



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30323

OCT 18 1988

Report No.: 50-400/88-28

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

Docket No.: 50-400

License No.: NPF-63

Facility Name: Harris 1

Inspection Conducted: August 15-19 and August 30-September 2, 1988

Inspectors: C. M. Hosey 10/11/88
 C. H. Bassett Date Signed

M. T. Lauer 10/11/88
 M. T. Lauer Date Signed

Approved by: C. M. Hosey 10/11/88
 C. M. Hosey, Section Chief Date Signed
 Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of the facility radiation protection program including: the solid radioactive waste program, transportation of radioactive materials and the radiological aspects of the current outage.

Results: No programmatic weaknesses were found in the radiation protection program. The licensee's radiation protection program for outages appears to be generally effective in protecting the health and safety of occupational radiation workers. However, within the areas inspected, the following violations were identified:

- Failure to provide the proper monitoring devices for an individual entering a high radiation area, Paragraph 2.c.
- Inadequate surveys of items released from a contaminated area, Paragraph 2.e.
- Failure to follow procedures for response checking alarming dosimeters, Paragraph 2.e.
- Failure to review and approve Process Control Program implementing procedures, Paragraph 3.d.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *+L. Beidelman, Senior Specialist, Radiation Control ALARA
- *+R. Biggerstaff, Principal Engineer, Onsite Nuclear Safety
- *C. Crawford, Director, Onsite Nuclear Safety
- D. Elkins, Radioactive Waste Foreman, Radiation Control
- J. Floyd, Operations Foreman Radiation Control
- *+C. Gibson, Director, Programs and Procedures
- *+C. Hinnant, Plant General Manager
- *J. Leonard, Specialist, Radioactive Waste
- +J. McDuffie, Supervisor, Radiation Control
- +T. Morton, Manager, Maintenance
- J. O'Halloran, Foreman, Dosimetry
- *C. Olexik, Supervisor, Operations
- *+A. Poland, Project Specialist, Radiation Control
- +M. Pugh, Project Specialist, In-service Inspection
- F. Reck, Foreman, Support
- *+J. Sipp, Manager, Environmental and Radiation Control
- *D. Tibbitts, Director, Regulatory Compliance
- +R. Van Metre, Manager, Technical Support
- *M. Wallace, Senior Specialist, Regulatory Compliance
- *R. Watson, Vice President, Harris Nuclear Plant
- L. Williams, Principal Engineer, Corporate

Other licensee employees contacted during this inspection included craftsmen, engineers, technicians, and administrative personnel.

Other Organizations

Nuclear Regulatory Commission (NRC), Region II

- *P. Fredrickson, Section Chief, Division of Reactor Projects
- *C. Hehl, Deputy Director, Division of Reactor Projects
- *C. Hughey, Radiation Specialist, Division of Radiation Safety and Safeguards
- *E. Merschoff, Deputy Director, Division of Reactor Safety

NRC Resident Inspectors

- *+W. Bradford, Senior Resident Inspector
- G. Maxwell, Senior Resident Inspector
- *+M. Shannon, Resident Inspector

*Attended exit interview on August 19, 1988

+Attended exit interview on September 2, 1988

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Occupational Exposure During Extended Outages (83729)

a. Organization and Management Controls (83722)

(1) Organization

The licensee is required by TS 6.2 to establish specific onsite and offsite organizations for unit operation and corporate management. The responsibility, authority and other management controls necessary for establishing and maintaining a health physics program for the facility are further outlined in Chapters 12 and 13 of the FSAR. TS 6.5.2 specifies the composition of the Plant Nuclear Safety Committee (PNSC) and delineates its functions, responsibilities and authority.

The inspector reviewed the licensee's site organization, as well as the responsibilities, authority and control given to management as they relate to the site radiation protection program. Recent changes in plant management were reviewed to verify that they would not adversely affect the ability of the licensee to continue implementing the critical elements of the program. The inspector discussed the support received for the radiation protection program with the E&RC Manager and determined that it was adequate.

(2) Staffing

TS 6.2 also specifies the minimum staffing requirements for the facility. FSAR Chapters 12 and 13 outline further details on staffing levels at the site.

The inspector reviewed the Rad Con or HP organization with the E&RC Manager. The subjects of attrition rate, use of contractor HP personnel, promotions, staff qualifications and actual versus authorized staffing levels were also reviewed and discussed. At the time of the inspection, 22 of the 27 authorized senior or ANSI qualified technician positions were filled. The licensee indicated that there was an active recruitment program in place and that the five empty positions would be filled as soon as personnel accepted job offers. It was also noted that the licensee had 12 junior technicians in training status. The licensee indicated that the junior technicians were being used during the current outage to perform closely supervised routine jobs. Licensee representatives also indicated that they would be qualified by February 1989.

In addition to the permanent personnel, the licensee had acquired the assistance of 70 contractor HP technicians to

augment the staff during the outage. Upon completion of the outage, the licensee planned to reassess the personnel needs in the HP group and explore the possibility of increasing the permanent staff, especially in the ALARA section (see Paragraph f(1)).

(3) Management Controls

The inspector reviewed the licensee's Radiation Safety Violation (RSV) reports which were used to identify and document safety and radiological incidents. It was noted that most of the RSVs involved personnel failure to follow good radiological work practices or failure to comply with instructions. The inspector discussed these problems with the E&RC Manager who indicated that these problems would likely be eliminated as the work force became more experienced in dealing with actual radiation and contamination. It was noted that adequate corrective actions had been initiated, as required.

No violations or deviations were identified.

b. Training and Qualifications (83723)

10 CFR 19.12 requires that all individuals working in or frequenting any portion of a restricted area shall be provided basic radiation protection training.

The licensee's General Employee Training (GET) was divided into two parts. If individuals were only entering the protected area then Level I training was required. Level I required approximately seven hours of classroom work with a written test and covered workers rights, conduct, and plant specifics. If the individual needed to enter the radiation control area, Level II GET was required. Level II required approximately nine hours of classroom work which included a test and "mock-up". "Mock-up" was the practical factors portion of the course and required the worker to demonstrate the proper use of a survey instrument, proper dress-out in protective clothing, RWP comprehension, and SRPD reading. The inspector reviewed lesson plans for Level I and II and verified that all topics specified in 10 CFR 19.12 were covered during the training. Selected training records of licensee and contractor personnel working in the radiation control area were reviewed. Licensee representatives stated that GET retraining was given every twelve months and consisted of approximately four and a half hours of classroom work, "mock-up", and a written test.

Respirator training, which required approximately four hours and included hands on work, was reviewed by the inspector and found to be adequate.



Training personnel stated, that since the staff could be supplemented with trainers from other training groups, an adequate number of GET trainers were available for the increased number of individuals requiring GET training due to the outage.

Because the inspector observed individuals improperly wearing PCs within the RCA (see Paragraph 2.e.(3)), specific attention was given to the type and amount of information conveyed to the worker relating to PC donning and wearing. Training appeared adequate in this area; however, more emphasis may be required.

Through discussions with training personnel the inspector determined that a good line of communication existed between operational HP and GET training personnel to quickly address any possible poor work practices identified in the field through improvements in training.

No violations or deviations were identified.

c. External Exposure Control and Dosimetry

(1) Dosimetry

The licensee is required by 10 CFR 20.101 and 20.102 to maintain workers' doses below specified levels. 10 CFR 20.202 requires each licensee to supply appropriate personnel monitoring devices to specific individuals and require the use of such equipment.

The licensee's external exposure control and personnel dosimetry programs were reviewed by the inspector. This included facilities, equipment, personnel, records, and procedures used to control exposures and determine doses.

The licensee uses Panasonic four element thermoluminescent dosimeters (TLDs) which are routinely read on a quarterly basis. The Dosimetry Program is due for National Voluntary Laboratory Accreditation Program (NVLAP) accreditation renewal October 1, 1988. The licensee also participates in a TLD spiking program with Battelle National Laboratory. Licensee representatives stated that they will soon begin using a newly developed finger-ring dosimeter from Panasonic for extremity monitoring of the hands. Previously, the licensee used band-aid type finger dosimeters with Panasonic elements.

(2) Administrative Control Levels

The inspector reviewed the licensee's administrative exposure controls and determined that those controls were designed to maintain exposure as low as reasonably achievable (ALARA). The licensee required consecutively higher tiers of supervision to approve dose extensions with the plant manager having approval

authority for whole body exposures in excess of 2400 mrem during the calendar quarter.

(3) Records

Exposure records of plant and contractor personnel for 1988, year-to-date, were selectively reviewed. No exposure greater than limits in 10 CFR 20.101 or the station's quarterly administrative control level was noted. A review of the station Dose Report, dated September 1, 1988, indicated a maximum individual dose of 924 mrem for the current quarter. Skin and extremity doses were negligible.

(4) Steam Generator (S/G) Work

The inspector reviewed the licensee's procedure for working in and around steam generators, Health Physics Procedure HPP-010, Steam Generator Entry, Revision 3, dated August 22, 1988. It was noted that the procedure contained references to protective clothing, respiratory protection, dosimetry requirements and exposure control, as well as "jump sheets" to control entries. The Procedure also specified requirements for radiological surveys which were performed by the licensee on August 28-29, 1988, during and following the removal of the manway covers, diaphragm and inserts for the three S/Gs. The results of the surveys indicated that beta radiation levels just inside the manway openings were from 4 to 5 times higher than the gamma radiation levels, the highest being 44 Rad per hour beta and 10 R/hr gamma.

The inspector discussed beta radiation exposure control with licensee representatives and reviewed the licensee's investigation of the isotopes present in the S/Gs and the energies involved. This was being done to ensure that the controls being used during S/G entries were adequate and to assess the possible need for other measures such as beta radiation stay times. It was noted that, although the licensee's procedure required surveys prior to S/G entry, no mention was made of the beta radiation exposure control evaluations. The licensee acknowledged this and agreed to revise the procedure to add a requirements for such evaluations prior to S/G entry. In addition, the licensee agreed to consider inclusion of attenuation studies using various samples of clothing and eye protection in the evaluations to be required by procedure.

The inspector reviewed the TLD dose value results from the multiple badge sets worn by workers during various S/G entries. These results did not indicate any lens of the eye dose greater than the whole body dose.

(5) High Radiation Area Control

Technical Specification 6.12 requires that any individual permitted to enter a high radiation area in which the intensity of radiation is equal to or less than 1000 millirem per hour at 18 inches shall be provided with or accompanied by:

- (a) a radiation monitoring device that continuously indicates the radiation dose rate in the area; or
- (b) a radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received; or
- (c) an individual qualified in radiation protection procedures, with a radiation dose rate monitoring device.

During tours of the Unit 1 containment, the inspector verified dose rates in various areas throughout containment and high radiation areas (HRAs). The inspector also reviewed survey maps of various areas in the RCB and noted that dose rates up to 800 mrem/hr at contact and 250 mrem/hr at 18 inches existed in the area near the "A" S/G inside the biological shield. Other areas within the containment were noted with similar radiation levels.

During tours on August 15-17, 1988, the inspector observed work in progress on all elevations in the RCB including work in HRAs. During that time period the inspector noted that the licensee issued a survey meter or an integrating/alarming dosimeter to individuals entering HRAs or to groups of individuals entering HRAs who would be working in the same location. The inspector questioned three individuals on August 16 and five individuals on August 17 about the use of these devices to monitor radiation dose rates and control exposure and found that all individuals either had a meter or an alarming dosimeter or were accompanied by someone who had one.

On the morning of August 18, 1988, at approximately 9:30 a.m., a worker was observed within a posted HRA inside the biological shield in Unit 1 RCB. The inspector questioned the individual as to the nature of the work he was performing and about the possession and use of an integrating dosimeter or a survey meter in a HRA. The worker indicated that he was performing snubber inspections under the requirements of SRWP 318, Inspection and Functional Testing of Snubbers, Scaffolding Support and HP Support, which required individuals to have access to all areas inside and outside the biological shield. When asked, the individual stated that he had neither a meter nor an integrating/alarming dosimeter. The worker left the HRA and went to the containment control point and obtained an alarming

dosimeter for work in the HRA. The inspector also reviewed the requirements of SRWP 318 which required the use of a survey meter (or alarming dosimeter) in HRAs.

Failure of the licensee to provide the worker with a survey meter or an integrating/alarming dosimeter or to have the worker accompanied by an individual qualified in radiation protection procedures with a monitoring device for entry into a HRA was identified as an apparent violation of TS 6.12 (50-400/88-28-01).

d. Internal Exposure Control and Assessment (83725)

(1) Engineering Controls

10 CFR 20.103(b)(1) requires that the licensee use process or other engineering controls to the extent practicable to limit concentrations of radioactive materials in the air to levels below those which delimit an airborne radioactivity area as defined in 20.203(d)(1)(ii).

During tours of the Auxiliary Building and the Unit 1 Reactor Containment Building, the inspector observed the use of various engineering controls employed to limit the concentrations of radioactive material in air. The licensee used enclosures or tents constructed around equipment or areas which were highly contaminated and provided HEPA filtered ventilation systems for the enclosures. In other areas, the licensee used ducting to draw air away from contaminated areas and into the filtered ventilation system. Machining or grinding was also performed in tents or using directed ventilation to control and limit airborne radioactivity. The inspector also observed the use of a continuously oscillating water sprayer used to keep the upper internals of the reactor wet while stored in the drained portion of the cavity.

(2) Respiratory Protection Program

10 CFR 20.103(b) requires that, when it is impracticable to apply process or engineering controls to limit concentrations of radioactive material in air below 25% of the concentrations specified in Appendix B, Table 1, Column 1, other precautionary measures should be used to maintain the intake of radioactive material by any individual within seven consecutive days as far below 40 Maximum Permissible Concentration-hours (MPC-hrs) as is reasonably achievable.

Through records review, observations and discussions with licensee representatives, the inspector evaluated the respiratory protection program including training, medical qualifications, fit testing, MPC-hr assignment, and issue, use,

decontamination and storage of respiratory protection devices. The records, observations and discussions indicated that only those personnel who have been trained and qualified to wear a respiratory protective device were issued respirators. Review of the MPC-hr assignments for selected individuals revealed that all exposures were below the 40 MPC-hr per week control level and below the facility's administrative control levels as well.

(3) Air Sampling and Bioassays

10 CFR 20.103 establishes the limits for exposure of individuals to concentrations of radioactive materials in air in restricted areas. Section 20.103 also requires that suitable measurements of concentrations of radioactive material in air be performed to detect and evaluate the airborne radioactivity in restricted areas and that appropriate bioassays be performed to detect and assess individual intakes of radioactivity.

The inspector reviewed the results of selected air samples taken during the current outage. The air sample log indicated that the airborne concentration had seldom been above 25% of the MPC of radionuclides specified in 10 CFR 20, Appendix B, Table 1, Column 1. The licensee also indicated that no problems had been encountered during the outage, to date, concerning airborne radioactivity including radioiodine. It was noted that the air samples had been evaluated for alpha, beta and gamma activity and analyzed to determine the specific isotopes present.

The results of selected WBCs were also reviewed. No instances were noted in which personnel received greater than the limits specified in 10 CFR 20.103. Through records review and discussions with licensee representatives, it was determined that there had been no detectable intakes of radioactive material since the last inspection and no confirmed internal exposures.

(4) Air Quality

The inspector discussed with licensee representatives their procedures for ensuring air quality supplied to airline respirators, bubble hoods and self-contained breathing apparatuses (SCBAs). It was noted that a dedicated air compressor was used to fill air bottles used in SCBAs. The compressor was tested every 3 months to maintain Grade D air. Plant instrument air was used for airline respirators and bubble hood air supply and air quality was checked onsite every 3 months or the first time a connection was made to a given outlet to ensure Grade D air was always available.

No violations or deviations were identified.

e. Control of Radioactive Material and Contamination, Surveys and Monitoring (83726)

(1) Contamination Surveys

10 CFR 20.201(b) 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 in this part and (2) are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

Health Physics Procedure HPP-030, Control and Release of Equipment/Material from the RCA/Restricted Area, Revision 3, dated August 27, 1987, requires in Section 10.1.1 that material/equipment being transferred within the RCA be surveyed for radiation and contamination per HPP-060, Performance of Radiation and Contamination Surveys. Also, Section 10.1.2 states that, if radiation/contamination levels are less than 100 net cpm per probe area as measurable within a thin window pancake-type GM detector by direct frisk and less than MDA (defined as 100 net cpm per 100 cm²) for the counting instrument used by smear survey (removable), the material/equipment can be released for transfer.

Health Physics Procedure HPP-060, Performance of Radiation and Contamination Surveys, Revision 2, dated September 29, 1987, requires in Section 7.12 that, when counting smears for beta-gamma contamination using a frisker, a minimum count time of about 20 seconds is recommended to allow for a 90 percent deflection of full scale on the slow response mode. Also, Section 10.8.2 requires a frisk of the accessible surfaces of the material being surveyed by moving the probe slowly over the surfaces within one-half inch of the surface.

While touring the Auxiliary Building, the RCB and the Radwaste Building to determine whether or not adequate personal contamination surveys were being performed, the inspector observed workers exiting contaminated areas and exiting the RCA. The movement of material from contaminated areas and from the RCA also was observed to determine if adequate direct and smearable contamination surveys were being performed. All personnel surveys observed appeared to be adequate and the material surveys performed at the exit of the RCA were also adequate. However, the contamination surveys performed at the main control point to the RCB, for items crossing the contaminated area boundary, were less than adequate.

On numerous occasions during the period of August 15-18, at varying times during the day, the inspector noted HP technicians surveying items out of the RCB contaminated area at the main



control point. Various survey techniques were observed during the time period, the most prevalent of which was the use of a white cotton liner to "smear" an item. If the liner was worn on the hand, the fingers of the liner would be wiped over a portion of the item being surveyed and then checked for contamination by placing the fingertips over a frisker probe for 3-5 seconds. Another method involved the use of a cotton liner to wipe over the item in question continually folding the liner as it was used. The liner would then be checked for the presence of contamination by placing the folded liner over a frisker probe for 3-5 seconds. The liner was not unfolded or spread out on a flat surface to frisk the entire surface used to "smear" the item. When a smear patch was used to smear an item, it was seldom counted for more than 2 seconds with a frisker probe. Only on infrequent occasions were items such as electrical cords, hoses, cables or other pieces of equipment wiped down or smeared along their entire length or over the entire surface area to check for contamination.

The inspector also noted that such items were not frisked with a probe along their entire length or over their entire external surface. Usually only a cursory frisk of the item was performed before removing the item from the contaminated side of the barrier and placing the item on the "clean" side of the boundary.

Failure to perform an adequate survey of items being released from a contaminated area was identified as an apparent violation of 10 CFR 20.201(b) (50-400/88-28-02).

(2) Personnel Contamination Reports

The inspector reviewed selected personnel contamination reports for 1988 and all reports of contamination that had occurred since the current outage began. It was noted that, of those involving skin contamination, most were determined to have been caused by torn PCs or from improperly removing the PCs. Licensee representatives indicated an awareness of these problems and had made suggestions and recommendations to the training group about the proper use and removal of PCs. The inspector verified that the training group had been advised of these issues and had taken steps to emphasize the correct use and removal of PCs in GET and retraining classes.

(3) Protective Clothing (PCs)

During tours of the RCB, the inspector observed various jobs in progress including installation of the guide pins in the reactor, snubber inspection, installation of shielding, decontamination efforts following a spill from the RTD manifold, as well as other maintenance activities. During these tours,

the inspector also noted isolated instances in which workers were wearing the PC cloth hood with the flaps tied or attached behind their heads. Two workers were also noted to be wearing their PC coveralls with the front zipper partially undone thus exposing the upper portion of the neck and chest. When asked about this practice, licensee HP representatives indicated that this was an improper practice and that this would be monitored during future management and HP tours of the containment. Through review of personnel contamination reports, the inspector found no evidence that this problem was contributing to an increased incidence of personnel contaminations. This issue will be reviewed during subsequent inspections and will be tracked by the NRC as an Inspector Followup Item (IFI) (50-400/88-28-03).

(4) Radioactive Material Labeling and Storage

10 CFR 20.203(e) requires each area or room in which licensed material is used or stored and which contains any radioactive material in an amount exceeding 10 times the quantity of such material specified in Appendix C of this part shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: "CAUTION, RADIOACTIVE MATERIAL." 10 CFR 20.203(f) requires that each container of radioactive material bear a durable, clearly visible label identifying the radioactive contents.

During tours of the RCA, adjacent storage areas and warehouses, the inspector observed the licensee's radioactive material storage areas. The rooms or areas used for storage of radioactive material were posted as required and the items kept therein were properly labeled. It was noted that the licensee had very little radioactive material in storage.

(5) Radiation Detection and Survey Instruments

During plant tours, the inspector observed the proper use and selection of instruments appropriate for the radiation protection activity in progress. The inspector verified that instruments in use or available for use had been calibrated within the prescribed time period. Licensee personnel stated that the quantity and type of portable radiation detection instruments were adequate for the increased radiation protection activities resulting from the outage.

The inspector discussed, with licensee representatives, operation and calibration of the whole body contamination monitors permanently located at the RCA exit and, during the outage, at the main containment control point. Licensee representatives stated that three Nuclear Enterprise IPM-7s and



six Helgeson 2As were currently onsite. The inspector reviewed procedures SIC-046, Calibration of IPM-7, Revision 1, dated November 25, 1986, and SIC-045, Calibration of HECM-2A, Revision 0, dated May 19, 1987, and inquired as to the supporting documentation for the set-up parameters dictated by these procedures. Licensee representatives stated that the vendor's Technical Manuals were used and supplemented by start-up operational testing performed by the licensee. The licensee could not supply specifics of the start-up testing because the reports documenting the tests had been lost. Concerns raised by the inspector, such as the monitors' detection efficiency for commonly found isotopes other than the Cs-137 used for calibration and the difference in the monitors' sensitivity for point sources versus plate sources, were not addressed in the Technical Manuals. The inspector discussed with the licensee the adequacy of personnel contamination surveys and the need to review the documentation of the operational tests conducted by the licensee. The licensee agreed that documentation of the old operational tests should be obtained or that new operational tests be performed and properly documented. Documentation supporting the set-up parameters used for the IPM-7 and the HECM-2A personnel contamination monitors will be reviewed during a subsequent inspection and tracked by the NRC as Inspector Followup Item (IFI 50-400/88-28-04).

(6) Response Checks

TS 6.12 allows individuals to enter high radiation areas if they are provided with a radiation monitoring device that continuously integrates the radiation dose rate and alarms at a preset integrated dose.

TS 6.11.1 requires that procedures for personnel radiation protection shall be prepared consistent with the requirements of 10 CFR 20 and shall be approved, maintained and adhered to for all operations involving personnel radiation exposure.

Health Physics Procedure HPP-460, Operation of the Dositec 502A, Revision 1, dated June 25, 1987, states that a Dositec 502A may be used if specified acceptance criteria are met, one of which is passing a response check.

The inspector discussed the source check and response check of Dositecs with licensee representatives and reviewed documentation of the results. Through discussions and record reviews, the inspector verified that during the period of August 15-17, 1988, all Dositec 502As issued from the main control point of the RCP were not response checked prior to the instruments being used. The inspector informed the licensee that failure to perform the required response checks was an apparent violation of TS 6.11.1 (50-400/88-28-05).

f. Program for Maintaining Exposures As Low As Reasonably Achievable (ALARA) (83728)

10 CFR 20.1(c) specifies that licensee should implement programs to maintain workers' doses ALARA. Other recommended elements of an ALARA program are outlined in Regulatory Guides 8.8 and 8.10. The FSAR, Chapter 12, also contains licensee commitments regarding worker ALARA actions.

(1) Site ALARA Group

Prior to the outage, the ALARA group was composed of one HP specialist and one contract technician. During the outage, the ALARA group was augmented by two additional contract technicians. Their major functions were to review Plant Operating Manual procedures, perform pre-plan and post-job reviews, provide trend analyses of such items as current personnel exposure, job exposure, and personnel contaminations and establish and track trends against established facility and group exposure goals. The ALARA personnel were also required to make tours of the plant and observe jobs in progress whenever possible.

The inspector discussed the staffing of the ALARA group with the E&RC Manager. While the group was able to perform the various tasks assigned, it was apparent that more personnel would facilitate better tracking of exposures and more field coverage. Licensee management indicated that the subject of increasing the size of the ALARA staff had been considered and that, following the outage, an increase would again be evaluated and given serious consideration.

(2) ALARA Subcommittee

The ALARA Subcommittee was composed of representatives from each of the major work groups onsite. The PNSC representative on the subcommittee was the E&RC Manager with the ALARA specialist from the HP group acting as committee chairman. The group was established to report to the PNSC and make recommendations to management on ways to maintain exposures ALARA. The subcommittee also functioned as a review committee for jobs whose total exposure exceeded 25 person-rem. The majority of the recommendations made to date consisted of suggestions for plant modifications. The committee chairman also tracked these recommendations and the progress made in implementing them or lack thereof.

The subcommittee meets monthly as outlined by procedure to review past performance and recommendations and consider new recommendations. The inspector reviewed the minutes of the subcommittee meetings for 1988 and the recommendations that had



been made. It was noted that many of the recommendations were still pending. The licensee indicated that, because most of the recommendations dealt with plant modifications, a great deal of time was often required to implement the ones that had been adopted.

(3) Job Review

The inspector discussed the job evaluation and review process in detail with the ALARA specialist. Prior to a job being performed, the job coordinator was required to determine if an ALARA prejob review was required. If a review was required, the job coordinator filled out a checklist to ensure that various aspects of the job were or had been considered, such as, approval of procedures, staging of necessary materials, availability of service lines, and availability of communications equipment. The ALARA specialist or his designee would then complete a checklist addressing such items as review of historical data, temporary shielding, and decontamination requirements. For high risk or complicated jobs, a prejob review would be held including representatives from the various groups involved to perform and cover the work. During such a review, the actual details of the job evolution would be reviewed and the expected actions of the workers and the results of the work discussed.

The inspector also reviewed the job evaluation and review procedure, Administrative Procedure AP-514, ALARA Job Evaluations, Revision 1, dated December 12, 1986. While the procedure specifically covered pre-plan and post-job ALARA reviews, it did not address the subject of review of jobs/work in progress. The licensee indicated that, when the scope of the job changed which could entail more exposure, the HP technician covering the work would inform the ALARA group. The ALARA specialist would then review the change and make changes to the exposures estimated as necessary. Licensee representatives indicated that the procedure was under review and would be revised, following the outage, to facilitate its usage in the future.

The inspector reviewed numerous ALARA pre-job reviews and the associated documentation delineating the estimated person-rem to be expended, the aspects of the work considered, any extra or additional requirements established as a result, and the required approvals. The reviews included S/G opening and entry, weld inspections, eddy current testing, and sludge lancing. The estimates, work reviews and additional requirements appeared to be adequate. All pre-job reviews had been approved as required by procedure.

(4) Job Performance

The inspector reviewed the jobs being performed during the outage. The licensee indicated that, as of September 1, 1988, they were in day 34 of a scheduled 56-day outage. The major jobs performed and the total dose received in person-rem for each job were:

<u>Job</u>	<u>Person-rem</u>
HP Coverage & Surveys	13.2
Scaffold & Insulation Work	12.1
Guide Stud Repairs	1.6
S/G Manway Removal	4.1
Nozzle Dam Installation	8.5
Decontamination	3.4
Section XI Weld Inspection	10.3
S/G Secondary Work	6.3
Reactor Head Work/Refueling	8.3
Reactor Coolant Pump PMs	3.1
Snubber Inspections	4.6
Routine Maintenance	2.6
Management Inspections	2.6

(5) Annual and Outage Exposure Goals

The person-rem exposure goal for the outage was set at 200 with an annual goal of 363 person-rem. As of August 11, 1988, the licensee had expended approximately 63 person-rem, including both routine and outage activities, as determined by SRPD. The licensee had only expended 33 person-rem during their first year of operations in 1987. Personnel contaminations for 1988 totaled 67, with 17 of those occurring during the outage to date. The licensee experienced a total of 87 personnel contaminations during 1987, 48 skin and 39 clothing contaminations.

No violations or deviations were identified.

3. Solid Waste (87422)

10 CFR 20.311 requires a generating licensee who transfers radioactive waste to a land disposal facility or to a licensed waste collector to prepare all waste so that the waste is classified according to 10 CFR 61.55 and meets waste characteristic requirements of 10 CFR 61.56. The regulation further establishes specific requirements for conducting a quality control program.

a. Waste Characterization and Classification

Licensee representatives stated that updated scaling factors used to classify waste streams at the plant were received from an offsite vendor the week of the inspection. The frequency of these updates had previously been on a quarterly cycle; however, licensee representatives stated that beginning next quarter, waste stream sampling and analysis will be on an annual frequency. Special samples will be taken if anomalies in a system which is the source of a waste stream become apparent.

b. Shipments

As of August 17, 1988, eight shipments of evaporator concentrates solidified in cement had been made to a disposal site and one shipment of dry active waste (DAW) was transferred to a licensed waste collector (vendor supercompactor). The inspector reviewed the waste manifest for these shipments and verified that 10 CFR 20.311 requirements had been met. Licensee representatives stated that no dewatered resins had been shipped this year. The inspector noted that the licensee has never shipped Chemical Volume Control System (CVCS) resins or primary water system filters both of which have higher specific activities than material currently being shipped. However, CVCS resins and primary filters will be processed in the near future and subsequently shipped. Licensee representatives stated that as of July 20, 1988, 5,330 ft³ of radioactive waste containing 1.825 curies of activity had been shipped offsite and 824 ft³ was stored onsite awaiting shipment.

c. Waste Segregation

The inspector discussed the methods and procedures used for release of "clean" trash and segregation of "contaminated" trash with licensee representatives and reviewed licensee procedure HPP-100, Segregation and Release of Waste from the RCA/Protected Area, Revision 2, dated December 15, 1987. All trash taken from the RCA, both clean and potentially contaminated, is spread out under a HEPA filtered hood. Each piece is then surveyed and segregated. The "clean" bags of trash are then taken to a low background area and surveyed with a microR meter and released to the licensee-controlled landfill. Licensee representatives stated that the landfill is also surveyed with a microR meter once a week. Multiple surveys of the trash prior to its removal from the RCA is indicative of a radioactive waste program committed to ensuring that radioactive contamination is not released to uncontrolled areas.

d. Process Control Program Procedures

TS 6.8.1 requires that procedures be established, implemented, and maintained covering Process Control Program (PCP) implementation. TS 6.8.2 requires that each procedure of Specification 6.8.1, and

changes thereto, shall be reviewed and approved in accordance with Specification 6.5.1 prior to implementation.

During a review of the vendor supplied procedures which implement the PCP Program for solidification of radioactive waste, the inspector determined that no review and approval conforming with Technical Specification 6.5.1 was documented. Licensee representatives stated that an informal review was conducted; however, this review was not documented and no formal approval was obtained prior to the initiation of waste solidification and implementation of the PCP procedures. The licensee produced documentation showing that the NRC had accepted the vendor's topical report describing the mobile cement solidification system and documentation showing that NRC acceptance is pending for the vendor's topical report which demonstrates that the vendor's final solidified product meets waste structural stability requirements specified in 10 CFR Part 61.

The inspector stated that these NRC approvals do not address PCP implementing procedures and that failure to review and approve the PCP implementing procedures prior to implementation was an apparent violation of TS 6.8.2 (50-400/88-28-06).

4. Transportation of Radioactive Materials (86721)

a. Shipping Records

10 CFR 71.5(a) requires that each licensee who transports licensed material outside of the confines of its plant or other place of use, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of the Department of Transportation (DOT) in 49 CFR Parts 170 through 189.

In addition to the shipments referenced in Paragraph 3.b., the inspector reviewed selected "special" radioactive material shipments shipped in 1988. These shipments included such items as hot particles, waste stream samples, and an alloy analyzer. All transportation documentation reviewed complied with applicable 49 CFR regulations.

b. Site Transportation Organization

The transportation/shipping staff was composed of a foreman, who also assisted HP operations during the outage, two permanent technicians, and a third position which was filled with HP technicians rotated from the HP operations group. Specialized training for the staff was adequate with retraining given at an appropriate frequency.

c. Quality Assurance Audits

Licensee representatives stated that a Quality Assurance audit completed in July 1988, covered proper shipment packaging and shipping paper completion. The report had not been completed at the time of the inspection and was not reviewed by the inspector. The audit was conducted by QA personnel supplemented with technical specialists from other licensee facilities. Licensee representatives stated that no findings were identified in the area of transportation and shipping.

No violations or deviations were identified.

5. Exit Interview

The inspection scope and results were summarized on August 19, 1988 and on September 2, 1988, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provide to or reviewed by the licensee.

<u>Item Number</u>	<u>Description and Reference</u>
400/88-28-01	Violation - Failure to provide the proper monitoring device for an individual entering a high radiation area, Paragraph 2.c.
400/88-28-02	Violation - Inadequate surveys of items released from a contaminated area, Paragraph 2.e.
400/88-28-03	IFI - Review wearing of protective clothing in contaminated areas, Paragraph 2.e.
400/88-28-04	IFI - Review documentation for pre use test of the IPM-7 and HECM-2A personnel contamination monitors, Paragraph 2.e.
400/88-28-05	Violation - Failure to follow procedure for response checking alarming dosimeters, Paragraph 2.e.
400/88-28-06	Violation - Failure to review and approve Process Control Program implementing procedures, Paragraph 3.d.

6. Acronyms and Initialisms

ALARA	As Low as Reasonably Achievable
ANSI	American National Standards Institute
cpm	Counts Per Minute
DAW	Dry Active Waste

DOT	Department of Transportation
E&RC	Environmental and Radiation Control
FSAR	Final Safety Analysis Report
ft ³	Cubic Feet
GET	General Employee Training
GM	Geiger-Mueller
HEPA	High Efficiency Particulate Air (Filter)
HP	Health Physics
HRA	High Radiation Area
IFI	Inspector Followup Item
IN	Information Notice
MDA	Minimum Detectable Activity
MPC	Maximum Permissible Concentration
MPC-hr	Maximum Permissible Concentration-hour
mrem/hr	Millirem per hour
NVLAP	National Voluntary Licensee Accreditation Program
PCs	Personal Protective Clothing
PCP	Process Control Program
PNSC	Plant Nuclear Safety Review Committee
QA	Quality Assurance
R/hr	Roentgens per hour
RCA	Radiation Control Area
RCB	Reactor Containment Building
RWP	Radiation Work Permit
SCBA	Self-Contained Breathing Apparatus
S/G	Steam Generator
SRD	Self-Reading Dosimeter
SRPD	Self-Reading Pocket Dosimeter
SRWP	Special/Standing Radiation Work Permit
TLD	Thermoluminescent Dosimeter
TS	Technical Specification
WBC	Whole Body Count