UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-269/95-22, 50-270/95-22, and 50-287/95-22

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-269, 50-270, and 50-287 License Nos.: DPR-38, DPR-47, and DPR-55

Facility Name: Oconee Nuclear Station

Inspection Conducted: November 13-17, 1995

Inspector: Wade T. Loo 12/14/95
W. T. Loo Date Signed

Approved by: T. R. Decker 12/14/95
T. R. Decker, Acting Chief Date Signed
Plant Support Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the area of occupational radiation exposure and health physics activities to include those activities associated with the current Unit 1 Refueling Outage. The specific areas examined included: audits and appraisals; external exposure control; internal exposure control; control of radioactive materials and contamination, surveys and monitoring; and program for maintaining occupational exposures as low as reasonably achievable.

Results:

In the areas inspected, no violations or deviations were identified. Based on various interviews with licensee personnel, records review, and observations of work activities in progress, the inspector found that the radiation protection program continued to adequately protect the health and safety of occupational radiation workers.

For the current Unit 1 Refueling Outage, the licensee had increased controls over occupational radiation exposures to facility workers. As a result of those efforts the licensee planned to complete the outage with a radiation dose of less than 100 person-rem.

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Enclosure

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*M. Bailey, Regulatory Compliance
D. Berkshire, Senior Scientist, RP
*M. Boyle, General Supervisor, Station Services, RP
E. Brown, Scientist, RP
*S. Bryant, Internal Assessment, RP
E. Burchfield, Manager, Regulatory Compliance
T. Cherry, ALARA Specialist, ALARA/Planning, RP
*J. Davis, Manager, Engineering
J. Long, ALARA Specialist, ALARA/Planning, RP
B. Murphee, Administrative Supervisor, Dose and Records Control, RP
W. Pursley, Shift Supervisor, RP
*S. Spear, General Supervisor, Station Sciences, RP
*J. Twiggs, Manager, RP
R. Waterman, RPS, RP
D. White, Supervisor, Surveillance and Control, RP

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

Nuclear Regulatory Commission

*P. Harmon, Senior Resident Inspector
G. Humphrey, Resident Inspector
L. Keller, Resident Inspector
N. Salgado, Resident Inspector

*Attended Exit Meeting

Abbreviations and Acronyms used throughout this report are defined in the last paragraph.

2. Audits and Appraisals (83750)

This area was reviewed to determine the adequacy of the licensee's identification and corrective action program for deficiencies or weaknesses related to the control of radiation or RAM.

10 CFR 20.1101(c) requires that the licensee periodically review the RP program content and implementation at least annually.

a. Audits

Through discussions with licensee representatives, the inspector determined that the licensee had not conducted an audit of the RP program since the last onsite inspection of this area as documented in IR 50-269, 50-270 and 50-287/95-15, dated July 27, 1995. The inspector was informed by licensee representatives that

an audit of the RP program was scheduled to be conducted from November to December 1995. The inspector informed licensee representatives that the RP audit, findings, and conclusions would be reviewed during future inspections of this program area.

b. Problem Investigation Process

The inspector reviewed PIPs initiated since June 1995, and determined that approximately 45 PIPs had involved radiological concerns. Based on discussions between the inspector and licensee representatives and a review of various PIPs that had been completed, the inspector concluded that the licensee was adequately identifying areas of concern and taking corrective actions to prevent recurrence of those items identified. Furthermore, no adverse trends were noted by the inspector since the last onsite inspection.

Based on those discussions and review of various records, the inspector noted that the PIPs documented by the licensee were identifying areas of concern relating to the RP program.

No violations or deviations were identified in this area.

3. Planning and Preparation (83750)

Licensee activities and documents for this area were reviewed to determine the adequacy of management and staff efforts in planning and preparation of outage radiation activities.

At the time of the onsite inspection, the licensee was in the third calendar week (days 11-15) of a scheduled 38 day RFO that began on November 2, 1995. The inspector reviewed the licensee's organization to support ongoing U1 RFO activities. For the outage, the licensee employed contract personnel to supplement the routine RP staff. Based on discussions with licensee representatives and observation of activities in progress, the inspector concluded that the RP staffing levels appeared to be adequate to support ongoing U1 RFO activities. Based on observations made by the inspector and discussions with licensee representatives, the inspector noted that the licensee had increased RP oversight for the U1 RFO because of a previous NRC inspection finding as documented in IR 50-269, 50-270 and 50-287/95-15, dated July 27, 1995. This increased oversight included RP personnel monitoring all RCA exits to ensure that all tool, equipment, and personnel were properly frisked to ensure proper RAM control. In addition, the licensee decreased the number of RCA exit points from ten to seven. Upon completion of the outage, the licensee planned to reduce those exit points from seven to five. Also, the licensee had an RPS conducting quality assurance checks to ensure that facility personnel were conducting activities in accordance with licensee RP procedures and policies as well as regulatory requirements.

No violations or deviations were identified in this area.

4. External Exposure Control (83750)

This area was reviewed to determined whether personnel dosimetry, administrative controls, and records and reports of external radiation exposure met NRC regulatory requirements.

10 CFR 20.1201(a) requires each licensee to control the occupational dose to individual adults, except for planned special exposures under 10 CFR 20.1206, to the following dose limits:

(1) An annual limit, which is the more limiting of:

(i) The total effective dose equivalent being equal to 5 rems; or
(ii) The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems; and

(2) The annual limits to the lens of the eye, to the skin, and to the extremities, which are:

(i) An eye dose equivalent of 15 rems; and
(ii) A shallow-dose equivalent of 50 rems to the skin or to any extremity.

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 radioactive hazards that may be present.

a. Administrative Controls

The inspector reviewed external radiation exposure records and discussed those records with licensee representatives for various facility and contract employees for the calendar year 1995 to date. The inspector noted that for those individuals reviewed, the maximum 1995 external radiation exposures were: TEDE, 2,060 mrem; SDE-Skin, 3,392 mrem; SDE-Extremity, 4,451 mrem; and Eye, 1,886 mrem. From a review of those external radiation exposure records, the inspector confirmed that those whole body exposures assigned during the period reviewed were within 10 CFR Part 20 limits.

The inspector reviewed various outage RWPs for appropriateness of the RP requirements based on work scope, location, and conditions. For those RWPs reviewed, the inspector noted that the radiological concerns were appropriately addressed. The inspector observed personnel reviewing RWPs and logging into the DADs EDC system. From observations, the inspector noted that personnel were properly using the EDC system. The inspector conducted random interviews with radiation workers in the RCA. The radiation workers were knowledgeable of their RWP requirements, personal dose, and proper response to DAD alarms. Based on those

discussions and review of various RWPs, the inspector determined that the licensee's program for RWP implementation adequately addressed radiological protection concerns and provided proper control measures for those activities.

b. Personnel Dosimetry

10 CFR 20.1502(a) requires each licensee to monitor occupational exposure to radiation and supply and require the use of individual monitoring devices by:

(1) Adults likely to receive, in one year from sources external to the body, a dose in excess of 10 percent of the limits in 10 CFR 20.1201(a);

(2) Minors and declared pregnant women likely to receive, in one year for sources external to the body, a dose in excess of 10 percent of any of the applicable limits of 10 CFR 20.1207 or 10 CFR 20.1208; and

(3) Individuals entering a high or very high radiation area.

The inspector reviewed the licensee's radiation dosimetry program to ensure that the licensee was meeting the radiation monitoring requirements of 10 CFR Part 20. The inspector noted that the licensee continued to provide TLDs to individuals requiring personnel radiation exposure monitoring. The licensee used the TLD for primary radiation exposure monitoring and used DADs for secondary radiation exposure monitoring. Personnel TLDs were read quarterly and results served as the official dose of record. DADs were read upon exiting the RCA and served as a means for tracking an individual's cumulative external radiation exposure on a day-to-day basis. During tours of the RCA, the inspector noted that those personnel observed were wearing DADs and TLDs were doing so properly.

c. High Radiation Areas

During tours of the Auxiliary building and other areas of the licensee facility, the inspector observed and independently verified that various HRAs were locked and/or posted as required by licensee procedural and NRC regulatory requirements. The inspector noted that the licensee had properly barricaded and enclosed posted Very HRAs observed by the inspector so as to prevent unauthorized or inadvertent entry by individuals into those areas. For those HRAs observed, all were found by the inspector to be properly posted, locked, and secured to prevent unauthorized access by individuals not allowed access to those areas.

d. Posting and Labeling

10 CFR 20.1902(e), requires that for posting of areas or rooms in which licensed material is used or stored, the licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in Appendix C to 20.1001-20.2401 with a conspicuous sign or signs bearing the words "Caution, Radioactive Material(s)" or "Danger, Radioactive Material(s)."

10 CFR 20.1904(a) requires the licensee to ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "Caution, Radioactive Material," or "Danger, Radioactive Material." The label must also provide sufficient information (such as radionuclides present, and the estimate of the quantity of radioactivity, the kinds of materials and mass enrichment) to permit individuals handling or using the containers, to take precautions to avoid or minimize exposures.

During tours of various areas of the licensee's facility, the inspector noted that the licensee's posting and control of radiation areas, HRAs, airborne radioactivity areas, contamination areas, and radioactive material areas, were adequate. All signs were conspicuous and legible, and maps and labels were clearly visible and informative. The inspector noted that all containers and materials were properly labeled in accordance with the radiation hazards present. The inspector also conducted random independent radiation surveys and noted no problems with observed radiation levels.

Based on those discussions, observations, and review of various records, the inspector noted that the licensee was adequately labeling, posting and controlling access to radiation and HRAs and RAM to include appropriate RWPs.

No violations or deviations were identified in this area.

5. Internal Exposure Control (83750)

This area was reviewed to determined the adequacy of the licensee's use of process and engineering controls to limit exposures to airborne radioactivity, respiratory protection program, administrative controls for assessing the total effective dose equivalent in radiation and airborne radioactive materials areas, assessments of individual intakes of radioactive material and records of internal exposure measurements and assessments.

10 CFR 20.1204 states that for purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee, when required to monitor internal exposure, shall take suitable and timely measurements of concentrations of radioactive materials in air, quantities of radionuclides in the body, quantities of

radionuclides excreted from the body, or combinations of these measurements. When specific information on the behavior of the material in an individual is known, that information may be used to calculate the Committed Effective Dose Equivalent.

10 CFR 20.1502(b) requires each licensee to monitor the occupational intake of radioactive material by and assess the CEDE to:

(1) Adults likely to receive, in one year, an intake in excess of 10 percent of the applicable ALI in Table 1, Columns 1 and 2 of Appendix B to 10 CFR 20.1001-20.2401; and

(2) Minors and Declared Pregnant Women likely to receive, in one year, a committed effective dose equivalent in excess of 0.05 rem.

a. Use of Process or Engineering Controls

During discussions with licensee representatives, the inspector was informed that during the U1 RFO the licensee made efforts to decrease respirator usage and expand engineering controls to limit airborne radioactivity concentrations to include the use of portable High Efficiency Particulate Air filtration units and face shields. Based on those discussions and observations of work activities associated with the U1 RFO, the inspector determined that, at the time of the onsite inspection, the licensee's initiatives in reducing radiation exposures through decreased respirator usage and increased engineering controls during potential airborne radioactivity activities were adequate to maintain radiation worker TEDE exposures ALARA.

b. Respiratory Protection Program

The inspector reviewed the licensee's respiratory protection program. At the time of the onsite inspection, the licensee had used approximately 1,061 respirators for the U1 RFO. As compared to previous outages, the licensee continued to make significant efforts in reducing the use of respirators in those areas where respirators had been previously used. During the two previous U1 RFOs conducted in 1992 and 1991, the licensee used approximately 2,320 and 4,880 respirators, respectively. Although the licensee observed an increase in PCEs, the licensee had anticipated this occurring due to the decrease in respirator usage and previous outage experience in this area. The inspector noted that licensee procedures provided guidance for the selection of respiratory protection devices so as to keep the radiation worker's TEDE ALARA.

c. Internal Exposure Assessments

10 CFR 20.1204 states that for purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee, when required to monitor internal exposure, shall take

suitable and timely measurements of concentrations of radioactive materials in air, quantities of radionuclides in the body, quantities of radionuclides excreted from the body, or combinations of these measurements. When specific information on the behavior of the material in an individual is known, that information may be used to calculate the CEDE.

The inspector reviewed various records of BBAs performed by the licensee for the calendar year 1995 to date. From those reviews of records and discussions with licensee representatives, the inspector determined that for the calendar year 1995 to date, the licensee had conducted numerous BBAs. Although the licensee continued to reduce respirator usage and had observed an increase in facial PCEs as discussed in Paragraph 5.b, no significant increase in positive uptakes were observed by the licensee. At the time of the onsite inspection no concerns were noted by the inspector based on those reviews of various records and discussions with licensee representatives.

In addition, the inspector reviewed various records regarding follow-up on intakes of RAM and noted that the licensee was appropriately monitoring and controlling internal radiation exposures for facility personnel. The inspector also reviewed and discussed the licensee's program for monitoring internal radiation dose and noted that the licensee's policy regarding internal radiation exposure was adequate.

Based on those discussions, observations, and review of various records, the inspector concluded that the licensee's program for monitoring, assessing, and controlling internal radiation exposures was conducted adequately in accordance with NRC regulatory and licensee procedural requirements.

No violations or deviations were identified in this area.

6. Control of Radioactive Materials and Contamination, Surveys, and Monitoring (83750)

This area was reviewed to determine whether radiation survey and monitoring activities were performed as required and control of radioactive materials and contamination met NRC regulatory requirements.

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 radioactive hazards that may be present.

a. Surveys, Personnel Monitoring, and Instrumentation

During tours of various areas within the plant, the inspector noted that portable radiation detectors, air samplers, friskers and contamination monitors had up-to-date calibration stickers and had been source-checked as required by licensee procedural requirements.

The inspector reviewed various records of routine and special radiation and contamination surveys performed during the current U1 RFO and discussed the survey results with licensee representatives. During tours of various areas within the plant, the inspector observed RPSs performing radiation and contamination surveys. The inspector independently verified radiation and contamination levels in various areas of the Auxiliary building. No concerns with the adequacy or frequency of the radiological survey activities were identified.

b. Control of Contamination and Radioactive Material

During tours of various areas within the plant, the inspector observed an individual carrying a radioactive contaminated piece of equipment in a properly labeled radioactive material bag. The inspector noted that the individual frisked himself appropriately by entering a personnel contamination monitor but had laid the radioactive material bag down on the clean non-RCA floor beside the personnel contamination monitor. The inspector discussed the observations with licensee representatives and determined that this was a routine practice conducted by the licensee for individuals going from the Auxiliary Building RCA to the hot machine shop RCA. The licensee's procedures allowed individuals to transport potentially contaminated material from the RCA to a non-RCA and back into another RCA as in the case observed by the inspector. At the time of the onsite inspection, the inspector informed licensee representatives that this practice observed by the inspector would be identified as an apparent violation of NRC regulatory requirements for conducting inadequate surveys of radioactive material leaving the licensee's RCA. Upon further NRC review, it was determined that the issue did not constitute a violation of NRC regulatory requirements. Although the licensee's procedures allowed this practice to be conducted it was determined that other licensee controls were adequate to detect and prevent the spread of potential radioactive contamination from the bags containing contaminated radioactive equipment. On November 29, 1995, a telephone call was held between the inspector and licensee representatives to inform the licensee of this decision.

During facility tours, the inspector observed adequate housekeeping and contamination control practices. The inspector noted that the licensee's control and labeling of radioactive material was adequate. In addition, the inspector reviewed survey records and verified that the licensee was performing routine surveys of radioactive materials areas and checks of labels on radioactive material containers stored in outside storage areas.

c. Control of Contaminated Areas

The licensee maintained approximately 127,466 ft^2 of floor space as radiologically controlled. At the time of the onsite inspection, the contaminated area tracked by the licensee was

approximately 3,810 ft^2. During facility tours, the inspector noted that radioactive material contamination control and general RP housekeeping practices were adequate. Based on those direct observations made by the inspector, the inspector concluded that the licensee was adequately controlling the spread of radioactive material contamination.

d. Personnel Contaminations

The inspector reviewed the licensee's PCEs to date since the last inspection and discussed those records with licensee representatives. For the calendar year 1995 to date, the licensee had a total of 123 PCEs for skin and clothing contaminations. Of those contaminations there were 11 involving hot particles to the skin and 51 involved hot particles to clothing. Review of selected contamination events noted that licensee documentation and follow-up on the individual events were appropriate, and radiation skin dose assessments were performed, when required. For reports reviewed, resultant radiation exposures were minor.

d. U3 Power Entry

At the time of the onsite inspection, the licensee conducted a U3 power entry to work on a quench tank level transmitter. The inspector attended the pre-job ALARA briefing and observed those activities associated with RP job coverage throughout the entire job evolution. Based on those reviews of radiation area and contamination surveys and air sample records and observations, the inspector found the RP activities to be adequate for the U3 power entry. During the power entry, the inspector observed the RPS and the three workers associated with the level transmitter work conduct proper radiation worker practices in accordance with ALARA and licensee procedural requirements. In addition, the inspector observed the RPS conduct adequate radiation area and contamination surveys to prevent inadvertent exposure to the high radiation levels in the U3 containment during 100% power operations. The licensee had made three previous entries into the U3 containment at 100% power with individual radiation exposures ranging from 13 to 42 mrem. During the power entry observed by the inspector the individual radiation exposures ranged from 3 to 8 mrem.

Based on those discussions, observations and review of various records, the inspector noted that the licensee was adequately conducting area radiation and contamination surveys at the licensee's facility with appropriate radiation survey detection and measurement instruments.

No violations or deviations were identified in this area.

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

This area was reviewed to determine the adequacy of the ALARA program. Areas reviewed included organization support, goals and objectives, radiation source reduction, worker awareness and involvement, ALARA plans and reviews, and ALARA results in the implementation of the licensee's ALARA program.

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

The site's collective radiation dose goal for the calendar year 1995 was set at 325 person-rem. The collective radiation dose at the time of the onsite inspection was approximately 121 person-rem and the licensee was below dose estimate projections for the work completed.

The inspector concluded that for the U1 RFO, the licensee accumulated approximately 35.842 person-rem which was significantly below the estimated 52.900 person-rem at that point of the RFO. The U1 RFO began on November 2, 1995, and was scheduled to be 38 days with an estimated collective radiation dose of approximately 119 person-rem. The lowest Oconee RFO radiation dose had been 120 person-rem several years ago and the licensee was anticipating a radiation dose of less than 100 person-rem. This would be the first B&W unit to complete an RFO, for less than 100 person-rem. For the RFO the licensee conducted a crud burst that was effective in reducing radiation exposure dose rates in plant systems.

Based on those discussions and review of various records, the inspector noted that the ALARA staff was adequately addressing ALARA initiatives for licensee outage and non-outage activities.

No violations or deviations were identified in this area.

8. Exit Meeting

On November 17, 1995, an exit meeting was held with those licensee representatives denoted in Paragraph 1 of this report. The inspector summarized the scope and findings of the inspection. At the time of the onsite inspection, the inspector informed licensee representatives of an apparent violation of NRC regulatory requirements. Upon further NRC review it was determined that the issue did not constitute a violation of NRC regulatory requirements as discussed in Paragraph 6.b. The licensee did not indicate any of the information provided to the inspector during the onsite inspection as proprietary in nature and no dissenting comments were received from the licensee.

9. Index of Abbreviations Used in this Report

ALARA	As Low As Reasonably Achievable
BBA	Body Burden Analysis
CFR	Code of Federal Regulations
DAD	Digital Alarming Dosimeter
EDC	Electronic Dose Capture
HRA	High Radiation Area
IR	Inspection Report
mrem	Milli-Roentgen Equivalent Man
NRC	Nuclear Regulatory Commission
PCE	Personal Contamination Events
PIP	Problem Investigation Process
RCA	Radiologically Controlled Area
RFO	Re-Fueling Outage
RP	Radiation Protection
RPS	Radiation Protection Specialist
RWP	Radiation Work Permit
SDE	Shallow Dose Equivalent
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent Dosimeter
Unit 1	U1
Unit 3	U3