



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

JAN 23 1985

Report Nos.: 50-269/84-33, 50-270/84-30, and 50-287/84-34

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 1, 2, and 3

Inspection Conducted: November 26-30, 1984

Inspectors:	<u><i>R. H. Albright</i></u>	<u>1-9-85</u>
	R. H. Albright	Date Signed
	<u><i>William T. Cooper</i></u>	<u>1-9-85</u>
	W. T. Cooper	Date Signed
Approved by:	<u><i>G. R. Jenkins</i></u>	<u>1/9/85</u>
	G. R. Jenkins, Section Chief	Date Signed
	Division of Radiation Safety and Safeguards	

SUMMARY

Scope: This routine, unannounced inspection involved 78 inspector-hours on site in the areas of external exposure control and personal dosimetry, internal exposure control and assessment, and control of radioactive materials and contamination, surveys and monitoring.

Results: Two violations were identified. Unauthorized disposal of radioactive material (paragraph 6), and failure to post an airborne radioactivity area (paragraph 4).

## REPORT DETAILS

### 1. Licensee Employees Contacted

- \*M. S. Tuckman, Oconee Nuclear Station Manager
- \*T. Barr, Superintendent of Technical Services
- \*R. T. Bond, Compliance Engineer
- \*D. Davidson, Compliance Engineer
- \*C. L. Harlin, Health Physics Staff
- \*B. P. Cripe, Health Physics Staff
- \*B. Jones, Chemistry Staff
- \*O. L. Whit, Quality Assurance

Other licensee employees contacted included technicians and office personnel.

NRC Resident Inspector

J. Bryant, Senior Resident Inspector

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on November 30, 1984, with those persons indicated in paragraph 1 above. The violations for unauthorized disposal of radioactive material (paragraph 6) and failure to post an airborne radioactivity area (paragraph 5) were discussed with licensee management. Licensee management stated their position that the airborne radioactivity area was not required to be posted because exposure to noble gases is treated as external exposure in accordance with 10 CFR 20.

### 3. Licensee Action on Previous Enforcement Matters

(Closed) UNR (270/84-25-01) - This item was determined to be a violation and is discussed further in paragraph 5.

### 4. External Exposure Control and Personal Dosimetry (83724)

10 CFR 20.101(b)(3) requires the licensee to determine an individual's accumulated occupational dose to the whole body on an NRC Form 4 or equivalent record prior to permitting the individual to exceed the limits of 20.101(a). The inspector reviewed selected occupational exposure histories of individuals who exceeded the values in 10 CFR 20.101(a). The exposure histories were being completed and maintained as required by 10 CFR 20.102.

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

During tours of the plant, the inspector observed workers wearing appropriate personnel monitoring devices.

The inspector reviewed selected active RWPs for appropriateness of the radiation protection requirements based on work scope, location, and conditions.

20.401(a) requires each licensee to maintain records showing the radiation exposure of all individuals for whom personnel monitoring is required under 20.202 of the regulations. Such records shall be kept on Form NRC-5 or equivalent.

The inspector reviewed selected individual exposure records maintained by the licensee for personnel employed at the plant.

10 CFR 20.201 requires licensees to make surveys as may be necessary to comply with the regulations in 10 CFR 20 and which are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. A survey is defined as an evaluation of the radiation hazards.

The inspector reviewed a licensee report of possible overexposure for personnel working in the secondary side of the steam generator when their extremity pocket dosimeters were found offscale. The work being performed involved adjusting an orifice plate in the secondary side of the 1A steam generator. Extremity and whole body doses were monitored by TLD and pocket dosimeters located on the hands, upper arm and chest.

The highest extremity exposure for the four workers involved was 10.829 rem. The quarterly extremity exposure limit is 18.75 rems. The highest whole body dose received was 1.080 rems. The quarterly whole body exposure limit is 3.0 rems. The preplanning work package for this job indicated that the highest dose rate would be from the steam generator tubes and gave the highest previous dose rate as 17 R/hr. The vendor health physics technician who did the survey for the job read the preplanning work package; however, when he made the initial survey, he surveyed only the handhole area and found up to 3.3 R/hr.

About halfway through the job, this technician read the pocket dosimeters located at the extremity and chest for the workers and found approximately 150 mrem at the chest and 1 rem for the right hand. Near the end of the work, a second vendor health physics technician took over the surveillance and discovered the steam generator tubes were reading 21 R/hr. He checked the wrist and upper arm dosimetry for the individual doing most of the work. At the end of the work, the right hand dosimetry for three personnel was offscale. No actual overexposures occurred. The licensee investigation determined the apparent cause of the incident as 1) inadequate radiation surveys, 2) inadequate determination of which portion of the body was receiving the highest exposure, and 3) inadequate monitoring of pocket dosimeters at the extremities, upper arm, and chest during the work. The licensee restricted the workers from the restricted area until their exposures were determined. The health physics technicians involved received

disciplinary action and the incident was reviewed with the HP staff. The investigation report was also being routed to the HP staff for review and this incident will be included in the preplanning work package for future work on the secondary side of the steam generator.

The licensee had preplanned the work and had established adequate measures for exposure control. Personnel errors resulted in an inadequate evaluation for the work. The inspector stated that this is a violation of 10 CFR 20.201. However, since the violation meets the criteria of 10 CFR 2, Appendix C for a licensee identified violation, no enforcement action will be taken.

10 CFR 20.203 specifies the posting, labeling and control requirements for radiation areas, high radiation areas, airborne radioactivity areas and radioactive material. 10 CFR 20.203(d) requires that each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: "Caution - Airborne Radioactivity Area". Airborne radioactivity area is defined as any room, enclosure, or operating area in which airborne radioactive materials composed wholly or partly of licensed material exists in concentrations in excess of the amounts specified in Appendix B, Table I, Column I of 10 CFR 20, or when, in any of the areas listed above, airborne radioactive material when averaged over the number of hours in any week during which the individuals are in the area, exceeds 25 percent of the amounts specified in Appendix B, Table I, Column I of 10 CFR 20.

During tours of the plant, the inspector reviewed the licensee's posting and control of radiation areas, high radiation areas, airborne radioactivity areas, contamination areas, radioactive material areas and the labeling of radioactive material.

10 CFR 19.11 requires that each licensee post current copies of 10 CFR 19 and 10 CFR 20 or if posting of the documents is not practicable, the licensee may post a notice which describes the document and states where it may be examined. 10 CFR 19.11 further requires that copies of any Notice of Violation involving radiological working conditions be conspicuously posted within two working days after receipt of the documents from the Commission. The inspector observed the posting of notices required by 10 CFR 19.11 during tours of the plant.

The inspector reviewed the licensee's program for handling and leak testing sealed sources containing byproduct, source and special nuclear materials as required by Technical Specification (TS) 4.16.1. The inspector examined survey records for 11 sealed sources for 1982, 1983 and 1984. The inspector also reviewed the licensee's "Health Physics Source Handling Procedure" which implements TS 4.16.1 requirements. Two separate records are currently maintained to demonstrate compliance with the TS requirements. Record number 1 is a log book which indicates the sealed source number, the date of the surveillance and the smear survey activity for all sources requiring surveillance. Record number 2 is Enclosure 5.1 to procedure number HP/O/B/1C05/01 Health Physics Source Handling procedure which documents the

source location, the leak test date, inventory date and the initials of the employee performing the surveillance. The use of multiple records for the same surveillance resulted in one record not being completed for the leak test of one source (#ONS-144). However, the second record showed that the source leak test had been performed within the required time frame. A licensee representative stated that the two separate records would be combined to make one record.

5. Internal Exposure Control (83725)

10 CFR 20.103(a) establishes the limits for exposure of individuals to concentrations of radioactive materials in air in restricted areas. This section also requires that suitable measurements of concentrations of radioactive materials 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 selected results of general in-plant air samples taken during the period June - August 1984 and the results of air samples taken to support work authorized by specific radiation work permits.

The inspector reviewed selected results of bioassays (whole body counts) and the licensee's assessment of individual intakes of radioactive material performed during the period June - November 1984.

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 an individual within seven consecutive days as far below 40 MPC-hours as is reasonably achievable. By review of records, observations and discussions with licensee representatives, the inspector evaluated the licensee's respiratory protection program, including medical qualifications, MPC-hour controls and quality of breathing air.

The inspector reviewed the analysis data for breathing air quality. A cross contamination analysis is performed on the system on a quarterly frequency and the air meets grade D breathing air requirements.

Health Physics procedure HP/O/B/1000/81 requires that only instrument air be used for diving operations as the breathing air system does not supply the necessary air pressure. The inspector reviewed analysis data for the instrument air system and found that the air met grade D quality specifications. However, the licensee did not perform a radionuclide contamination check on the instrument air. The inspector stated that the licensee should implement a radionuclide test program for the instrument air system when used for diving operations. The licensee stated that a procedure change will specify sampling the instrument air for radionuclide cross contamination.

10 CFR 20.103(a)(3) requires that for the purposes of determining compliance with the requirements the licensee shall use suitable measurements of concentrations of radioactive material in air for detecting and evaluating airborne radioactivity in restricted areas and in addition, as appropriate, shall 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 of radioactivity by exposed individuals. 10 CFR 20.103(b)(2) requires that whenever the intake of radioactive material by an individual exceeds 40 MPC-hours in a seven day period, the licensee shall make such evaluations and take such actions as may be necessary to assure against recurrence. The licensee shall maintain records of such occurrences, evaluations, and actions taken in a clear and readily identifiable form suitable for summary review and evaluation.

A review and discussion with licensee representatives of the body burden analysis program indicated that the program was not established to ensure that body burden analyses are reviewed to determine if personnel have exceeded 40 MPC-hours in a seven day period. The inspector determined that there were investigation points which would cause internal dose evaluations; however, these investigation points for certain radionuclides would be reached after the individual had been exposed to significantly greater than 40 MPC-hours in a seven day period. At the established investigation points an MPC-hour calculation was not required by the licensee program. The inspector reviewed selected body burden analyses for the period June - November 1984 and found no indications that personnel had been exposed to greater than 40 MPC-hours in a seven day period. The calculation of MPC-hours for individuals who have body burdens which could be the result of greater than 40 MPC-hours in a seven day period is required so that the required investigation and corrective action can be identified and documented. Licensee management acknowledged the need for the program to be changed. The inspector stated that this is an inspector followup item and will be reviewed during the next inspection (269/84-31-01, 270/84-30-01, 287/84-34-01).

During the review of the licensee's radiological survey data, the inspector noted the presence of low levels of alpha radiation on some equipment used during refueling operations. Licensee representatives stated that the equipment was used in all three units during refueling and that the contamination possibly occurred in Unit 3, which did have fuel leakage when the equipment was used. The inspector questioned licensee representatives about the counting equipment used for alpha detection and the equipment's ability to detect the low levels of alpha radiation on air samples necessary to insure that the alpha radiation did not pose an internal exposure hazard to employees. Alpha measurement problems are discussed in Inspection Report No. 50-269/84-30, 50-270/84-29 and 50-287/84-32. Licensee representatives stated that alpha contamination was low in comparison to beta-gamma contamination and that personnel protection from the beta-gamma contaminants has been adequate to protect from the alpha contaminants. The inspector stated that alpha contamination may increase due to the fuel leakage and

changes to the air sampling program could be necessary to accommodate sensitivity problems with laboratory counting equipment.

10 CFR 20.203 specifies the posting, labeling and control requirements for radiation areas, high radiation areas, airborne radioactivity areas and radioactive material. 10 CFR 20.203(d) requires that each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: "Caution - Airborne Radioactivity Area". Airborne radioactivity area is defined as any room, enclosure, or operating area in which airborne radioactive materials composed wholly or partly of licensed material exists in concentrations in excess of the amounts specified in Appendix B, Table I, Column I of 10 CFR 20, or when, in any of the areas listed above, airborne radioactive material when averaged over the number of hours in any week during which the individuals are in the area, exceeds 25 percent of the amounts specified, in Appendix B, Table I, Column I of 10 CFR 20.

NRC Region II Report Nos. 50-269/84-26, 50-270/84-25, and 50-287/84-28 discussed an unresolved item, UNR 50-270/84-25-01, concerning the failure to post an airborne radioactivity area. On October 1, 1984, the resident inspector was cautioned that the area outside the Unit 2 waste gas decay tank room contained airborne noble gas. The area was not posted as an airborne radioactivity area. The licensee measured noble gas concentration of Xe-133 at 2.7 times its concentration listed in 10 CFR 20 Appendix B and Xe-135 at 4.6 times its concentration listed in 10 CFR 20 Appendix B. The inspector discussed the failure to properly post the area as an airborne radioactivity area with licensee representatives. The licensee did not agree that the area had to be posted as an airborne radioactivity area since the xenon is inert and the gas is not an internal hazard. 10 CFR 20 allows the licensee to account for exposures to noble gases as part of the quarterly external exposure limits of 10 CFR 20.101. The inspector stated that the method by which the licensee chooses to account for exposure to the noble gas, as described in 10 CFR 20.103(a)(1), does not allow for exemption from the requirement to post airborne radioactive areas as stated in 10 CFR 20.203(d). The failure to post the areas containing the xenon gas in concentrations above those which require posting as an airborne radioactivity area is a violation of 10 CFR 20.203(d) (270/84-30-02).

#### 6. Surveys, Monitoring, and Control of Radioactive Material (83726)

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 and (2) are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

The inspector reviewed procedure HP/O/B/1000/54 which established the licensee's radiological survey and monitoring program and verified that the procedures were consistent with regulations and good health physics practices.

Procedure HP/O/B/1000/54 outlines the base schedule and frequency for the radiological survey and monitoring program.

The inspector reviewed selected records of radiation and contamination surveys performed during September and October 1984 and discussed the survey results with licensee representatives.

During tours of the plant the inspector observed the health physics technicians performing radiation and contamination surveys.

The inspector performed independent radiation surveys in the auxiliary building and in the restricted area outside the auxiliary building and verified that the areas were properly posted.

The inspector discussed with the licensee the method used to release material from the restricted area and observed technicians performing release surveys for material.

10 CFR 20.301 forbids a licensee to dispose of licensed material as waste except 1) by transfer to an authorized recipient as provided in the regulations in Parts 30, 40, 60, 61, 70, or 72 of this chapter, whichever may be applicable, or 2) as authorized pursuant to 10 CFR 20.302 or 10 CFR 61, or 3) as provided in 10 CFR 20.303, applicable to the disposal of licensed material by release into sewage systems, or in 10 CFR 20.306 for disposal of specific wastes, or in 10 CFR 20.106 (radioactivity in effluents to unrestricted areas).

The inspector reviewed a licensee investigation for the disposal of approximately 13.5 microcuries of Cs-137 and 1.18 microcuries of Cr-51 in 18,635 gallons of waste oil during the period September 1981 to June 1984. The waste oil was shipped to a fossil fueled plant to be burned. Environmental surveys around the fossil fueled power plant subsequent to the burning did not indicate high radioactivity levels. Duke Power Company internal correspondence dated March 25, 1981, indicated that waste oil from oil sources on the primary side could be handled differently than oil sources from the secondary plant. The correspondence indicates that it was understood by Duke Power Company that there were no exempt concentrations of licensed material when it originated from contaminated systems on the primary side. However, they determined that oil from the secondary system, principally turbine oil, would not normally be considered contaminated and after a survey if less than exempt quantities per 10 CFR 30.18 were measured the oil could be disposed of by burning without additional regulatory agency approval.

The inspector reviewed the licensee's response to IE Information Notice No. 83-05. The IE Information Notice stated that a license application had to be initiated for any method of disposing of radioactive material which was not described in the regulations. Their response to the general office (GO) did not question the disposal of contaminated waste oil which was being shipped to the fossil fuel steam plant for burning. The problem was first realized by GO personnel who read a letter from NRC Region II dated



March 20, 1984, to the McGuire plant where the allowed use of the exempt quantity as defined by 10 CFR 30.18 was explained. Shortly after the last shipment of contaminated oil was made, GO personnel realized that the NRC interpretation of 10 CFR 30.18 would not allow it to be used for disposal purposes. The plant was notified by the GO not to ship contaminated oil on July 25, 1984. Near the end of September 1984, the NRC Region II was notified that the licensee had disposed of radioactive material in the oil. The inspector stated that the unauthorized disposal of licensed radioactive material was a violation of 10 CFR 20.301 (269/84-31-02, 270/84-30-03, and 287/84-34-02).

7. ALARA Program (83728)

10 CFR 20.1c states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposure as low as reasonably achievable (ALARA). The recommended elements of an ALARA program are 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.

The inspector determined the ALARA goals and objectives for the current year from licensee representatives and reviewed the man-rem estimates and results for the current year.

As of November 30, 1984, the actual collective exposure for calendar year 1984 was 1056 man-rem which represented approximately 90 percent of the estimated exposure for the year.

No violations or deviations were identified.

8. Information Notices (93717)

The inspector reviewed licensee responses to the following Information Notices:

- 84-24 Physical Qualification of Individuals to Use Respiratory Protective Devices
- 84-34 Respirator Users Warning: Defective Self-Contained Breathing Apparatus Air Cylinders
- 84-40 Emergency Worker Doses
- 84-61 Overexposures of Diver in Pressurized Water Reactor (PWR) Refueling Cavity
- 84-59 Deliberate Circumventing of Station Health Physics Procedures
- 84-60 Failure of Air Purifying Respirator Filters to Meet Efficiency Requirement

84-75 Calibration Problems - Eberline Instrument Model 6112B Analog Teletectors

From the review and discussions with licensee personnel, the inspector determined that appropriate evaluations of these IE Information Notices had been made. The inspector had no further questions.