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

OCT 0 7 1988

Report Nos.: 50-269/88-26, 50-270/88-26, and 50-287/88-26

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: September 12-16, 1988

Inspector: Susan S. Adamovitz 10/4/88
S. Adamovitz Date Signed

Approved by: [signature] 10/5/88
J. B. Kahle, Section Chief Date Signed
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of liquid and gaseous radwaste programs, environmental monitoring, and previously identified inspector followup items.

Results: In the areas inspected, violations or deviations were not identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

L. Benge, Supervising Scientist
R. Bouser, Nuclear Production Specialist II
H. Bruce, Nuclear Chemistry Specialist
* S. Coy, Supervising Scientist
* J. Davis, Superintendent of Technical Services
B. Green, Associate Scientist
G. Hamrick, Radioactive Waste General Supervisor
* E. Lampe, Associate Scientist
* T. Mathews, Regulatory Compliance
* F. Owens, Compliance, Shift Supervisor
D. Price, Nuclear Performance Specialist
* J. Sevic, Station Chemist
J. Stewart, Scientist
*D. Sweigart, Superintendent, Operations
D. Taylor, Project Support Engineer
R. Taylor, Health Physics Specialist
*M. Thorne, General Supervisor
*M. Tuckman, Station Manager
* C. Yongue, Station Health Physicist

NRC Resident Inspector

*L. Wert

* Attended exit interview

2. Inspector Followup Items (92701)

a. (Closed) IFI 50-269, 270, 287/86-07-01: Review of radwaste burial site environmental monitoring. The inspector and licensee representatives discussed the onsite burials and reviewed the associated environmental monitoring programs. The licensee had obtained approval on August 14, 1985, from the South Carolina Department of Health and Environmental Control (DHEC) for onsite burial of three feedwater heaters. The heaters were buried on December 23, 1985, and the volume of the buried material was estimated to be 4,525 cubic feet with a total activity of 6.5 millicuries (mCi). A second request for onsite burial of two moisture separator reheaters (MSRs) was approved on March 30, 1987, by DHEC and approximately 6,460 cubic feet and 2.53 mCi were buried. Environmental sampling for the two burial locations was defined in station procedures and consisted of monthly vegetation samples, annual soil samples, quarterly direct radiation readings by thermoluminescence dosimetry and semiannual instrument surveys. Quarterly well water samples were collected from a nearby sampling

point which was part of the station's normal environmental monitoring program and was located in the drainage field downstream of the burial sites. The inspector reviewed selected environmental data beginning April 1986, and did not note any isotopic activity levels significantly above background. The licensee indicated that the burial of additional MSR bundles was being planned. This item is considered closed.

b. (Closed) IFI 50-269, 270, 287/86-07-02: Review of incinerator facility counting room and ventilation testing procedures. The incinerator facility counting room had been initially planned as an additional counting facility to the primary count room. As of the date of this inspection, the incinerator facility counting room had never been operational and was not scheduled to be used. The primary count room was used to analyze all effluent and radwaste samples, and the associated analytical equipment was operated, calibrated and maintained using approved station procedures. Licensee representatives indicated that the counting equipment in the incinerator counting room might be moved to the primary count room and would be covered by the associated procedures prior to use. The incinerator off-gas system was part of the low-level radioactive waste processing facility. This facility was still in the testing stage and was not being used to process waste. Performance testing of the filters was covered under existing plant procedures. Operating procedures for the filters were still in the developmental stage but were assigned to the commitment index of the plant. This commitment required approved operating procedures to be in place prior to use of the system. This item is considered closed.

c. (Closed) IFI 50-269, 270, 287/86-32-01: Review licensee procedures for systematic review of environmental data and identification of anomalous measurements. The licensee's Health Physics Manual contained two sections which dealt with environmental data review and evaluation. Section 6.7 of the manual entitled "Environmental Sampling Program," indicated results were to be reviewed against Technical Specifications or station limits. This section also detailed the corrective steps that were to be taken for exceeding limits or missing samples. Trend evaluation of environmental data was discussed in Section 8.6 of the Health Physics Manual. "Review of Radioactive Effluent Releases" discussed the annual environmental monitoring report and assigned the responsibility to the Health Physics staff for identifying trends and investigating the causes. Discussions with Health Physics personnel indicated that analytical results were received approximately twice monthly from the Applied Science Center, and current data were compared to previous activity levels and isotopes. The environmental results were also entered into a computer data base which provided a summary or a selected sort. Future planned modifications for the computer software would provide the ability to compare the results to action levels and automatically trend data. This item is considered closed.

d. (Closed) VIO 50-269, 270, 287/86-32-02: Inadequate 1985 annual radiological monitoring report. This violation was based on the failure to include summaries and interpretations of the results of the radiological environmental surveillance activities and an assessment of any observed impacts of plant operation on the environment. The inspector reviewed the Annual Radiological Environmental Operating Reports for the calendar years 1986 and 1987. The reports contained an evaluation of the current environmental data which included a comparison to preoperational and historical data and statistical analyses of the data for trend determination. Also doses calculated from environmental measurements were compared to doses calculated from effluent data. This item is considered closed.

e. (Closed) IFI 50-269, 270, 287/87-09-01: Operability of the post accident liquid sampling (PALS) system. The licensee had experienced continuing problems with the operability of the facility's PALS systems and had committed to NRC to install a new system by June 1, 1988. A PALS II system had been installed by this date for Unit 3. Functional testing of the new system was still underway and the licensee had made a commitment to NRC to complete testing, procedures, and training on the new PALS II by December 1, 1988. This item is discussed further in Paragraph 11 of this report. This item is considered closed.

f. (Closed) IFI 50-269, 270, 287/87-09-02: Check quality assurance for sampling lines and thiosulfate solution in the post accident gaseous sampling system (PAGSS). During a previous inspection conducted during February 1987, the inspector observed operation of the Unit 1 PAGSS and noted liquid leakage from a tygon sampling line. Analytical results also indicated contamination of the thiosulfate solution by Co-58. Subsequent to that inspection, the licensee altered procedure HP/3/A/1009/17, Operating Procedure for Post Accident Containment Air Sampling, to include replacement tygon tubing. The thiosulfate solution which was originally prepared in the primary chemistry laboratory, was prepared in the secondary chemistry lab to avoid possible contamination. This item is considered closed.

3. Procedures (84723, 84724, 80721)

Technical Specification 6.4.1 requires the station to be operated and maintained in accordance with approved written procedures with appropriate checkoff lists and instructions for the following conditions: normal startup, operation, and shutdown of the complete facility and of all systems and components involving nuclear safety of the facility; emergency procedures involving potential or actual release of radioactivity; personnel radiation protection procedures; and offsite dose calculation manual implementation. The inspector reviewed selected portions of procedures concerning liquid and gaseous effluent sampling and analysis, in-place filter testing, environmental sampling, process and effluent monitor calibrations, and post accident systems testing and sample

collection. Procedures were approved and implemented in accordance with administrative requirements.

No violations or deviations were identified.

4. Semiannual Effluent Reports (84723, 84724)

a. Technical Specification 6.6.1.4 requires that routine Radioactive Effluent Release Reports covering the operation of the unit during the previous six months of operation shall be submitted within 60 days after January 1 and July 1 of each year. The inspector reviewed the Oconee Nuclear Station Semiannual Radioactive Effluent Release Reports for the last half of 1986, 1987, and the first half of 1988. The effluent release data summarized in Table A were obtained from current and previous Semiannual Effluent Release Reports.

TABLE A

EFFLUENT RELEASE SUMMARY FOR OCONEE UNITS 1, 2, AND 3

Activity Released (Curies)	1985	1986	1987	(First Half) 1988
1. Gaseous Effluents				
Fission and Activation Products	2.35E+4	2.43E+4	1.05E+4	1.85E+4
Iodines and Particulates	6.14E-3	5.41E-2	1.58E-1	9.74E-2
2. Liquid Effluents				
Fission and Activation Products	4.16E0	5.85E0	2.90E0	1.57E0
Tritium	1.24E+3	1.34E+3	9.49E+2	4.28E+2

In reviewing the effluent data, the inspector noted a decrease in effluent activity for the calendar year 1987, with the exception of gaseous iodines and particulates. The licensee attributed the lower 1987 values to several factors. During 1987, the licensee began subtracting background activity from the monitor readings for the RIA-45, the radwaste facility vent monitor. A decrease in liquid effluent activity resulted from fewer steam generator tube leaks during 1987, and the facility experiencing only one tube leak outage for Unit 3 during that year. The increase in gaseous iodine and particulate activities from 1985 to 1987, was due to problems with failed fuel in Units 1 and 3. Gaseous fission and activation products showed an increase in activity for the first half of 1988, and the licensee indicated that this increase was due to numerous Hot Gas Tank releases. One gaseous waste release for that time period totaled 5,250 curies of noble gas.

b. Technical Specification 3.5.5.2 requires that radioactive gaseous process or effluent monitor inoperable for greater than 30 days be reported in the Semiannual Radiation Effluent Release Report. In reviewing the 1986, 1987, and 1988 reports, the inspector noted that the Units 1, 2, and 3 liquid monitors, RIA-35s, had been inoperable during the entire two and a half years. These RIAs monitor the low pressure service water and have been nonfunctional due to system design inadequacies. The licensee indicated that the monitors did not receive sufficient flow in order to obtain a representative composite sample. The inoperable monitors had put the station in an action statement requiring sampling every 12 hours. Discussions with licensee personnel indicated that correction of this low flow condition was part of a major upgrade package for the entire RIA monitoring system. The system upgrade was not due to be implemented for approximately three years and, until that time, the plant would have to continue the sample collection at 12 hour intervals.

c. Technical Specification 6.6.1.4 requires that the Effluent Release Report include descriptions and causes for all unplanned releases to unrestricted areas of radioactive materials in liquid and gaseous effluents. Actions taken to prevent recurrence and the consequences of the unplanned releases are also to be documented in the report. From July 1986 to June 1988, the licensee reported four abnormal liquid releases and two abnormal gaseous releases. Activity released totaled 3.33 E+1 curies for gases and 6.60 E0 curies for liquids. The inspector reviewed station investigation reports which described the incidents, documented the activity released and dose calculations, and detailed corrective actions. The largest individual gaseous release occurred on April 26, 1987, during a Unit 3 steam generator tube leak outage and activity released was calculated to be 3.33 E+1 curies. The reactor building equipment hatch was open with the main purge operating at 9000 CFM. The licensee's evaluation indicated that the cause of the release was the failure of the main purge to maintain a negative pressure and air flow into the reactor building. Corrective actions included closure of the equipment hatch and an evaluation to determine a minimum flow rate for the main purge when the equipment hatch is open. Air doses due to noble gas were calculated to be less than 0.04% of Technical Specification limits and the organ dose due to radioiodine was calculated to be 0.22% of the Technical Specification limit.

The highest individual liquid release occurred on February 11, 1988, and involved a Unit 1 High Pressure Injection (HPI) instrument root valve. The valve ruptured under system pressure when maintenance was mistakenly being performed on the Unit 1 valve rather than the Unit 2 valve. A total of 6.53 curies was released and air doses were calculated to be less than 3 E-4% of Technical Specification limits.

No violations or deviations were identified.

5. Audits (84723, 84724, 80721)

Technical Specification 6.1.3.4 requires audits of station activities to be conducted under the cognizance of the Nuclear Safety Review Board encompassing the conformance of station operation to provisions contained within the Technical Specifications and applicable facility operating license conditions at least once per year and the Offsite Dose Calculation Manual (ODCM) and implementing procedures at least once per 24 months. The inspector reviewed Departmental Audit NP-88-01(ON), Health Physics Group and Radiological Environmental Monitoring Activities, conducted January 11, 1988, through February 10, 1988. One deficient item was identified concerning compliance with Regulatory Guide 1.21, Revision 1, Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants. The guide states that periodically, a series of samples should be taken during the interval of liquid discharge to determine if individual grab samples are representative of the effluent stream. This item was determined to be a generic issue for the three Duke nuclear power plants. Implementation of this test was considered optional due to use of the word "should" rather than "shall." The licensee is currently reviewing proposed changes to Duke Nuclear Guide 1.21 which is based on Regulatory Guide 1.21. The proposed changes would clarify the sampling requirements.

No violations or deviations were identified.

6. Liquid Radwaste System (84723)

The inspector discussed system operation and toured selected portions of the liquid radwaste system. For the primary system, liquid wastes were accumulated in the High or Low Activity Waste Tanks and then were mixed in the Miscellaneous Waste Hold Up Tank (MWHUT). These waste tanks were maintained strictly as holding tanks and no liquid processing was performed. A liquid sample was taken from the MWHU tank and tested with flocculating agent and sodium chloride which assisted in the removal of Co-58. The waste was then routed to a feed tank where the flocculating agent and the sodium chloride were added and was then processed through a series, typically four, of vendor-supplied demineralizer vessels. The licensee was currently installing six sluicable demineralizer tanks which would replace the vendor-supplied vessels. These sluicable tanks would have a capacity of 20 cubic feet each and were expected to be operational by January 1989. From the demineralizer vessel, the liquid flowed to Condensate Monitor Tanks and was sampled for isotopic activity. Prior to September 1986, the liquid waste was released from these monitor tanks if the isotopic concentrations were below allowable release limits. Currently, the liquid waste was sent to four Waste Monitor Tanks in the Radwaste Facility if the isotopic activity was below the administrative limit. If the activity exceeded the administrative limit, the waste was pumped back to the Feed Tank to be processed through the demineralizers again. The Waste Monitor Tanks were isolated and sampled, and a release rate consistent with the dilution flow from the Keowee Hydro Station was

determined. The effluent release was monitored by 1RIA-33 and IRIA-34 and the radiation monitor alarm setpoints were adjusted to comply with Technical Specification limits. The wastes were then discharged to the Keowee Hydro tailrace and could be terminated by a high alarm from the effluent monitor.

Secondary system liquid wastes were collected in the Turbine Building Sump and monitored by RIA-54. The monitor was set to alarm if the sums of the MPC ratios of the predicted nuclides exceeded one. On a high alarm, the wastes were routed to a set of four demineralizer vessels connected in parallel and then to the Turbine Building Tank Farm for hold-up and sampling. Normal routing of the wastes bypassed the demineralizers and the tank farm and sent the liquid to the Chemical Treatment Pond No. 3. The chemical treatment pond discharged continuously at a rate of 2000 gallons per minute and a composite sampler was maintained at the discharge point into Lake Hartwell.

A licensee representative estimated that the volume of primary system liquid waste discharged was 2.5 million gallons annually and the largest portion of this waste effluent was due to outage activities. Liquid wastes from the secondary system averaged three million gallons per day.

No violations or deviations were identified.

7. Gaseous Radwaste System (84724)

The plant was equipped with four waste gas tanks located in the Auxiliary Building and three waste gas tanks located in the Waste Management Facility. Releases were monitored from these tanks by RIA-37 and RIA-38, the normal and high waste disposal gas monitors. Cover gases from the reactor coolant systems were collected in the waste disposal header. The waste gases were then drawn from the header by one of two waste gas compressors into a gas separator. After moisture removal, the gases were then routed to a waste gas decay tank and finally discharged to the unit vent after passing through a filter bank which included a prefilter, a HEPA (high effeciency particulate air) filter, and a charcoal adsorber.

Discussions with licensee representatives indicated problems with leakage from the waste gas disposal header into the Auxiliary Building. The system was designed to be maintained at a negative pressure to allow inleakage. However, as the waste gas decay tanks became full, only a slight negative pressure could be maintained for this system and system pressure could sometimes be increased to a slight positive pressure. If the compressor was used to increase the negative pressure of the system, the decay tanks filled sooner and the design storage capacity of the waste gas decay tanks could be exceeded.

No violations or deviations were identified.

8. Radioactive Liquid and Gaseous Effluent Monitoring (84723, 84724)

Technical Specification 3.5.5 provides the requirements for the operability of radioactive liquid effluent, gaseous effluent, and gaseous process monitoring instrumentation. The inspector and licensee representative examined selected effluent monitoring locations and verified the operability of selected control room monitor readouts. The inspector also examined selected 1987 and 1988 records for the following monitors: RIA-33 - Liquid Waste Disposal Monitor; RIA-37 - Waste Gas Disposal Monitor; RIA-45 - Vent Gas Monitor; RIA-44 - Vent Iodine Monitor; and RIA-43 - Vent Particulate Monitor. The examined records appeared complete and followup actions for inoperable monitors had been implemented.

No violations or deviations were identified.

9. Reactor Coolant Chemistry (84723)

Technical Specification 3.1.4 requires that the total activity of the reactor coolant due to nuclides with half lives longer than 30 minutes shall not exceed 224/E-bar microcuries per ml whenever the reactor is critical. The inspector reviewed summary graphs for 1988 isotopic iodines and percent power values for all three units. The Unit 3 I-131 values spiked to 2.5 uCi/ml during April 1988, due to a power decrease. A licensee representative attributed the high iodine spike to the amount of failed fuel in Unit 3. Although the licensee did not have a Technical Specification limit for dose equivalent iodine (DEI), the facility did maintain an administrative limit of 1.0 uCi/ml and allowed four days to reduce high DEI values before having to reduce power.

No violations or deviations were identified.

10. Air Cleaning Systems (84724)

Technical Specifications 4.12 and 4.14 provide requirements for testing of charcoal adsorber sample retention efficiency for methyl iodide and for inplace leak testing of HEPA filtration and charcoal adsorption sections of exhaust and atmosphere cleanup filtration systems. The inspector reviewed procedures for the inplace HEPA filter testing of the reactor building purge, the control room filter system and the gaseous waste disposal filter. The inspector also examined the results of selected 1987 and 1988 inplace and laboratory tests for the following systems: the control room HEPA filters, the gaseous waste disposal filters, the reactor building purge filters, the penetration room ventilation system and the spent fuel pool ventilation system. In reviewing the data, the inspector noted that the charcoal for the gaseous waste disposal filter was not laboratory tested for methyl iodide retention. Licensee representatives explained that the filter unit was small and did not have a sampling point for carbon. The filter unit had to be disassembled in order to obtain a carbon sample and the licensee had opted to change the carbon whenever the HEPA filter was tested.

No violations or deviations were identified.

11. Post-Accident Liquid Sampling (PALS) Systems

The licensee had committed to the NRC to install a new PALS system on Unit 3 by June 1, 1988, to complete functional testing, procedures and training by December 1, 1988; and publish a schedule for implementation of the new PALS for Units 1 and 2 by January 1, 1988. The new Unit 3 PALS system was installed to facilitate sampling from the letdown line, the steam generator "J" leg or the low pressure injection (LPI) pump discharge. In the PALS panel, the liquid sample would first be circulated through a 500 milliliter liquid tank for pH measurement and then be routed to one of three sample loops. The sample panel was equipped with a set of three Rheodyne valves which could trap a 100 microliter, one milliliter or five milliliter aliquot in a sample loop. The liquid tank would be degassed by nitrogen sparging or by a solenoid tapping the side of the tank. The gases would flow to an evacuated 500 milliliter gas tank and then to a 30 milliliter gas tank. Prior to liquid and gaseous sample collection, the panel would be flushed to minimize dose. The gaseous sample would be collected from a septum port on the 30 ml gas tank using a gastight syringe. Liquid samples would be obtained by flushing the fluid out of the sample loop into an evacuated sample bottle.

The inspector observed a PALS system test where the liquid sample was collected from the Unit 3 LPI pump discharge. Since Unit 3 was in an outage, only the liquid portion of the sample panel could be tested. The inspector discussed system testing and analytical results with the licensee. The licensee had obtained acceptable results comparing liquid PALS samples to normal coolant samples but had had problems with the gaseous tests. Temporary modifications and further performance testing of the gaseous portion of the panel indicated a problem with gas stratification inside the sampling panel. The licensee was working on resolving this problem at the time of this inspection. The liquid sample results from the September 14 test are presented below:

Oconee Unit No. 3
Reactor Coolant Sample PALS Results

	RCS Current Samples	PALS Test Data	Ratio PALS/Normal Sample
Gross Gamma (uCi/ml)	2.60E-2	2.37E-2	1.10
Boron (ppm)	2291	2423	0.94

The licensee was also working on several system modifications which included improvement of low flow indication through the Rheodyne valves, development of an automatic mechanism for extracting the liquid sample from the Rheodyne loop in order to minimize dose, and redesign of the system to accommodate two pH buffer tanks.

The inspector informed licensee representatives that completion of performance testing and modifications of the PALSS II would be considered an inspector followup item.

IFI 50-269, 270, 287/88-26-01: Track modifications and complete performance testing of the PALSS II.

No violations or deviations were identified.

12. Environmental Monitoring (80721)

Technical Specifications 4.11.1 and 6.6.1.5 require the licensee to perform environmental sampling and analysis, and to submit an annual Radiological Environmental Operating Report which shall include summaries and interpretations of the data, comparisons with previous results, and an assessment of the impact of plant operation on the environment. The inspector reviewed plant procedures for sample collection, the 1986 and 1987 annual reports and selected 1988 environmental data. The licensee had changed the methodology for calculating 1987 mean concentrations to exclude minimum detectable or negative activities. The change resulted in higher mean concentrations for 1987 data over previous years. However, the licensee's evaluation of the environmental data supported the conclusion that the increased mean was due to the calculational change and not to a significant increase in radionuclides from plant operations.

As discussed in Paragraph 2, Item C of this report, the licensee had procedural or program guidance in place for environmental data review and trend evaluation. Plant personnel had the responsibility for sample collection and the Duke Power Company corporate environmental laboratory, the Applied Science Center, performed the analyses.

No violations or deviations were identified.

13. Exit Interview

The inspection scope and results were summarized on September 16, 1988, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Although proprietary information was reviewed during this inspection, none is contained in this report. The licensee had installed a new Post Accident Liquid Sampling System for Unit 3 and was continuing performance testing of the system. In general liquid and gaseous effluents decreased for 1987, due to fewer outages and to background subtraction for a gaseous effluent monitor. Gaseous iodine and particulate effluents had been increasing since 1985 and the increase was attributed to failed fuel in Units 1 and 3. A liquid monitor, the R1A-35, had been inoperable for several years and had subsequently put the licensee in an action statement requiring 12 hour interval sampling. The monitor was nonfunctional because of low flow conditions.