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

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Report Nos.: 50-413/92-19 and 50-414/92-19

Licensee: Duke Power Company
P. O. Box 1007
Charlotte, NC 28201-1007

Docket Nos.: 50-413 and 50-414 License Nos.: NPF-35 and NPF-52

Facility Name: Catawba 1 and 2

Inspection Conducted: August 3-7 and 10, 1992

Inspectors: _____ 09/14/92
B. A. Parker Date Signed

_____ 09/14/92
A. T. Boland Date Signed

Approved by: _____ 09/14/92
J. P. Potter, Chief Date Signed
Facilities Radiation Protection Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the area of occupational radiation safety and included an examination of: audits and appraisals, training and qualifications, external exposure control, internal exposure control, control of radioactive materials and contamination, surveys and monitoring, and maintaining occupational exposures ALARA.

Results:

Based on interviews with licensee management, supervision, personnel from station departments, and records review, the inspector found the radiation protection program to be effective in protecting the health and safety of plant employees. One non-cited violation was identified for failure to control access to a posted high radiation area (Paragraph 7b).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

M. Couch, Radiation Protection (RP) Supervisor, Dosimetry
W. Deal, RP Manager
R. DeShazo, RP Supervisor, Safety Review Group
G. Ford, Quality Verification Specialist II
*T. Harrall, Safety Assurance Manager
J. Isaacson, Supervising Scientist
*J. Lowery, Compliance Specialist
*W. McCollum, Station Manager
*G. Mode, General Supervisor, Technical Support
T. O'Donohue, RP Supervisor, Special Projects
S. Powell, RP Supervisor, Surveillance and Control
*L. Schlise, General Supervisor, Surveillance and Control
R. Smith, Quality Verification Specialist II
C. Whitener, Scientist
*F. Wilson, RP Supervisor, Surveillance and Control

Other licensee employees contacted during the inspection included technicians, maintenance personnel, and administrative personnel.

*denotes attendance at exit meeting held on August 6, 1992.

2. Organization and Management Controls (83729)

The inspector reviewed changes made to the licensee's organization, staffing levels and lines of authority as they related to radiation protection. Since the last inspection, Duke Power Company experienced a major reorganization. The Radiation Protection group (RP) was not significantly impacted by the reorganization.

Within the licensee's organization, four General Supervisors reported to the RP Manager, who reported to the Station Manager. A staff of approximately 92 scientists, technicians and specialists were under the General Supervisors. In addition, Duke Power employed 45 permanent health physics (HP) contract personnel for use at each nuclear site during outages. Fifteen of the permanent contractors were assigned to each of the three Duke nuclear sites. For the current outage, the licensee brought in approximately 107 contract personnel in addition to the permanent contractors and staff. Staffing levels appeared to be adequate.

The inspector attended outage meetings and noted that good communication existed between RP and other work groups. After each meeting, an RP representative would hand

deliver outage meeting notes to various work groups and discuss any significant concerns or comments.

No violations or deviations were identified.

3. Self-Assessment Program (83729)

The inspector reviewed the licensee's program for identifying and correcting deficiencies and weaknesses related to the control of radiation and radioactive materials.

a. Audits

Technical Specification (TS) 6.5.2.9 requires audits of facility activities to be performed under the cognizance of the Nuclear Safety Review Board (NSRB) encompassing conformance of facility operation to all provisions contained in the TSs and applicable license conditions, as well as the Process Control Program (PCP) and implementing procedures.

The inspector reviewed the most recent Quality Verification Department audit of the RP program conducted March 16 through April 23, 1992, and documented in Report NG-92-06(CN), dated May 1, 1992. The audit included an evaluation of dosimetry, surveillance and control, whole body counting, qualifications and training, respiratory protection, ALARA, radioactive material control, high radiation area access control, and the corrective action program. The inspector determined that the audit was detailed and addressed appropriate RP program areas. The inspector noted that the audit included performance-based evaluations as well as review of pertinent documentation and procedures. Review of audit documentation and discussion with licensee representatives indicated that the audit was conducted by individuals knowledgeable of the RP area, many of which held RP positions within the utility.

The audit identified findings categorized as good practices, followup items, observations, recommendations, findings and document discrepancies. The latter two categories required a formal written response stating the corrective actions taken and the root cause for the finding. The inspector noted that all categories of findings were tracked for completion of corrective action by the Safety Review Group (SRG). Review of selected audit findings revealed that corrective actions were both timely and appropriate. Overall, the inspector noted that the audit results

contained issues of substance, were well documented, and were reported to facility management, as required.

In addition to the required audits, the inspector was informed that several surveillances/assessments had been performed in the RP area. The specific surveillances reviewed included:

- CN-90-40: Review of the contaminated warehouse;
- CSRG/91-015: Evaluation of ALARA Improvement Notices; and
- CSRG/92-01: Review of Radiation Work Practices.

The inspector noted that the assessments/surveillances included a comprehensive review of the areas being addressed and included recommendations for program improvement. However, review of documentation and discussions with personnel who performed the reviews revealed that a number of the recommendations from the two most recent evaluations remained as open items; and the plant RP group had not formally responded and/or resolved many of the items identified. The inspector noted that although the recommendations were tracked by the SRG, correction of the recommendations were handled more informally than those originating from the TS-required audit program. Overall, the inspector informed licensee management that the performance of the surveillances and assessments was a good initiative; however, in order to foster program improvement, RP, in conjunction with the SRG, needed to address the findings more aggressively. Licensee audit personnel stated that this program was being considered for incorporation into the plant-wide Problem Investigation Process (PIP) to provide a more systematic approach and response to corrective action for surveillance and assessment findings.

In general, the audit program was conducted consistent with regulatory requirements.

b. Radiological Incident Reporting System

Licensee procedures HP/0/B/1009/22, Investigation of Personnel Contamination, Unplanned Uptakes, and Unplanned Exposures, and HP/0/B/1009/23, Investigation of Unusual Radiological Occurrences, provided the primary procedural bases for the documentation and investigation of Radiological Incident Investigation and Accountability Reports (RIIAs). The licensee tracked RIIAs by the following assessment categories:

loss or theft of licensed material; unplanned uptake; skin contamination; clothing contamination; unplanned external exposure; unplanned radioactive release; and lost waste shipment. Through August 3, 1992, the licensee had identified approximately 54 RIIAs, the majority of which were associated with personnel contaminations.

Review of selected RIIAs by the inspector noted no significant trends or indicators of RP performance problems. Several RIIAs were discussed in detail with licensee representatives and are addressed in the appropriate topical sections of this report. The inspector noted that the licensee conducted quarterly RIIA review meetings to evaluate the various incidents, to identify any potential adverse trends, and to identify any corrective actions necessary to improve overall performance. Review of the first and second quarter 1992 review committee meeting minutes indicated that this process was working effectively.

In addition to the RIIA program, the licensee utilized the plant-wide Problem Identification Process (PIP) for the identification, resolution, and tracking of radiological problems. For RP, this process was governed by licensee procedure HP/0/B/1000/40, Problem Identification and Resolution Program, and encompassed problems such as observed poor radiation work practices, adverse trends in RIIAs, inadequate control of high radiation areas (HRAs) and extra high radiation areas (EHRAs), contamination outside the radiation control area, and exposures or releases in excess of regulatory requirements.

The inspector reviewed selected PIPs associated with the RP function for the period October 1991 through August 1992 and noted several instances in which RP actions to screen, document, and closeout PIPs were untimely. For example, the licensee had not screened, documented the significance, or evaluated PIP 1-C92-0434, which involved an HRA access control incident that occurred in May 1992 (see Paragraph 7b). The actions to update the PIP were completed prior to the end of the onsite inspection. The need for improved RP involvement in the use of the PIP program was previously identified by the licensee during the 1992 TS audit, and the inspector noted that actions had been initiated in response to this finding. The inspector informed licensee representatives that this issue would be reviewed during future inspections for adequacy of corrective actions.

No violations or deviations were identified.

4. Training and Qualifications (83729)

10 CFR 19.12 requires the licensee to instruct all individuals working or frequenting any portions of the restricted areas in the health protection aspects associated with exposure to radioactive material or radiation, in precautions or procedures to minimize exposure, and in the purpose and function of protection devices employed, applicable provisions of the Commission Regulations, individuals responsibilities and the availability of radiation exposure data.

The inspector reviewed the following procedures associated with the licensee's training program:

- GT-CNBA 001 - Radiation Worker Level II, Revision 1, dated May 1989;
- GT-CNBA 002 - Radiation Worker Level I, Revision 1, dated June 1989;
- GT-CNBA 007 - Duke Power Site Specific Refresher Training, Revision 1, dated May 1984;
- GT-CNBA 008 - Special Access Training for INPO and NRC Personnel, Revision 1, dated April 1991;
- GT-CNSP 001 - Initial Respiratory Training, Revision 3, dated February 1991;
- HP/0/B/1000/19 - Radiation Protection Vendor Technician Training/Qualification, Change 5, dated April 30, 1992; and
- Standard #2201.0 - General Employee Training (GET), Revision 11, dated May 1, 1991.

From review of the training procedures, course outlines and examinations, the inspector determined that the radiation protection training program met the provisions of 10 CFR 19.12.

The inspector recommended that the licensee develop written lesson plans for bubblehood training to include loss-of-air emergency removal procedures not currently shown in the licensee's training video for donning bubblehoods. Written lesson plans would ensure continuity in training. The inspector also noted that the bubblehood training instructor had not been formally trained, but rather had received on-the-job training.

The inspector also reviewed HP vendor training, resumes, and examinations for both junior and senior technicians. The licensee experienced a high return rate of HP contract personnel who had worked previous Duke Power outages. The high return rate of personnel minimized the amount of training needed for the current outage.

No violations or deviations where identified.

5. External Exposure Control (83729)

10 CFR 20.101 requires that no licensee possess, use, or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of on calendar quarter a total occupation dose in excess of 1.25 rem to the whole body, head and trunk, active blood forming organs, lens of the eyes, or gonads; 18.75 rem to the hands, forearms, feet and ankles; and 7.5 rem to the skin of the whole body.

a. Personnel Dosimetry

10 CFR 20.202 requires each licensee to supply appropriate monitoring equipment to specific individuals and require the use of such equipment.

10 CFR 20.202(c) req ires that dosimeters used to comply with 10 CFR 20.202(a) 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 reviewed and discussed the licensee's dosimetry program. The inspector noted that the site's TLDs were processed and analyzed on a monthly basis by the corporate dosimetry group located at the General Office. Documentation provided to the inspector indicated that this facility holds NVLAP accreditation which is valid through April 1993 for categories I through VII. Licensee representatives stated that actions were underway to implement a new TLD system by January 1, 1993, and that accreditation in all eight categories was expected.

In addition to TLDs, pocket ion chambers were also provided to plant workers to readily monitor external dose, and alarming dosimeters were issued to workers entering HRAs, as required. The inspector was informed by the licensee that implementation of a computerized alarming dosimetry system was also planned for January 1, 1993. The inspector noted that the addition of this equipment should be an enhancement to the

overall dosimetry program.

During tours of the plant and observation of work activities, the inspector noted workers properly wearing personnel monitoring devices appropriate for the work being performed.

b. Whole Body Exposure

The inspector discussed with licensee representatives the January 1 through June 30, 1992, whole body exposure data for licensee and contractor personnel. Of the licensee personnel monitored in 1992, the maximum first and second quarter whole body exposures were 711 millirem (mrem) and 218 mrem, respectively. In addition, the inspector reviewed whole body exposure data for workers associated with Radiation Work Permits (RWPs) 1808 and 1809 for the installation and removal of steam generator nozzle dams and RWP 1444 for the Unit 1 reactor head vent modification. At the time of the onsite inspection, the maximum whole body exposures associated with these outage activities were 550 mrem and 640 mrem, respectively.

For the records reviewed, no exposures in excess of 10 CFR Part 20 limits were identified. Further, licensee representatives informed the inspector, that no unplanned exposures in excess of administrative limits had occurred in 1992.

On August 10, 1992, subsequent to the onsite inspection, the Region was informed of a potential whole body overexposure (3650 mrem) for a worker associated with reactor head vent modification activities. Specifically, the worker was welding on a 6-inch diameter pipe with contact radiation readings of approximately 1000 mR/hr. Due to the nature and position of the work, the whole body TLD and "multipack" (one high range and one low range pocket dosimeter (PD)) were located on the worker's head. In addition, an additional high range PD was used as a sacrificial dosimeter in order to periodically monitor the worker's dose during the job.

Upon completion of the job, the sacrificial PD recorded a dose of approximately 1600 mR for the worker which was consistent with estimates as well as previous worker doses for the same job. However, the high range PD in the multipack for the same job read approximately 3650 mrem. Immediate surveys conducted by the licensee revealed no change in radiation and contamination levels compared to the pre-job surveys. Analysis of

the TLD determined a whole body dose of 1350 mrem which was consistent with the sacrificial PD.

The licensee leak-tested the PDs and surveyed them for hot particles; however, no explanation for the discrepancy was confirmed. The licensee suspected that the multipack PD was dropped or bumped causing an erroneous reading. Based on the available data, the licensee determined the TLD value to be an accurate reflection of the actual dose. The inspector noted the licensee's assessment to be appropriate.

c. Dose Extensions and Form NRC-4

10 CFR 20.101(b)(3) requires the licensee to determine an individual's accumulated occupational dose to the whole body on an Form NRC-4 or equivalent record prior to permitting the individual to exceed the limits of 20.101(a).

Discussions with licensee representatives and review of licensee procedure HP/0/B/1000/01, Exposure History Control, Dose Record Keeping and Issuance of Personnel Dosimetry, revealed that Form NRC-4 information was obtained from employees prior to the issuance of dosimetry. A review of selected records for plant personnel indicated that documentation of prior exposure history on Form NRC-4 was maintained on file, as required.

Station Directive 3.8.5, Exposure Extensions and Exposure Limit Reductions, detailed the licensee's program for approval of exposure extensions in excess of established administrative limits. This process included review by the ALARA group as well as approval by the Radiation Protection Manager or Station Manager, as appropriate. Station Manager approval was required for all exposure extensions which exceeded 3 rem total exposure in a year. In accordance with procedures, the maximum allowable quarterly extension was 2500 mrem for whole body exposure.

The inspector reviewed and discussed with the licensee dosimetry personnel exposure extensions granted in 1992. Through August 3, 1992, approximately 49 extensions had been authorized. The majority of the extensions were associated with Unit 1 outage activities, and with steam generator work, in particular. Review of selected exposure extensions verified that requests were processed and approved as required by procedure. For the documentation reviewed,

the maximum extension granted was to 2000 mrem for a quarter.

d. Skin Dose Assessment

On April 29, 1992, the licensee issued Licensee Event Report (LER) 92-005-00 reporting an apparent violation of 10 CFR 20.101 due to a hot particle overexposure to the skin. The LER stated that on April 1, 1992, two Safety Associates (workers) were conducting a routine fire extinguisher inspection/walkdown. While attempting to exit the Protected Area, one of the workers alarmed the walk-through portal monitor. Radiation protection personnel responded and found a "hot particle" on the skin behind the individual's left ear. The particle was retrieved and saved for analysis.

The licensee initiated an investigation as required by licensee procedure HP/0/B/1009/22, Investigation of Possible Personnel Contamination. The licensee interviewed the individuals involved and studied a videotape of the individuals exiting the RCA. The individuals had been working in various areas of the RCA, including contaminated areas, and the licensee took surveys and smears in those areas to check for any unidentified contaminated areas. No such areas were found. The licensee concluded from the investigation that the hot particle initially adhered to a spring scale used by the individual in a contaminated area. Upon exiting the contaminated area, the scale was neither properly frisked nor bagged in a polyethylene bag. Upon exiting the RCA, the scale was improperly frisked. The licensee believed that the particle was then passed from the scale, to the worker's hand, and onto the hair/skin behind his left ear after the workers had cleared the personnel contamination monitors. The particle remained behind the individual's ear and went undetected for approximately seven hours.

The analysis of the hot particle found that it consisted of approximately 0.6958 microcurie (uCi) cobalt-60 and 0.0574 uCi manganese-54. Measuring and viewing it under a microscope revealed that the particle was metallic grey, slightly shiny, and roughly rectangular in shape with a length and width of approximately 100-150 microns. The thickness of the particle could not be determined, but it appeared to be less than 100 microns.

To evaluate the skin dose from the hot particle, the licensee utilized the VARSKIN computer program, which estimated the skin dose to be 22,202 millirem. This was based on the activity levels and the seven hour retention time noted above. Also, only the Co-60 dose was accounted for, as Mn-54 is not in the VARSKIN program's isotope library; however, the beta dose rates of Mn-54 are relatively insignificant. Direct measurements of the particle using calibrated survey meters and appropriate correction factors were performed in accordance with Health Physics Procedure Guide III-10, Evaluation of Skin Dose from Discrete and Distributed Sources. The resultant skin dose was determined to be 8,664 millirem. The licensee attributed the difference in calculated and measured doses to self-attenuation of the beta particles within the particle itself.

The inspector reviewed the incident with the licensee during the inspection. Several procedural violations occurred during the fire extinguisher inspection and were identified by the licensee. Many of the violations contributed to the acquisition and retention of the hot particle, including failure to properly frisk, failure to properly exit a RCZ located outside of the RCA, failure to follow RWP dressout instructions, and failure to bag or wrap materials removed from a contaminated area. A procedural violation with three examples was cited by the resident inspector and documented in IR 50-413, 414/92-09. The licensee responded with an acceptable response to the violation dated June 1, 1992.

The inspector also performed independent dose calculations using the licensee's data. A similar calculation using VARSKIN indicated a dose of approximately 22,000 millirem. Utilizing the estimated dimensions of the particle noted above, and a recently upgraded, draft version of VARSKIN that accounts for self-attenuation, a skin dose in the range of 6,000-10,000 millirem was calculated. Based on this confirmation, the licensee's assignment of a 8,664 millirem skin dose to the individual appeared appropriate.

No additional enforcement action was taken since the exposure was calculated to be 5.2717 microcurie-hours, which was well below the 75 microcurie-hour direct skin exposure criteria specified in NRC Information Notice 90-48, "Enforcement Policy for Hot Particle Exposures."

No violations or deviations were identified.

6. Internal Exposure Control (83729)

10 CFR 20.103(a)(1) states that no licensee shall possess, use, or transfer licensed material in such a manner as to permit any individual in a restricted area to inhale a quantity of radioactive material in any period of one calendar quarter greater than the quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentration of radioactive material in air specified in Appendix B, Table 1, Column 1.

a. Whole Body Counting and Exposure Tracking

10 CFR 20.103(a)(3) requires, in part, that the licensee, as appropriate, use measurements of radioactivity in the body, measurements of radioactivity excreted from the body, or any combination of such measurements as may be necessary for timely detection and assessment of individual intakes for radioactivity by exposed individuals.

Licensee procedure HP/0/B/1009/22, Investigation of Personnel Contamination, Unplanned Uptakes and Unplanned External Exposures, required that special bioassays be performed for events in which facial contamination exceeded 300 corrected counts per minute (ccpm) on the area sealed by a full-face respirator or when skin contacted a tritiated liquid with a concentration greater than 1.0 uCi/ml.

The inspector reviewed selected RIIAs for the period January 1 through July 31, 1992, detailing individuals reported to have had positive facial or tritium skin contamination. A review of the records indicated that two such events had occurred, one facial and one tritium contamination. The inspector noted that appropriate whole body counts and/or urinalyses were performed as required. For the facial contamination event (RIIA 92-51), an initial maximum permissible organ burden (MPOB) of 0.2 percent cesium-137 was initially measured with subsequent measurements of 0.1 percent MPOB. The licensee's followup of the event was still in progress at the time of the inspection; however, the inspector noted that the MPOB results were less than the licensee's action limit for maximum permissible concentration-hour (MPC-hr) calculation of 0.5 percent MPOB. The inspector was informed by licensee representatives that no internal contaminations in excess of 0.5 percent MPOB had been identified to date in 1992.

To determine the effectiveness of the overall internal exposure control program, the licensee conducted quarterly evaluations which included the performance of special whole body counts for selected plant employees. Employees were chosen for participation in the evaluation based on established criteria such as: (1) MPC-hour assignment; (2) respirator usage; (3) assigned external exposure; and (4) involvement in internal exposure incidents. The specific criteria changed each quarter to obtain an adequate sampling of workers with the maximum values in each category. Review of the first and second quarter 1992 reports indicated that no positive whole body counts were identified through this process.

In addition, licensee procedures routinely required initial, annual, and termination bioassay measurements for workers issued dosimetry. The inspector reviewed records of selected contract and plant personnel and determined that routine whole body analyses were performed as required.

b. Air Sampling and Exposure Assessments

The inspector reviewed weekly air sample data from the Auxiliary Building and the Unit 1 Containment Building. A review of selected surveys indicated that the requirements of licensee procedure HP/0/B/1000/02, Taking, Counting, and Recording Surveys, were met. The inspector determined that the licensee was appropriately performing MPC calculations and evaluating workers' exposure to airborne radioactivity. For the records reviewed, the maximum exposure assigned from airborne exposure through June 30, 1992, was 1.15 MPC-hours.

c. Respiratory Protection

10 CFR 20.103(c)(2) permits the licensee to maintain and implement a respiratory protective program that includes, at a minimum: air sampling to identify the hazard; surveys and bioassays to evaluate the actual exposures; written procedures to select, fit, and maintain respirators; written procedures regarding supervision and training of personnel and issuance of records; and determination by a physician prior to the use of respirators that the individual user is physically able to use respiratory protective equipment.

10 CFR 20, Appendix A, Footnote (d), requires adequate respirable air of the quality and quantity in

accordance with NIOSH/MSHA certification described in 30 CFR Part 11 to be provided for atmosphere-supplying respirators.

30 CFR 11.121 requires that compressed, gaseous breathing air meets 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 toured the respiratory training and fit-testing areas, reviewed the training film, and discussed with licensee representatives the implementation and adequacy of the respiratory protection program. After reviewing the technical procedures and training, the inspector determined procedural guidance to be appropriate. The inspector reviewed selected individuals' records and noted that training, including written examinations, as well as fit tests and medical qualifications, were satisfactory and up-to-date.

The inspector observed breathing apparatus in use and determined that air manifold gauges were calibrated and that hoses and hoods were compatible per manufacturers' instructions. The licensee indicated that the breathing air being used exceeded Grade D air requirements.

Based on the above, the inspector concluded that the licensee was adequately controlling internal exposures.

No violations or deviations were identified.

7. Surveys, Monitoring, and Control of Radioactive Material and Contamination (83729)

a. Posting and Labeling

10 CFR 20.203(f) requires, in part, that each container of licensed material with greater than Appendix C quantities bear a durable, clearly visible label identifying the radioactive contents.

Licensee procedure HP/0/B/1000/30, Use of Release/Radioactive Material Tags, detailed the licensee's implementation of the aforementioned requirements. During tours of the Auxiliary Building, Unit 1 Containment, and various outside and inside radioactive material storage locations, the inspector noted that radioactive material areas were

appropriately posted and containers were tagged and labeled consistent with regulatory and procedural requirements.

b. High Radiation Areas

TS 6.12.1 requires, in part, that each high radiation area with radiation level greater than or equal to 100 mrem/hr but less than or equal to 1000 mrem/hr be barricaded and conspicuously posted as a high radiation area. 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; a radiation monitoring device which continuously integrates the radiation dose rate in the area; or an individual qualified in radiation protection procedures with a radiation dose rate monitoring device.

TS 6.12.21 requires that areas accessible to personnel with radiation levels greater than 1000 mr/hr at 18 inches be provided with locked doors to prevent unauthorized entry in addition to the requirements of TS 6.12.1. The keys for the locked high radiation areas were to be maintained under administrative control.

Licensee procedure HP/0/B/1000/25, High Radiation Area Access, described the licensee's specific requirements for establishing, posting, and controlling HRAs and EHRAs. The procedural requirements were more restrictive than TSs in that HRAs were required to be maintained locked.

During tours of the Auxiliary Building and Unit 1 Containment, the inspector noted that all EHRAs and HRAs were locked and conspicuously posted, as required. For those areas that could not be locked (i.e., reactor head storage, steam generator platform) the licensee posted the area consistent with the hazard present and placed flashing lights in the area to warn radiation workers. The licensee's use of flashing lights for temporary areas that could not be locked was consistent with NRC guidance.

During a review of Problem Investigation Process Reports, the inspector noted an instance in which the licensee failed to control access to a posted HRA. Specifically, the event involved the mechanical failure of the lock on controlled access door (CAD) 612, an upper containment access door. The door was typically

CAD-secured by Security (no access even with security card key) as well as locked by RP. However, during the period May 18-20, 1992, the mechanical lock (RP-controlled) failed, leaving only the CAD control as a safeguard. The licensee subsequently identified that, during periods of access when the door was not CAD-secured, the door was left unsecured and unattended for RP control purposes. Immediate corrective actions implemented by the licensee included maintaining the door CAD-secured except during entry and egress or ensuring the door was guarded if not CAD-secured, and repairing the mechanical lock. Licensee personnel stated that the primary contributor to the event was failure to recognize that the door was not CAD-secured during periods of access and, therefore, control was not being maintained as required.

The inspector reviewed CAD access logs, HRA key issuance logs, and reactor building access logs to determine if any individuals accessed the door without proper RP controls. For the records reviewed, the inspector determined that all individuals entering the area during this time were authorized to do so by Operations and were either escorted by an RP technician or were issued integrating alarming dosimeters.

Although radiation surveys taken during the period May 18-20, 1992, indicated that the area was not actually a HRA, the inspector informed the licensee that the failure to control access to a posted HRA in accordance with approved procedures was a violation of TS 6.11. Prior to the end of the onsite inspection, the licensee revised and approved a revision to licensee procedure HP/0/B/1000/07, Duties of the Radiation Protection Shift Compliance/Routines Personnel, to provide additional guidance for RP Technicians on the actions to take when a mechanical lock fails on a normally CAD-secured door. The inspector informed the licensee that because the identification and correction of the violation met the criteria specified in Section V.G.1 of the NRC Enforcement Policy, the violation would not be cited (NCV 50-413, 414/92-19-01).

c. Area and Personnel Contamination

The licensee maintained approximately 184,000 square feet (ft^2) as radiologically controlled. As of August 3, 1992, approximately 25 days into the Unit 1 outage, the contaminated area tracked by the licensee was 3,620 ft^2. This equates to about 2 percent contaminated floor space. Also, licensee representatives informed the inspector that during the

month of July prior to the outage, an all-time low of 2,655 ft² of contaminated area was achieved. During tours of the facility, the inspector noted that housekeeping was appropriate for that stage of the outage.

As of August 1, 1992, approximately 51 personnel contamination events (PCEs) had occurred in 1992 as compared to the yearly goal of 124. The inspector noted that the rate of PCE occurrence has shown a decreasing trend. Through June 30, 1992, the rate of occurrence was 14.7 PCEs per 100,000 RWP-hours. This compared to rates of 64.5, 62.5, and 35.7 PCEs per 100,000 RWP-hours for 1989, 1990, and 1991, respectively. Several of the initiatives implemented by the licensee to reduce contamination events included: use of sticky pads, increased masslinn surveys, installation of small article monitors, and use of oil cloth.

The licensee has also implemented an aggressive drip-bag program to contain contamination from both active and inactive ("dry") leaks. Although the licensee has been proactive in containing potential leaks, the inspector noted that the licensee's tracking system did not distinguish between radiological and non-radiological catch containers. During a facility tour, the inspector noted a yellow catch container which was draining into a container labeled with a radiation symbol; however, the system was clean. The inspector discussed with licensee representatives the need for consistent labeling and packaging of radioactive material such that it can be readily identified by workers.

Based on the above the inspector concluded that the licensee was effectively controlling the spread of contamination.

One non-cited violation for the failure to control access to a posted high radiation area was identified.

8. Program for Maintaining Exposures As Low As Reasonably Achievable (ALARA) (83729)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures a low as reasonably achievable. The recommended elements of an ALARA program were contained in Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposure at

Nuclear Power Stations will be ALARA, and Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures 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 as low as reasonably achievable (ALARA).

Just prior to the inspection, the licensee's ALARA program as a whole underwent a major reorganization. The reorganization resulted from the licensee's desire to allow more interaction among the groups involved in ALARA planning. Prior to the reorganization, ALARA planning consisted of the RP ALARA staff planning jobs expected to be greater than one person-rem and the Planning Department handling all other jobs expected to be less than one person-rem. Upon completion, the job plans were forwarded to the appropriate group for execution. As part of the reorganization, the licensee created the four-member ALARA Planning Center (APC) consisting of two representatives from RP ALARA, one representative from Planning and one representative from one of the designated groups responsible for execution of work (i.e. Maintenance). Assignment of each representative to the APC was expected to be completed in one-year rotationals to provide ALARA planning experience to a greater number of staff. The inspector noted that the reorganization should allow for more consistency and better communication prior to initiation of work; however, the new system had not been "tested" at the time of the inspection. The inspector informed the licensee that future inspections would assess the adequacy of the new system.

The licensee's ALARA Committee, implemented by Station Directive 3.8.1, ALARA Program, essentially consisted of the managers that report directly to the Station Manager. The Committee met on an "as needed" basis and functioned as an oversight committee only. Specific jobs and dose levels were not discussed.

The inspector reviewed other aspects of the licensee's program related to ALARA, including cost/benefit analysis, ALARA suggestions/incentives, shielding, dose tracking, and source term reduction. In July 1992, Duke Power increased the dollar amount allowed for ALARA cost/benefit analysis from $2,500 per person-rem to $12,500 per person-rem, and higher under certain circumstances. ALARA awards were given out for suggestions that saved significant dose. Individuals were nominated for awards by co-workers. Forty-four shielding packages had been approved and installed at

the time of inspection. The inspector noted that the licensee tracked shielding by job instead of by weight in order to better characterize the overall dose savings due to shielding. The ALARA group tracked dose from a daily RWP dose printout. All daily doses of greater than 25 mrem were reviewed and any that appeared excessive were investigated. At the time of inspection, the licensee was developing a source term reduction program. The inspector reviewed the draft plan and noted that the licensee planned to reduce source term in many ways including chemistry control, cobalt reduction, and fuel reliability.

The licensee's overall dose goal for the outage was 322 person-rem. At the time of inspection, the estimated exposure was approximately 154 person-rem versus the to-date goal of 135 person-rem. The licensee was projecting an end-of-outage collective dose of approximately 340 person-rem. The licensee indicated that dose was being tracked closely in an effort to meet the established outage goal.

No violations or deviations were identified.

9. Onsite Followup of Licensee Event Reports (92700)

LER 92-005-00: Apparent Violation of 10 CFR 20.101 due to a Hot Particle Overexposure.

The inspector reviewed the circumstances surrounding the hot particle event as well as the associated dose assessments. As discussed in Paragraph 5.d of this report, the licensee's dose assessment was appropriate; however, a violation with multiple examples was issued for the failure to follow RP procedures. Corrective actions, provided to NRC in a response dated June 1, 1992, will be evaluated during future inspections. This LER is considered closed.

10. Exit Meeting

At the conclusion of the inspection on August 6, 1992, an exit meeting was held with those licensee representatives indicated in Paragraph 1 of this report. The inspector summarized the inspection scope and discussed the non-cited violation identified and listed below. The licensee did not indicate any of the information provided to the inspectors during the inspection as proprietary in nature and no dissenting comments were received from the licensee. On August 24, 1992, the licensee was contacted and informed that the event reported to the Region on August 10, 1992, (see Paragraph 5.b) would be included in this report. Clarification on final inspection results was also discussed.

Item Number	Description and Reference
50-413, 414/92-19-01	Non-Cited Violation of TS 6.11: Failure to control access to a posted high radiation area in accordance with approved procedures. Licensee corrective actions completed prior to the end of the onsite inspection (Paragraph 7).