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

Report Nos. 50-269/77-07, 50-270/77-07, 50-287/77-07

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

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

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

Facility Name: Oconee Units 1, 2 and 3

Inspection at: Oconee Site, Seneca, South Carolina

Inspection conducted: May 12-13, 1977

Inspector-in-Charge: Carl E. Alderson

Inspector: G. L. Troup

Reviewed by: R. C. Parker 6-1-77
R. C. Lewis, Chief Date
for Reactor Projects Section No. 2

Inspection Summary

Inspection on May 12-13, 1977: (Report Nos. 50-269/77-07; 50-270/77-07; 50-287/77-07)
Areas Inspected: Special unannounced inspection to followup on nonroutine event involving unplanned release of radioactive effluents from restricted area. The inspection involved 22 inspector-hours onsite by two NRC inspectors.
Results: In the area inspected one apparent item of noncompliance was found (infraction - failure to follow procedure - Details II, Paragraph 4). One additional apparent item of noncompliance was found (Deficiency - failure to post documents required by 10 CFR 19.11(a)(4) - Details I, Paragraph 8).

DETAILS I

Prepared by: R. C. Parker for C. E. Alderson, Reactor Inspector — 6-1-77 Date

Dates of Inspection: May 12-13, 1977

Reviewed by: R. C. Parker for R. C. Lewis, Chief, Reactor Projects Section No. 2 — 6-1-77 Date

1. Persons Contacted

Duke Power Company

*J. E. Smith - Station Manager
*M. Harris - Operating Engineer
C. Yongue - Health Physics Supervisor
D. Smith - Station Chemist
*R. Koehler - Technical Services Superintendent
*R. Bond - Technical Services Engineer
N. Edwards - Assistant Operating Engineer
D. Patterson - Shift Supervisor

*denotes those present at the Exit Interview.

2. Licensee Action on Previous Inspection Findings

Not within the scope of this inspection.

3. Unresolved Items

None identified during this inspection.

4. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on May 13, 1977. The inspector summarized the scope and findings of the inspection. Licensee representatives acknowledged that the noncompliance discussed in Paragraph 8 had occurred and stated that copies of the documents were being made and would be posted immediately.

5. Incident Notification

The Oconee Station Manager notified the Region II office by telephone on the morning of May 2, 1977, that an unplanned release of radioactivity from the station had occurred, starting sometime between 1100 and 1430 hours on May 11, 1977. The licensee stated the following:

a. Routine liquid samples were being taken from the turbine building sump (TBS) and Waste Oil Collection Basin (WOCB) at approximately four hour intervals.

b. A TBS sample which had been obtained at approximately 1430 hours on May 11, 1977, was analyzed at approximately 2230 hours that same day and indicated an Iodine-131 concentration of 8×10^{-5} μc/cc. A WOCB sample which had been obtained at 2000 hours was then analyzed and indicated an Iodine-131 concentration of 2.48×10^{-6} μc/cc in the WOCB.

c. Samples of the TBS and WOCB at 1100 and 1600 hours, respectively showed normal activity levels thus indicating that the release to the TBS occurred between 1100 and 1430 hours.

d. Based on normal Keowee leakage flow rates, the release of radioactivity to the unrestricted area was within the instantaneous limits established by the Technical Specifications.

e. A Keowee hydro unit was placed in service to provide additional dilution flow. When the hydro unit was subsequently removed from service, a flood gate was partially opened to assure continued dilution flow.

f. The licensee speculated that the water had come from the 1B steam generator which was pressurized for leak test during the period from 1145 to 1420 hours; however, the source of the contaminated water and the flow path to the T S had not been identified, but was being investigated by the licensee.

6. Onsite Followup of Incident

The inspectors arrived onsite at approximately 2115 hours on May 12, 1977. The inspector reviewed all entries in the Unit 1 Reactor Operations and Shift Supervisor Log Books for the period May 7-12, 1977, as well as entries in the Out-of-Normal (Removal and Restoration) Log. The inspector also held discussions with

licensee personnel with regard to the incident. Based on the review of documents and discussions with licensee personnel it appears that the sequence of events described in Paragraph 5 above, occurred as stated by the licensee. The following additional information was obtained.

a. Unit 1 shutdown was initiated at 0916 hours on May 7, 1977, due to a steam generator tube leak and the 1B steam generator was isolated at 1130 hours the same day.

b. The licensee initiated procedure OP/O/A/1106/31 at approximately the same time that reactor shutdown was initiated. This procedure was written as a result of the accidental release of radioactivity which occurred in January 1977. The purpose of the procedure is to collect normal secondary system leakage which might be contaminated as a result of a tube leak and prevent its entry into the TBS. The procedure also requires nonessential equipment to be removed from service to minimize the flow of noncontaminated water into the TBS. It appeared that this procedure was implemented correctly.

c. Normal cooldown was completed and procedure OP/O/A/1106/30 was initiated for the purpose of identifying the leaking steam generator tube(s). Sample analysis indicated that the water in the steam generator was above the activity limits for use in leak testing and the steam generator was drained to the radwaste system commencing at 1700 hours on May 10, 1977, as required by the procedure.

d. The steam generator was then flushed a total of three times in accordance with the procedure. This involved spraying condensate from the hotwell with an activity of approximately 1×10^{-6} μc/cc into the steam generator until the level reached approximately thirty inches (about 1260 gal.). A water sample was then analyzed and the licensee stated that based on limits established in procedure CP/O/B/100/2, water from each of the first two flushes was drained to the radwaste system and the flush was repeated. These actions were in accordance with the procedures, however, water from the third flush was not drained from the steam generator as required by the procedures. This is discussed more fully in Details II of this report.

e. The licensee stated that the following steps were being taken as a result of this incident. These will be reviewed during a future inspection.

(1) Procedure OP/O/A/1106/30 will be revised to require that the TBS pumps be locked out while the steam generator is pressurized and that before returning the pumps to service the sump water will be analyzed for radioactivity.

(2) Revision to OP/O/A/1106/30 will also establish a requirement that the Operations Duty Engineer and Duty Chemist will have to determine acceptability of the water in the steam generator before the steam generator is pressurized.

(3) A special test procedure will be written to perform another leak test on the 1B steam generator under controlled conditions in an attempt to identify the source and flow path of the contaminated fluid to the TBS.

7. Information Received Subsequent to Inspection

The licensee informed the inspector by telephone on May 18, 1977, that the special test procedure had been performed and the source of contaminated fluid appeared to be the main steam line and the flow path appeared to be from the main steam line on the leaking steam generator, through the above-seat drains on the turbine control valves to the Blowoff Tank. This tank collects and condenses steam discharges from various safety valves on the Auxiliary Boiler and the Heating Steam system and as it fills it overflows to a turbine building trench which empties into the TBS. The licensee stated that radiation levels at the tank measured 20-35 mR/hr and that the Iodine-131 activity of a sample from the tank was on the order of 1×10^{-4} μc/cc.

The licensee further stated that a plant modification was being processed to reroute the above-seat drain lines to the condenser rather than the Blowoff Tank.

8. Posting Requirements

During the inspection the inspector observed that the licensee's bulletin board did not contain copies of the following documents:

a. IE Inspection Report No. 50-269/77-3 which contained a notice of violation (noncompliance) involving radiological working conditions. The inspector determined that the report was received at the Oconee site on April 15, 1977.

b. The licensee's letter of response to the above report. The response was dated May 2, 1977.

c. The Notice of Proposed Imposition of Civil Penalty sent to the licensee as Appendix B to the letter to Duke Power Company dated March 29, 1977, from the Director, OIE.

d. The licensee's response to the above Notice. The response was dated April 20, 1977.

Posting of all of the above documents is required by 10 CFR 19.11(a)(4). The inspector asked licensee personnel if the above documents had been posted and then removed and the licensee stated that they had not. This is a Deficiency.

DETAILS II Prepared by: G. L. Troup 6/2/77
G. L. Troup, Radiation Specialist Date
Radiation Support Section
Fuel Facility and Materials Safety Branch

Dates of Inspection: May 12-13, 1977

Reviewed by: A F Gibson 6/2/77
A. F. Gibson, Chief Date
Radiation Support Section
Fuel Facility and Materials Safety Branch

1. Individuals Contacted

*J. E. Smith - Station Manager
*R. M. Koehler - Superintendent of Technical Services
C. J. Yongue - Health Physics Supervisor
D. C. Smith - Chemist
*R. T. Bond - Technical Services Engineer
W. P. Deal - Assistant Health Physics Supervisor
T. D. Patterson - Shift Supervisor

*denotes those attending the exit interview

2. Licensee Action on Previous Inspection Findings

No previous inspection findings were reviewed as part of this inspection.

3. Unresolved Items

No new unresolved items were identified during this inspection.

4. Scope of Inspection

The inspection consisted of a review of circumstances prior to and after the identification of abnormal radioactivity concentrations in the plant discharge, including discussions with licensee representatives and review of logs and records, to determine compliance with the Technical Specifications for discharge concentrations, adequate dilution flow and analysis of effluents. Details of areas inspected are discussed in paragraphs 5 and 6.

5. Testing of Steam Generator 1B

a. In order to locate the leaking tubes(s), the secondary side of the steam generator was filled with water and pressurized with nitrogen. Prior to testing, the water in the secondary side was drained and the steam generator was flushed and refilled. The Unit #1 Shift Supervisor's Log Book contained an entry at 5 p.m. on May 10 stating "secondary water 1B OTSG - activity too high to leak check." A licensee representative informed the inspector that this entry was after the second flush of the secondary side, that this water was drained to the radwaste system and a third flush was conducted. The Shift Supervisor's Log contained an entry at 9:40 p.m. on May 10 stating "1B OTSG I^{131} - 1.29×10^{-3} (μCi/ml) - when correction factor is applied this concentration is within limits for leak test. We are filling the steam generator for leak test."

b. The inspector discussed the "correction factor" which was referred to in the Shift Supervisor's Log with several licensee representatives. A licensee representative informed the inspector that the "correction factor" was actually an equation for determining if refill water in the steam generator could be transferred to the hot well. This equation is contained in enclosure 4 to plant procedure CP-0-B-100-2, "Corrective Action Guidelines." A licensee representative stated that this equation was used to determine the acceptability of water in the steam generator for leak testing as well as return to the hotwell as specified in operating procedure OP/0/A/1106/30, "Identification of Failed Steam Generator Tubes." The licensee representative stated that the log entry stating that the water was within limits for leak testing was in error, the water was not acceptable for testing. The inspector performed the calculation using data from the licensee's records and determined that the radioactivity concentration in the steam generator exceeded the limit of the procedure and was not acceptable for use in testing. The erroneous log entry was attributed by licensee representatives to a communications breakdown between the chemistry and operations groups.

c. Technical Specification section 6.4.1 requires that the station shall be operated and maintained in accordance with approved procedures. As the testing of the steam generator was performed using water which did not meet the requirements of the approved hydrostatic test and chemistry procedures, the inspector informed licensee management that this was an item of non-compliance.

6. Technical Specification Requirements for Effluents

a. Technical Specifications section 3.9.3 states that the release rate shall be controlled such that the instantaneous concentrations of radioactivity in liquid waste upon release shall not exceed the values listed in 10 CFR 20, Appendix B, Table II, Column 2. The inspector reviewed the sample results data sheets and the Unit #1 Shift Supervisor's Log Book and obtained the data on isotopic concentrations, flow rate from the waste oil collection basin and the flowrate out of the Keowee hydro unit. Although the licensee had determined and documented the hydro unit flowrate to verify compliance with the Technical Specifications, the inspector performed the calculations of the concentration at the restricted area boundary and verified compliance with the Technical Specifications. No items of noncompliance were identified.

b. Technical Specifications section 3.9.5 states "as far as practicable, the releases of liquid waste shall be coordinated with the operation of the Kowee hydro unit." The inspector reviewed the Unit #1 Shift Supervisor's Log Book and verified that once activity was identified in the waste oil collection basin (WOCB) discharge, the Keowee hydro unit was placed in service. At 11:30 p.m. on May 10 the shift supervisor was informed that the WOCB discharge concentration was abnormal; at 11:56 p.m. the Keowee hydro unit was placed in service at a flow of 8,200 cfs and kept in service until 4:20 a.m. on May 11. A flood gate on the dam was partially opened at 4:05 a.m. prior to stopping the hydro unit and provided dilution flow the remainder of May 12 and May 13 and was continuing. This action appeared to be consistent with the Technical Specification; the inspector had no further questions.

c. Technical Specifications Table 4.1-3 specifies the sampling and analysis requirements for the discharge of various tanks to the environment. Although the Turbine Building sump is not listed in Table 4.1-3, the sump was being used as the collection and discharge tank for leakage being collected. The inspector reviewed the Unit #1 Shift Supervisor's Log and sample analysis sheets for the sump and verified that the contents of the sump were being sampled and analyzed on a batch basis and the analyses being performed were in accordance with Table 4.1-3, item 7. The inspector discussed the control of the sump pumps with a licensee representative and determined that the pumps were being manually controlled to start them. The sump pumps discharge into the WOCB, which has continuous outflow rather than batch outflow. Prior to the identification of high

activity in the WOCB outflow, the outflow was being sampled and analyzed on a four hour frequency; after high activity was identified the sampling and analysis frequency was increased to two hour intervals. The analyses of the WOCB outflow were determined by examination of the sample analysis sheets to be consistent with the requirements of Table 4.1-3, item 7 although sampling was done on a periodic rather than batch basis. A licensee representative informed the inspector that plant records for the release would be based on the WOCB outflow sample results as these represent the activity actually discharged to the environment. No items of noncompliance were identified.

7. Exit Interview

At the conclusion of the inspection on May 13, 1977, the inspector met with licensee representatives (denoted in paragraph 1). The inspector summarized the scope and findings of the inspection. The licensee representatives made the following comments in response to certain of the items discussed by the inspector:

a. Acknowledged the statements by the inspector with respect to the item of noncomplinace (paragraph 5) and stated that changes to procedures were in progress which would clarify the review and approval requirements for use of contaminated water for testing of steam generators.

b. Acknowledged the statements by the inspector with respect to the need for identifying the source of radioactive water leakage in the Turbine Building which is the source of the activity being discharged.