



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
230 PEACHTREE STREET, N.W. SUITE 1217  
ATLANTA, GEORGIA 30303

Report No.: 50-269/77-8, 50-270/77-8 and 50-287/77-8

Docket Nos.: 50-269, 50-270 and 50-287

License Nos.: DPR-38, DPR-47 and DPR-55

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

Facility Name: Oconee Nuclear Station

Inspection at: Oconee Site, Seneca, South Carolina

Inspection conducted: May 26, 1977; May 31 - June 3, 1977

Inspectors: A. D. Kowalczyk  
S. C. Ewald  
W. J. Millsap

Reviewed by: A. F. Gibson 7/18/77  
A. F. Gibson, Chief Date  
Radiation Support Section  
Fuel Facility and Materials Safety Branch

Inspection Summary

Inspection on May 26, 1977; May 31 - June 3, 1977 (Report Nos. 50-269/77-8, 50-270/77-8 and 50-287/77-8)

Areas Inspected: Routine, unannounced, operational inspection of the radioactive waste systems including radioactive effluent releases, records and reports, procedures for testing and testing of air cleaning systems, review of unresolved item 77-1/1 and review of Immediate Action Letter (2/1/77) commitments. The inspection involved 81 inspector-hours on site by three inspectors. A management meeting was held May 26, 1977.  
Results: No items of noncompliance or deviations were disclosed. Three unresolved items involving air cleaning system tests, airborne effluent calculations, and effluent procedures were identified.

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DETAILS I

Prepared by:

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7/6/77  
Date

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Dates of Inspection: May 26, 1977; May 31 - June 3, 1977

Reviewed by:

*A. F. Gibson*  
A. F. Gibson, Chief  
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Fuel Facility and Materials Safety Branch

7/8/77  
Date

1. Persons Contacted

J. E. Smith, Manager, Oconee Nuclear Station  
R. M. Koehler, Superintendent of Technical Services  
R. T. Bond, Technical Services Engineer  
C. T. Yongue, Health Physics Supervisor  
T. S. Barr, Technical Services Engineer  
Various members of the plant support staff.

2. Licensee Action on Previous Inspection Findings

a. Sampling Radioactive Materials in Gases (Unresolved Item 77-1/2)

- (1) The inspector reviewed charcoal cartridge collection efficiency test data versus flowrate developed by the licensee. The licensee was unable to supply "minimum detectable activity" data to support the test conclusions at the time of the inspection. The inspector stated that collection efficiencies vary with the chemical composition of the radioiodine collected and that separate test data appeared necessary for various release locations such as the reactor building purge, the unit vent and the gas decay tanks.
- (2) Licensee representatives stated that sampling techniques for in-plant monitoring and effluent monitoring on the interim waste building are in the process of being changed to use charcoal cartridges with flowrate corrected collec-

tion efficiencies as opposed to using charcoal loaded filter papers. At the time of the inspection charcoal loaded filter papers were being used for radioiodine sampling on reactor building purges and gas decay tank releases due to radioxenon interference during laboratory analysis. Licensee representatives stated that alternative collection media are being investigated to reduce interference. The inspector stated that continued use of the filter paper is unacceptable in the interim.

- (3) Licensee representatives stated that right angle bends preceding particulate sampling media on unit vents 1 and 3 had been replaced with smooth bends and that modification of the unit 2 sampling line was in progress.
- (4) Discussions with licensee representatives indicated that particulate radioiodine is being included in effluent quantities.
- (5) The inspector emphasized the need to correct records to reflect actual releases or conditions if licensee evaluations of sampling, analysis, and accountability practices indicate that releases or exposure concentrations have been significantly underestimated.
- (6) Licensee representatives stated that work is proceeding to evaluate this item. This item remains open.

b. Enforcement Items A.3 and A.5, IE Report Nos. 50-269, -270 and -287/77-1

The inspector reviewed procedure HP/O/B/1000/62/Q titled, "Environmental Surveillance Following a Primary to Secondary Leak". The procedure appeared to satisfy the requirements of Technical Specifications 6.4.1 and 3.9.5.

c. Enforcement Items A.2 and A.4, IE Report Nos. 50-269, -270 and -287/77-1

The inspector reviewed corrective actions stated in a Duke Power Company letter dated April 20, 1977 to OIE, USNRC and the procedure mentioned in paragraph 2.b of these details. The corrective actions appear satisfactory to minimize the probability of recurrence of noncompliance with Technical Specifications 3.9.3 and 3.9.4 due to a similar occurrence.

3. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations.

a. Item 77-8/1, Updating of Radioactive Effluent Procedures

The inspectors reviewed more than eight radioactive effluent procedures. The procedures frequently reflected practices that had been revised or determined to be inadequate. Technical Specification 6.4.1 requires that detailed written procedures related to radioactive effluents be established and followed. Examples of such items follow.

- (1) HP/O/B/1000/60 does not specify the minimum sensitivity of analyses, required by Technical Specification Table 4.1-3, for radioactive effluent analyses. The inspector commented that the licensee had experienced several noncompliance items related to analytical sensitivities.
- (2) Quarterly averages calculated for liquid waste release data required by Technical Specification 6.6.1.2.c are incorrectly calculated. See paragraph 4 of these details for additional discussion.
- (3) Procedures HP/O/B/1000/60 and HP/O/B/1000/60/C permit release of liquid radioactive effluent from the low activity waste tank; whereas, a Duke Power Company letter dated April 20, 1977 to OIE, USNRC states that releases from this tank have been terminated and releases from isolatable tanks are now used.
- (4) Tables 4.1 and 4.2 of procedure HP/O/B/1000/60 do not specify analyses on effluent gases and liquids that are required by Technical Specification Table 4.1-3.
- (5) Procedures HP/O/13/1000/60/ A and B specify the use of charcoal loaded filter papers for radioiodine sampling; this method is unsatisfactory as discussed in paragraph 2.a of these details.
- (6) Enclosure 3 to procedures HP/O/B/1000/50 A and B specify listing of radionuclides with a half-life less than eight days; whereas, Technical Specification 3.10 requires listing those with half-lives greater than eight days.

- (7) Procedure HP/O/B/1000/60, Table 4.1 requires an analysis for tritium on particulate samples. Discussions with licensee representatives revealed that the analysis is not done and appears to be impractical.
- (8) Procedure HP/O/B/1000/60/C does not reflect a tritium analysis required by Technical Specification 3.8.
- (9) Procedure HP/O/B/1000/60/C prescribes a 10 minute counting time for alpha analysis. A count of this length does not meet the minimum sensitivity requirements of Technical Specification 3.9. One hundred minute counts were used in actual practice.
- (10) The inspector discussed the location of flowrate instrumentation in sampling trains used on the reactor building purges and gas decay tanks with licensee representatives. Instruments calibrated for atmospheric pressure and used in low pressure areas such as between a filter and pump suction can be in error if corrections are established. Procedures HP/O/B/1000/60/A and B do not appear to consider such a condition.

b. Item 77-8/2, Air Cleaning System Tests

The inspector examined the following filter systems for compliance with technical specification requirements on in-place leak testing of HEPA filter banks and charcoal adsorbers: Hydrogen Purge System, Penetration Room Ventilation Systems, Control Room Filtering Systems, and the Reactor Building Purge Filters. The first three of these systems appeared to perform adequately during tests completed in January, 1976; however, the Reactor Building Purge Filters for all three units failed several tests performed in January, August and October of 1976 for both HEPA filter and adsorber gross efficiency. The technical Specifications require 99% removal of DOP by the HEPA filter system and 99% removal of halogenated hydrocarbon by the charcoal adsorber system; however, the test data showed a DOP removal efficiency of 96.0% to 98.0% and a halogenated hydrocarbon removal efficiency of 95.9% to 97.5%. The apparent cause of these system failures was a by-pass built into the system; the licensee corrected this problem in all three systems January, 1977 by welding the by-passes shut. However, these filter systems have not been tested since they were modified. The inspector stated that the Unit 2 system should be tested as soon as possible since refueling is presently in progress and the Unit 1 and 2 spent fuel pool ventilation system ties

into the Unit 2 Reactor Building Purge Filter System. A licensee representative stated that attempts were being made to have the tests performed within two weeks. Tests on the Unit 1 and 3 systems are presently scheduled within the time frame allowed by technical specifications.

The inspector examined the records relating to the leak testing of the Gaseous Waste Disposal Filter Systems. Although the licensee is taking credit for a given removal efficiency in radioactive effluent release calculations, the systems have not been leak tested since October, 1973. The inspector stated that if credit is to be taken the systems' performance must be demonstrated. A licensee representative stated that the systems would be tested as soon as possible.

c. Item 77-8/3, Airborne Effluent Calculations

Discussions with licensee representatives revealed that particulate radioactivity released from gas decay tanks and reactor building purges is reduced to 0.06% of the measured value and iodine radioactivity from the same sources is reduced to 0.9% of the measured value to account for radioactivity removal by high efficiency particulate filters and charcoal adsorbers.

The inspectors determined from test data (see Unresolved Item 77-8/2) that air cleanup system leakage on the reactor building purge systems were as follows.

	<u>Percent Leakage</u>		
Unit	<u>1</u>	<u>2</u>	<u>3</u>
HEPA	2	4	2
Charcoal	2.5	4.1	3

Management representatives stated that air cleanup equipment in the waste gas disposal system for waste gas decay tank releases had not been tested for efficiency or leakage since 1973 and that filter and adsorbers in the system had not been replaced since 1973. The inspector stated that credit for radioactivity removal would not be allowed for equipment without data demonstrating current performance.

The effect of these conditions is to increase calculated releases from reactor building purges by the factor "actual % leakage" divided by 0.06% for particulates (a factor of 6.7 for Unit 2) and by the factor "actual % leakage" divided by

0.9% for radioiodines (a factor of 4.6 for Unit 2). The effect on gas decay tank releases is unknown and can only be determined by testing of the waste gas disposal air cleanup system in its current operating condition. Management representatives agreed to consider such tests.

In addition to the effect of filter bypass leakage, the inadequacies in radioiodine sampling described in Unresolved Item 77-1/2 appear, based on analytical results reviewed by the inspector, to increase radioiodine concentrations by a factor of 5 to 10 or greater over the values calculated for reactor building purge and gas decay tank releases using the licensee's current methods. Errors due to air cleanup system bypass and sampling are multiplicative.

Licensee representatives appeared to be unaware of these effects and their consequences in relation to the evaluation of airborne radioactive effluents. Fortunately, reactor building purges and gas decay tanks are released by way of the unit vents which have additional particulate and iodine sampling capability. A review of the unit vent effluent accountability techniques including estimates of potential errors based on typical release concentrations, rates and times by the inspectors indicated that particulate and radioiodine releases would be underestimated by about 5 to 20 percent due to inadequacies in the licensee's program. The error is primarily due to disproportionate sampling of the radioactivity released from the unit vent. Further, the practices in use cause an underestimation of radioactivity released from reactor building purges with a concurrent overestimation of activity released from the auxiliary building.

Management representatives agreed to review and evaluate the accountability techniques for airborne effluents and to correct inadequacies identified as a result of the evaluation. The inspector stated that report data required by Technical Specification 6.6.1.2.c must be corrected to reflect any significant changes in radioactive effluent release data.

#### 4. Liquid Waste Releases

An inspector reviewed liquid waste summary reports for the period January 1976 thru March 1977 and records relating to individual liquid waste releases for the first quarter of 1977. The review included analysis of summary reports relative to Technical Specifications and verification of summary report accuracy. The review of individual liquid waste releases included: (1) checking the calcu-

lations relative to 10 such releases for systematic errors; (2) discussion with plant staff relative to counting sensitivity, data analysis, detector geometry and calibration; and (3) review of the gamma spectrum analysis program used to perform isotopic analysis.

The inspector noted that the quarterly average concentration values are determined by calculating a straight average of monthly average concentrations. The quarterly average concentrations are averaged to yield semi-annual values and these are subsequently averaged to determine yearly averages. This technique can overestimate or underestimate the actual average concentration for these periods. Licensee representatives acknowledged the inspectors comments and stated the averaging calculations would be reviewed. The inspector requested a listing of the computer program used to accumulate release data and prepare summary reports. A licensee representative agreed to supply the listing. The inspector had no other questions.

5. Monitoring of Normally Uncontaminated Liquid Systems

A station directive dated November 19, 1975 details the specifications for a contamination detection and monitoring program directed at normally non-radioactive liquid systems. Plant operating experience to date (ref. IE Report Nos. 50-270/75-14, 50-269/77-1, 50-269/77-7) demonstrates the necessity of such a program. An inspector reviewed the results of weekly samples from the Yard<sub>6</sub> Drains and determined the analytical sensitivity to be  $4 \times 10^{-6}$   $\mu\text{Ci/ml}$  gross  $\beta$  activity. Concentrations of  $5 \times 10^{-5}$   $\mu\text{Ci/ml}$  occur frequently. The directive referenced above specifies a sensitivity of  $1 \times 10^{-7}$   $\mu\text{Ci/ml}$  as well as  $\gamma$ -isotopic, tritium, alpha, strontium, halogens, and barium-lanthanum analyses should activities exceed this level. The inspector stated that current sampling and analysis practice does not conform with the station directive. A licensee representative stated that procedures would be written to incorporate the specifications detailed in the directive and the monitoring program would be upgraded to conform with these specifications.

6. Collection of Sediment Samples

A licensee representative accompanied by the inspector collected, on the morning of 3 June 1977, five sediment samples to be analyzed by the Commission. The samples were collected from the upper settling basin, the lower settling basin, the oil pond, the creek discharge from the oil pond and from the discharge of the hydroelectric station.



7. Radioactive Effluent Design Objectives

The inspectors noted that design objectives for liquid effluents had been exceeded during the first quarter of 1976 and the first quarter of 1977. Also, design objectives for airborne effluents were exceeded by greater than a factor of two during the fourth quarter of 1976. The inspectors noted that the presence of radionuclides with half-lives of a fraction of an hour to a few hours in liquid effluents could be inconsistent with the time span required to process radioactive wastes through the installed systems.

8. Radiation Protection

- a. The inspector examined the radiological control measures in effect to protect divers working in the Units 1 and 2 spent fuel pool. By discussion with a licensee representative and the diving supervisor and an examination of the radiation work permit, the inspector determined that adequate control measures appeared to be in place. An examination of the licensee's records of five dives made on May 31 and June 1, 1977 showed that the doses to the divers ranged from 5 mrem to 28 mrem depending on the location and duration of the dive. Surveys made prior to the dives on May 31 and June 1, 1977 showed beta-gamma dose rates of 20 to 40 mrem/hr in the work areas; a water analysis completed on May 31, 1977 showed no unacceptably high concentrations of radioactive materials. The inspector had no further questions on this matter.
- b. An inspector reviewed the Statistical Report of Recorded Personnel Whole Body Exposures for Calendar Year 1976. The report appeared consistent with the requirements of 10 CFR 20.407(b). The inspector noted that the number of individuals with measurable exposure increased by greater than 40% from 1975 to 1976 and that the number of individuals with exposures between 1 and 5 rem increased from 166 in 1975 to 378 in 1976.

9. Management Meeting

At the licensee's request, a meeting was held in the Office of Inspection and Enforcement offices in Bethesda, Maryland on May 26, 1977 to discuss pending civil penalty action. Personnel attending the meeting included:

Duke Power Company

C. Horn, Chief Executive Officer and Chairman of the Board of Directors  
A. Theis, Senior Vice President Production and Transmission  
W. Parker, Vice President Steam Production  
H. Tucker, Manager of Nuclear Production  
K. Canady, Manager Project Coordination and Licensing  
E. Smith, Manager Oconee Nuclear Station  
R. Koehler, Superintendent of Technical Services - ONS  
L. Porter, Legal Counsel  
G. McGary, Attorney at Law

Nuclear Regulatory Commission

E. Volgenau, Director, OIE  
N. Moseley, Director, Region II  
J. Sniezek, Chief, Light Water Reactor Programs Branch, IE:HQ  
A. Gibson, Chief, Radiation Support Section, Region II  
C. Alderson, Reactor Inspector, Region II  
A. Kowalczyk, Radiation Specialist, Region II  
J. Metzger, Enforcement Specialist, IE:HQ  
J. Murray, Director and Chief Counsel Rulemaking and Enforcement, OELD  
D. Neighbors, Project Manager, Operating Reactors, NRR  
L. Barrett, Section Leader, Environmental Evaluation Branch, NRR

Licensee management stated their concern and disagreement with the language of the IE:HQ letter to them dated March 29, 1977, which transmitted the Notice of Proposed Imposition of Civil Penalty. The licensee then cited several specific achievements of DPC as being indicative of proper management, an attitude of public service, and concern for the health and safety of the public and their employees. The licensee then reiterated the positions stated in their letter of April 20, 1977, in response to the Notice of Proposed Imposition of Civil Penalty and the associated items of noncompliance.

The licensee also made a short presentation concerning the events leading to an unplanned release of radioactivity from the Oconee Station on May 11, 1977 (Ref. IE Report 50-269/77-7). The discussion also included steps taken by the licensee to prevent recurrence. The Director of OIE expressed concern that while this most recent unplanned release did not exceed any limits, it was similar to the January 1977 release indicating that further corrective action by the licensee was required. The Director further stated that the licensee's comments during the meeting and their letter dated April 20, 1977, would be considered in arriving at a decision on the civil penalty action.

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10. On June 3, 1977 an exit interview was conducted with Mr. J. E. Smith and members of his staff to discuss the inspection findings.