



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

AUG 26 1994

Report Nos.: 50-269/94-23, 50-270/94-23, and 50-287/94-23

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,  
DPR-55

Facility Name: Oconee 1, 2, and 3

Inspection Conducted: August 1-5, 1994

Inspector: D. W. Jones  
D. W. Jones

8/22/94  
Date Signed

Accompanied by: D. A. Kasnicki

Approved by: T. R. Decker  
T. R. Decker, Chief  
Radiological Effluents and Chemistry Section  
Radiological Protection and Emergency Preparedness Branch  
Division of Radiation Safety and Safeguards

8/22/94  
Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of primary and secondary water chemistry, radioactive effluent releases, and followup on previously identified issues.

Results:

No violations or deviations were identified.

The licensee had complied with the requirements for reactor coolant chemistry but four possible fuel cladding failures during the past six months caused increased activity levels in the Unit 3 reactor coolant (Paragraph 2).

The licensee had implemented an effective program to control liquid radioactive effluents. The projected offsite doses resulting from those effluents were well within the limits specified in the Technical Specifications (TSs) (Paragraph 3).

Two Inspector Followup Items (IFIs) and one Unresolved Item (URI) were closed (Paragraph 4).

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- †M. Bailey, Licensing Coordinator, Regulatory Compliance
- \*S. Benesole, Manager, Regulatory Compliance
- \*D. Berkshire, Senior Scientist, Radiation Protection
- †\*W. Elliott, Senior Scientist, Chemistry.
- \*G. Hamrick, Manager, Chemistry
- E. Lampe, Scientist, Radiation Protection
- C. McIlwain, Senior Scientist, Chemistry
- \*D. Nix, Licensing Coordinator, Regulatory Compliance
- †\*B. Peele, Station Manager
- R. Smith, Scientist, Chemistry
- \*T. Smith, Supervisor, Radiation Protection
- S. Spear, General Supervisor, Radiation Protection
- †E. Wehrman, Scientist, Radiation Protection
- R. Wright, General Supervisor, Chemistry
- C. Yongue, Manager, Radiation Protection

Other licensee employees contacted included engineers, technicians, and office personnel.

#### Nuclear Regulatory Commission

- P. Harmon, Senior Resident Inspector
- L. Keller, Resident Inspector
- \*K. Poertner, Resident Inspector

†Attended entrance interview.

\*Attended exit interview.

### 2. Primary and Secondary Water Chemistry (84750)

Technical Specifications (TSs) 3.14, 3.15 and 4.1.3 described the operational and surveillance requirements for reactor coolant activity and chemistry. Reactor coolant total activity, due to radionuclides with half-lives longer than 30 minutes, was required to be maintained less than 224/E-bar microcuries per milliliter ( $\mu\text{Ci/ml}$ ). Maximum concentration limits and sampling frequencies were specified for dissolved oxygen, chloride, and fluoride. Sections 5.2.1.7 and 9.3.1.2 of the Final Safety Analysis Report (FSAR) indicated that guidelines for maintaining reactor coolant and feedwater quality were derived from vendor recommendations and the current revisions of the Electric Power Research Institute (EPRI) PWR Primary and Secondary Water Chemistry Guidelines. Those sections of the FSAR also indicated that detailed operating specifications for the chemistry of those systems were addressed in the Chemistry Section Manual.

The inspector reviewed Section 3.10 of the Oconee Nuclear Station Chemistry Manual and determined that it included provisions for sampling and analyzing reactor coolant for the TS required parameters at the specified frequencies. Sections 3.8 and 3.10 of the manual also included provisions for implementing, with a few minor exceptions, the EPRI guidelines for PWR primary and secondary water chemistry.

The inspector also reviewed records and/or trend plots of analytical results for the following parameters which were either required by TSs to be monitored or were recommended by EPRI guides to be monitored as control parameters during power operation: dissolved oxygen, chloride, fluoride, boron, dose equivalent iodine-131 (DEI), E-bar, gamma isotopic, tritium, strontium-89 and 90, gross beta activity, and gross alpha activity in reactor coolant; pH, hydrazine, sodium, chloride, silica, iron, sulfate, and conductivity in feedwater; and dissolved oxygen in condensate. The data reviewed were primarily generated during May and June 1994 for all three units. During steady state operations the dissolved oxygen concentrations were typically 2 ppb, chloride concentrations were typically 25 ppb, and fluoride concentrations were typically <15 ppb. These parameters were well below their respective TS limits of 100 ppb, 150 ppb, and 150 ppb. The total activity of the reactor coolant for all three units was also well within its TS limit of 224/E-bar. The other parameters selected for review were generally maintained within the EPRI guidelines.

The licensee's TSs did not include a limit for reactor coolant specific activity in terms of DEI but sections 3.10 and 3.11 of the Chemistry Manual specified sampling frequencies, administrative limits, and corrective action guidelines for coolant DEI. Trend plots indicated that the Unit 1 coolant DEI was typically  $<5 \text{ E-3 } \mu\text{Ci/ml}$  and the Unit 2 coolant DEI was typically  $<9 \text{ E-2 } \mu\text{Ci/ml}$  during May and June 1994. Trend plots of the Unit 3 coolant DEI indicated that there had been four possible fuel cladding failures during the period February 25 through August 4, 1994. The first possible failure occurred on or about April 2 when the DEI increased from  $<0.05 \mu\text{Ci/ml}$  to  $\sim 0.145 \mu\text{Ci/ml}$ . The second possible failure occurred on or about May 1 when the DEI increased from  $<0.10 \mu\text{Ci/ml}$  to  $\sim 0.22 \mu\text{Ci/ml}$ . The third possible failure occurred on or about June 25 when the DEI increased from  $<0.15 \mu\text{Ci/ml}$  to  $\sim 0.25 \mu\text{Ci/ml}$ . The fourth possible failure occurred on or about August 1 when the DEI increased from  $<0.30 \mu\text{Ci/ml}$  to  $\sim 0.54 \mu\text{Ci/ml}$ . As of the date of this inspection, the licensee was continuing to evaluate the fourth possible occurrence to determine whether there had been an increase in coolant activity as a result of a fuel cladding failure or whether the DEI analytical results were biased high due to a leak in the valve used to sample the coolant. Pursuant to the corrective action guidelines in section 3.11 of the Chemistry Manual for elevated values of DEI, on August 1 the licensee implemented abnormal operating procedure AP/3/A/1700/21 "High Activity in RC System." Section 3.0 of

Enclosure 6.1 to that procedure specified that if the activity was due to failed fuel and the DEI was  $\geq 0.5 \mu\text{Ci/ml}$ , then the power should be reduced by 10 percent at a rate of  $< 3$  percent per hour. The unit was returned to full power after the DEI decreased to  $< 0.25 \mu\text{Ci/ml}$ .

Based on the above reviews, it was concluded that the licensee had complied with the requirements for reactor coolant chemistry.

No violations or deviations were identified.

### 3. Radiological Effluents (84750)

TS 6.4.6 required the licensee to implement by operating procedures a program for the control of radioactive effluents as described in Chapter 16 of the FSAR. The program was required to include: surveillance testing and set-point determination for liquid and gaseous effluent monitoring instrumentation in accordance with the Offsite Dose Calculation Manual (ODCM); limitations on the concentrations of radioactive materials released in liquid effluents; monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with the ODCM; limitations on the annual and quarterly radiation doses from radioactive material in liquid and gaseous effluents; and limitations on the operability and use of liquid and gaseous effluent treatment systems to ensure that dose limits are not exceeded. Section 16.11-1 of the FSAR described the limitations for radionuclide concentrations and dose limits for liquid effluents. Section 16.11-4 of the FSAR described the sampling and analysis requirements for liquid and gaseous effluents.

The inspector reviewed the licensee's records for a batch of liquid radioactive waste released on July 27, 1994 (LWR No. 94-0329). Based on the measured radionuclide concentrations in that batch, the volume of liquid waste released, and the volume of water used to dilute the liquid waste, the inspectors determined that the diluted concentrations of the radioactive material released conformed to 10 times the concentrations specified in 10 CFR 20, Appendix B, Table 2, Column 2.

Each month the licensee calculates the organ and total body doses from the radioactive materials released in liquid effluents during the month, the current quarter, and year to date. The inspectors verified that the calculations of the total body dose from the radioactive material released during June 1994 were in accordance with the methodology and parameters in the ODCM.

Based on the above reviews, it was concluded that the licensee had implemented an effective program to control radioactive liquid effluents.

No violations or deviations were identified.

## 4. Followup on Previously Identified Issues (92701)

- a. (Closed) Inspector Followup Item (IFI) 93-27-01: Review of revised procedures for restoration of data bases in computers which control radiation monitoring systems. As described in NRC Inspection Reports (IRs) 50-269, 270, 287/93-10 and 93-14, the Unit 2 ventilation system radiation monitor was left inoperable because the operational instruction data base for the computer which controlled the radiation monitoring system was not fully restored following maintenance work on the monitoring system. Previously the data bases for the monitoring systems were restored by manual entries. During the inspection conducted on October 18-22, 1994 (reference NRC IRs 50-269, 270, 287/93-27), it was found that those data bases had been stored on computer diskettes in order to automate restoration of the data and to prevent personal errors by manual entries. The licensee indicated that their procedures for restoration of data bases in computers which control radiation monitoring systems would be revised to stipulate that data bases will be restored from diskettes rather than by manual entries and that the data bases must be verified to be correct before the monitoring system can be returned to service. During this inspection it was found that procedure IP/O/A/0140/002 "Data Base Loading and Verification of Sorrento Radiation Monitoring System" had been implemented. This item is closed.
- b. (Closed) Unresolved Item (URI) 94-13-01: Adequacy of the licensee's procedure with regard to provisions for making advance notifications of shipments of radioactive waste. During the inspection conducted on April 18-21, 1994 (reference NRC IRs 50-269, 270, 287/94-13) it was noted that Section 3.0 "Limits and Precautions" of the procedure for shipment of radioactive waste (HP/O/B/1006/01A) referenced the requirement in 10 CFR 71.97 for advance notification of shipments of radioactive waste, but Section 4.0 "Procedure" did not include provisions for making those notifications. The referenced requirement specified that, prior to the transport or delivery to a carrier for transport of licensed material outside the confines of the licensee's plant or other place of use or storage, each licensee shall provide advance notification to the governor of a State, or the governor's designee, of shipments to, through, or across the boundary of the state. Advanced notifications were required to be made in writing to the office of each appropriate governor or governor's designee and to the Regional Administrator of the appropriate NRC Regional Office when the quantity of licensed material exceeded specified activity levels. The licensee indicated that the requirement for advanced notifications had been interpreted as being applicable only to interstate shipments and not applicable to their shipments of waste within the State of South Carolina. The issue of whether the requirement for advance notification applies to intrastate shipments of radioactive waste was referred to the NRC Office of General Counsel (OGC) for interpretation. The adequacy of the licensee's procedure with regard to not having included provisions

for making advance notifications was deemed to be an unresolved item pending interpretation by OGC of the applicability of the requirement for advance notifications to intrastate shipments of radioactive waste. Subsequent to that inspection, on June 22, 1994, the OGC issued a legal interpretation that the requirement for advance notification applies to intrastate as well as interstate shipments of radioactive waste. During this inspection, the licensee provided for the inspector's review copies of the completed forms which were used to make advance notifications for two shipments made during September 1993. The licensee also input a test set of data into the "Radman" computer program used for preparing the required shipping papers for shipments of radioactive materials. The computer printout for that test clearly indicated that advance notification would be required for such a shipment. The licensee further indicated that the procedure for shipment of radioactive waste would be revised to provide specific instructions for making advance notifications when required. This item is closed.

- c. (Closed) IFI 94-13-02: Review of implementation of corrective actions for audit results. During the inspection conducted on April 18-21, 1994 (reference NRC IRs 50-269, 270, 287/94-13), a report for a recently completed audit of chemistry procedure use and adherence was reviewed. The proposed corrective actions for issues identified by that audit included revisions to procedures and additional training of personnel. During this inspection it was determined that Section 2.1 of the Station Chemistry Manual had been revised to more clearly describe the roles and responsibilities of the chemistry groups and teams. The inspector also reviewed records of additional training which emphasized procedure use and adherence, the proper methods of documenting in working procedures that unnecessary steps were not performed, sign-off of procedural steps as performed, control of temporary modifications, and proper use of the Problem Investigation Process (PIP). Based on the above reviews, this item is closed.

#### 5. Exit Interview

The inspection scope and results were summarized on August 4, 1994, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed above. No dissenting comments were received from the licensee. Proprietary information is not contained in this report.

<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
50-269, 270, 287/93-27-01	Closed	IFI - Review of revised procedures for restoration of data bases in computers which control radiation monitoring systems (Paragraph 4.a).

50-269, 270, 287/94-13-01

Closed

URI - Adequacy of the licensee's procedure with regard to provisions for making advance notifications of shipments of radioactive waste (Paragraph 4.b).

50-269, 270, 287/94-13-02

Closed

IFI - Review of implementation of corrective actions for audit results (Paragraph 4.c).