no concerns with licensee actions or practices during the continuance of work.

After reviewing the sequence of events and the actions taken by the licensee, the inspector informed the licensee that there were two apparent violations associated with the event. The first violation involved a violation of licensee TS 6.8.1 which requires that written procedures shall be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, November 1972. Contrary to this TS requirement, on January 19, 1994, the licensee failed to establish and provide an adequate procedure(s) specifying engineering and work controls necessary to effectively control radioactivity commensurate with the hazards of the specific work evolution being performed in the Unit 1 Reactor Cavity area. The

failure of the licensee to provide an adequate procedure as required by TS 6.8.1 is a violation (VIO) of regulatory requirements (VIO 50-325, 324/94-01-01).

The second violation involved a violation of 10 CFR 20.1501(a) which requires: Each licensee shall make or cause to be made surveys that (2) Are reasonable under the circumstances to evaluate (ii) Concentrations or quantities of radioactive material; and (iii) The potential radiological hazards that could be present. Contrary to the above, on January 19, 1994, during performance of work in the Unit 1 Reactor Cavity area, the licensee failed to perform adequate surveys to evaluate the potential radiological hazards that could be present from unknown concentrations or quantities of airborne radioactivity that existed in areas of the Unit 1 Reactor Building not evaluated or established for the control of airborne radioactivity. The failure of the licensee to perform adequate surveys to evaluate the potential radiological hazards that could be present is a violation of regulatory requirements (VIO 50-325, 324/94-01-02).

Two NRC-identified violations (VIOs) were identified.

9. Program for Maintaining Exposures As Low As Reasonably Achievable (83750)

10 CFR 20.1101(b) states that the licensee shall to the extent practical, procedures and engineering controls based upon sound radiation protection procedures to achieve occupational doses to members of the public that are as low as reasonably achievable (ALARA).

Regulatory Guides 8.8 and 8.10 provide information relevant to attaining goals and objectives for planning and operating light water reactors and provide general philosophy acceptable to the NRC as a necessary basis for a program of maintaining occupational exposures ALARA.

During the inspection, the inspector reviewed and discussed with cognizant licensee representatives ALARA program initiatives and implementation for 1993. The inspector reviewed and discussed the status of the ALARA Suggestions Program implemented by the licensee and determined the program to be an effective measure used by the licensee to reduce exposure. The licensee tracks the suggestions. Outage doses have continued to trend downward and general area radiation levels have been reduced as a result of improved ALARA pre-planning packages, briefings, and area and system decontamination effectiveness.

The inspector determined that the licensee was aggressively implementing ALARA initiatives and was achieving a significant reduction of personnel doses.

The inspector reviewed the Reactor Water Clean Up (RWCU) phase separator room cleanup. This project reclaimed the area in the -3ft RWCU phase separator tank room. This job used a pair of robots to remove the previously spilled resins for disposal. The inspector reviewed selected



snippets of the approximately 120 hours of video tape from the clean-up activities. The job activities appeared to be well coordinated and the final results exceeded expectations.

No violations or deviations were identified in this area.

10. Exit Meeting (83750)

The inspector met with licensee representatives indicated in Paragraph 1 at the conclusion of the inspection on January 7, 1994. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
50-325, 324/94-01-01	Open	VIO - Failure to establish and provide an adequate procedure(s) specifying engineering and work controls necessary to effectively control radioactivity commensurate with the hazards of the work being performed as required by TS 6.8.1 (Paragraph 8.).
50-325, 324/94-01-02	Open	VIO - Failure to perform adequate surveys to evaluate the extent of concentrations or quantities of radioactive material; and the potential radiological hazards that could be present as required by 10 CFR 1501(2)(ii)(iii) (Paragraph 8).