



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos. 50-269/78-15, 50-270/78-15 and 50-287/78-16

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

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

Licensee: Duke Power Company
P. O. Box 2178
422 South Church Street
Charlotte, North Carolina 28242

Facility Name: Oconee Nuclear Station

Inspection at: Oconee Site, Seneca, South Carolina

Inspection Conducted: July 26-28, 1978 and August 1-4, 1978

Inspectors: C. M. Hosey
G. R. Jenkins

Reviewed by: *A. F. Gibson*
for: A. F. Gibson, Chief
Radiation Support Section
Fuel Facility and Materials Safety Branch

9/28/78
Date

Inspection Summary

Inspection on July 26-28, 1978 and August 1-4, 1978 (Report Nos. 50-269/78-15, 50-270/78-15 and 50-287/78-16)

Areas Inspected: Routine, announced inspection of previously identified items, shipments of spent fuel assemblies, neutron monitoring practices, radiation protection and radioactive waste management programs, including effluent release monitoring and records, radioactive contamination control and radiation surveys. The inspection involved 90 inspector-hours on site by two NRC inspectors.

Results: Of the ten areas inspected, no apparent items of noncompliance or deviations were identified in eight areas. One apparent item of noncompliance was found in each of two areas (Infraction - Failure to follow procedure for preparing spent fuel cask for shipment (269/270/78-15-01; 287/78-16-01, paragraph 11b; Infraction - Failure to perform necessary radiation surveys in Interim Radwaste Building (269/270/78-15-02; 287/78-16-02, paragraph 4).

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DETAILS I

Prepared by:

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Radiation Support Section
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9/22/78
Date

G. R. Jenkins
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9/22/78
Date

Dates of Inspection: July 26-28, 1978 and August 1-4, 1978

Reviewed by:

A. F. Gibson
A. F. Gibson, Chief
Radiation Support Section
Fuel Facility and Material Safety Branch

9/25/78
Date

1. Individuals Contacted

- *J. E. Smith, Station Manager
- ***R. M. Koehler, Superintendent of Technical Services
- L. N. Pope, Superintendent of Operations
- ***C. T. Yongue, Station Health Physicist
- G. F. Davis, Health Physics Supervisor
- J. A. Long, Health Physics Supervisor
- D. L. Davidson, Health Physics Supervisor
- M. D. Thorne, Health Physics Supervisor
- R. L. Clemmer, Health Physics Supervisor
- **S. R. Newcomb, Junior Health Physicist
- G. McAninch, Junior Engineer-Operations
- R. Sweigant, Junior Engineer-Operations
- J. Owens, Health Physics Laboratory Assistant
- K. Torr, Health Physics Laboratory Man
- **J. Itin, Safety Engineer
- **R. T. Bond, Technical Services Supervisor
- ***D. J. Vito, Technical Services Engineer
- D. F. Frech, Nuclear Engineer (Corporate Office)
- R. E. Foy, Chem-Nuclear Services Engineer

*Denotes those attending July 28, 1978 exit interview.

**Denotes those attending August 4, 1978 exit interview.

***Denotes those attending July 28, 1978 and August 4, 1978 exit interviews.

2. Licensee Action on Previous Inspection Findings

(Closed) Deviation (78-07-02): Sampling oil collection basin. An

inspector reviewed corrective actions as stated in Duke's letter of May 10, 1978, including procedure revisions and disciplinary action. Also, the inspector reviewed records of oil collection basin sampling subsequent to primary to secondary leakage identified on April 20, 1978. There were no further questions on this item.

3. Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance or deviations. One unresolved item was identified during this inspection.

(269/270/78-15-03;287/78-16-03) Failure to Follow Plant Directives Relating to Use of Personnel Friskers

A review of the practices used by plant personnel in monitoring their clothing and exposed skin prior to exiting the radiation control zone revealed some questions as to whether individuals are complying with plant directives. Failure of plant personnel to comply with plant directives would be in noncompliance with Technical Specification 6.4.1. This item is discussed further in paragraph 6.

4. Radiation Surveys

- a. 10 CFR 20.201(b) requires that each licensee make or cause to be made such surveys as may be necessary for him to comply with the regulations in this part. 10 CFR 20.203(b) states that "each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words CAUTION RADIATION AREA. 10 CFR 20.202(b)(2) states, in part, "Radiation area means any area, accessible to personnel in which there exist radiation. . . at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem. . . ."
- b. During a tour of the Interim Radwaste Building the inspector requested the accompanying licensee representative perform radiation surveys in the accessible areas of the building. Radiation levels in three separate areas were found to exceed 5 mr/hr (corridor leading to Room 390-15 mr/hr; corridor leading to Room 391-9 mr/hr and near entrance to evaporator Room-25 mr/hr). None of these areas were posted as radiation areas.
- c. The source of the radiation levels near the entrance to the evaporator room was found to be a hose running from a sample drain in the evaporator room to a low activity floor drain

located approximately four feet from the door to the room. The hose was reading approximately 200 mr/hr on contact and 25 mr/hr approximately 3 feet from the hose. No markings on the hose or signs in the area indicated the hose was carrying radioactive liquid or that the hose could be a radiation source. A licensee representative stated that the hose had been in use for approximately one year and that radioactive liquid was transferred through the hose several times per day. An inspector expressed concern that plant personnel are performing task which change radiological conditions without a health physics review. A licensee representative stated that the hose had been relocated to discharge to a floor drain in the evaporator room which is a locked high radiation area and that the building had been permanently posted as a radiation area. The inspector stated that failure to perform the surveys necessary to ensure compliance with 10 CFR 20 was in noncompliance (269/270/78-15-02; 287/78-16-02) with 10 CFR 20.201(b).

5. Effluent Release Monitoring and Records

- a. An inspector reviewed the Semiannual Radiation Effluent Release Reports for the period of July 1977 through June 1978 and discussed the report with licensee representatives. The review included a comparison of data in the reports with the release limits in Technical Specifications. The inspector noted a mathematical error in the report for the period of July through December 1978. The reported listed the total activity in solid waste shipped offsite as 7366.7 curies, whereas the total should have been 7267.7 curies. A licensee representative stated that action would be taken to ensure the accuracy of reports provided to the NRC. The inspector also reviewed the records relating to individual liquid waste releases for the month of July 1978 and discussed the records with licensee representatives. He observed that the liquid waste release form (enclosure 10.19 of Plant Procedure OP/O/A/1104/32) did not include the total activity released from the station for the quarter prior to the release, nor did it include an estimate of the activity to be released. The inspector commented that the individual responsible for authorizing the release should have that information available to determine whether or not the release will result in exceeding Technical Specification 3.9.4. The inspector identified this as an open item for followup (269/270/ 78-15-05;287/78-16-05).
- b. The inspector toured areas of the plant and observed that the effluent monitors were installed as required, were operable and that the pertinent data were being recorded.

- c. The inspectors observed the filtering of resin out of a flush water stream from the Unit 3 miscellaneous waste holdup tank and discussed the transfer operation with a Chem-Nuclear Services, Inc. representative. A licensee representative stated that resin had inadvertently entered the tank when a retention element failed during the back flushing of Unit 3 purification demineralizer. The inspectors also observed the transfer of concentrated radioactive liquid to a Chem-Nuclear processing trailer for solidification and discussed the operation with a Chem-Nuclear representative. The inspector had no further questions concerning the transfer of radioactive material to Chem-Nuclear.
- d. An inspector reviewed the accountability records for gaseous releases from the Interim Radwaste Building. Gaseous activity in the building is monitored by a radiation monitor (RIA-53); gaseous particulate and iodine grab samples are performed on a daily basis. Activity released from the building is calculated based on the grab sample results and measured air flow discharged from the building.

6. Contamination Control

- a. During a tour of the auxiliary building the inspectors observed that many of the RM-14 personnel friskers used for monitoring personnel for radioactive contamination prior to exiting the radiation control zone were set on the X10 scale. A licensee representative stated that the instrument could not be operated on the more sensitive X1 scale due to the high background radiation levels in the area of the friskers. Enclosure 5.1 to plant directive 3.8.10 (copy posted at each frisker) gives specific instructions to personnel to proceed to another exit where the instrument is set on X1 scale and frisk if the frisker at the original locations was on the X10 or greater scale. The inspectors and a licensee representative went to three locations before a personnel frisker could be found that was operating on the most sensitive (X1) scale. On another occasion an inspector and a licensee representative observed a member of the security force leaving the radiation control zone at the north end of the auxiliary building. The RM-14 personnel frisker used by the individual was found to be inoperative (high voltage indicator light was out and no meter or audible response to background radiation). An inspector expressed concern that the high background in the vicinity of a number of personnel friskers made it difficult for plant personnel to find a frisker on the most sensitive scale and thus has probably resulted in a lax attitude toward frisking. Personnel are probably exiting potentially contaminated areas without frisking with an

instrument sensitive enough to ensure contamination levels on personnel are below the limits specified in Duke Power Company's System Health Physics Manual (0.05 mrem/hr). The inspector also expressed concern that individuals may be frisking with inoperative instruments and this too may be indicative of a lax attitude toward frisking or inadequate training of personnel. A licensee representative stated that high background in the vicinity of friskers has been a problem for over a year and that a work order had recently been issued and the materials ordered to construct five shielded booths for evaluation. If the booths are successful in lowering the background, additional booths would be constructed. An inspector commented that the licensee should also consider evaluating the sources of high background radiation levels and eliminating the source, if possible. A licensee representative stated that some sample lines in one area had been identified as the source and maintenance orders had been issued to relocate the lines. The inspector stated that this item would be unresolved (269/270/78-15-03; 287/78-16-03) pending further review by an inspector during a subsequent inspection.

- b. An inspector reviewed the surface contamination smear surveys for the Interim Radwaste Building, toured the building and discussed the contamination monitoring program with a licensee representative. Smear surveys for loose surface contamination are performed in the corridors outside the posted contamination areas on a biweekly basis and surveys of step-off pads at the exit to contamination areas are performed daily. The inspector expressed concern that more frequent smear surveys are not performed in the corridors of the building, particularly since the personnel frisker at the exit of the building is operated on the X10 scale due to high background radiation levels in the area. A licensee representative stated that the frequency of the smear survey would be changed to weekly.
- c. During the plant tour the inspectors noted a posted "Contamination Area" outside the Interim Radwaste Building in the vicinity of the Chem-Nuclear solidification trailer. The sign posted on the barrier indicated the contamination levels in the area were approximately 400 dpm/100cm². A licensee representative stated that the contaminated area resulted from a packing leak in a valve in the line running from the Interim Radwaste Building to the Chem-Nuclear trailer which was discovered during the week of June 26, 1978. The licensee began cleaning up the area on August 3, 1978. The inspector commented that the contamination levels may be much higher than indicated due to the difficulty in obtaining good smear results on gravel. The inspector expressed

concern that the contaminated area had not been promptly cleaned up, since the potential existed for the release of radioactivity to unrestricted areas due to wind action.

- d. The inspectors noted that portal monitors were located in the corridor leading from the auxiliary building but were not in use. A licensee representative stated that the monitors had been on site since May 1978; however, they were not received in an operable condition. The portal monitors have been repaired and they are awaiting the issue of approved procedures for calibration and use. An inspector expressed concern over the low priority given to implementing the use of portal monitors and the intent of the licensee not to use portal monitors as a final check of all personnel leaving the radiation control zone.

7. Effluent Radiation Monitors

- a. An inspector discussed with licensee representatives an event which occurred at another facility involving the condenser air ejector discharge monitor. As a result of a significant leak in a steam generator tube, the monitor spiked momentarily but then went downscale due to saturation of the G-M detector. Oconee uses beta scintillation detectors in the air ejector monitors; however, both the waste gas tank high activity monitors and the plant vent gas high activity monitors use G-M detectors. Licensee representatives agreed to review the instrument technical manual for the latter two monitors to determine if current mode circuitry is used to preclude saturation of the G-M detectors. The inspector stated that this would be reviewed during a later inspection (269/270/78-15-06; 287/78-16-06).
- b. The inspector also discussed an event at another facility wherein a continuous iodine stack monitor gave erroneous readings due to the detection of noble gases. Oconee routinely uses charcoal absorbers in the continuous iodine vent monitors; however, the Station Health Physicist stated that they are aware of the charcoal absorption of noble gases if high activity levels occur, and silver zeolite absorbers are available if needed for that purpose. The inspector had no further questions.

8. Compressed Gas Bottles

During a previous inspection (RII Rpt. Nos. 50-269/270/287/78-7), an inspector expressed concern with compressed gas bottles in the auxiliary and turbine buildings which were not well secured. During this inspection, improperly secured compressed gas bottles were observed

during a tour of the interim radwaste building. Licensee representatives again acknowledged the inspector's comments, and stated that additional emphasis would be applied through internal inspections and management discussions.

9. Neutron Monitoring Practices

An inspector reviewed the licensee's program for evaluating and assigning personnel neutron exposures. No neutron film or neutron-sensitive TLD is currently used at the plant. Personnel neutron exposures are assigned based on stay time in the reactor building at power and rem-meter survey results. An inspector reviewed records and verified that neutron doses are calculated and included in the NRC-5 equivalent computer printout. The Station Health Physicist stated that entries into the reactor building at power are infrequent; no routine, periodic entries are made. He said that all entries inside the secondary (crane wall) shielding on the operating deck or basement level are accompanied by a health physics technician with a rem-meter survey instrument. At the request of an inspector, licensee representatives provided summary neutron exposure data for calendar year 1977, which indicated 32 individuals were assigned neutron dose (although 20 of these were less than 5 mrem and considered zero) for a total of 1.05 neutron man-rem. The inspector had no further questions.

10. Followup of Reactor Coolant Overflow of May 4, 1978

On May 4, 1978, reactor coolant overflowed into the reactor building through an open manway on the primary side of a steam generator (Ref: RII Insp. Rpt. 50-269/78-11). A written report describing the incident was submitted by Duke on May 19, 1978. During this inspection, an inspector reviewed records of radiation surveys conducted in the reactor building prior to the overflow, after the cleanup and decontamination of the overflow, and during the current inspection (August 3). The inspector stated that, although the survey records did not support the statement in the May 19, 1978 report that radiation levels after the incident were less than those before the incident, the general radiation levels appeared to be about the same as prior to the overflow. The inspector had no further questions.

11. Shipment of Irradiated Fuel Assemblies

- a. The transfer of four irradiated fuel assemblies from Oconee to the Crystal River plant was initiated during this inspection. The assemblies were shipped by truck one at a time in Nuclear Assurance Corp. NAC-1 casks.

- b. When the inspectors arrived on site on July 26, the first assembly had been loaded into the cask. On July 27, the inspectors observed the loaded cask in the spent fuel pool building during decontamination. A licensee representative said the cask had been left overnight in the dry decontamination pit. The inspectors noted that OP/O/A/1510/4, "Spent Fuel Shipping, NAC-1 Cask," states that the cask should be thoroughly rinsed as it emerges from the pool and should be kept wet, until decontamination begins, to prevent airborne contamination. The licensee representative said it was better to store the cask in dry pit than to leave it in the spent fuel pool where contamination might become more deeply imbedded. The inspectors concurred, but stated that health physics should be informed in such cases in order that closer surveillance of airborne activity might be carried out.
- c. The inspectors observed health physics personnel conduct radiation and contamination surveys during the night of July 27/28, after the cask was loaded on the trailer. Radiation levels at contact with the cask were generally 8-10 mr/hr gamma and less than 1 mrem/hr neutron, with a maximum reading of 30 mr/hr gamma at contact with the bottom of the cask. About 65 contamination swipes were taken on the cask; the results of many of these were greater than the plant's beta-gamma limit of 2,000 dpm/100 cm². Several evolutions of additional decontamination and swipes were accomplished until all results were less than the above limit. Results of all swipes taken on the trailer were less than the plant beta-gamma limit of 200 dpm/100 cm². No significant alpha contamination was detected on either the cask or the truck.
- d. While observing the radiological surveys, the inspectors noted that the right front trunnion tie-down bracket (one of four which secures the cask to the trailer) was partially sprung and not bolted flush to the trailer. Step 6.7 of Procedure OP/O/A/1510/4, "Spent Fuel Shipping, NAC-1 Cask," which had been initialed as completed, specified that the two fore and the two aft trunnion tie-downs were to be latched and the tie-down nuts torqued to 50 ft-lbs. Also, step 6.8 of the same procedure, which had been initialed as completed, specified that the four bolts on the closure head impact limiter were to be torqued to 60 ft-lbs. In response to the inspectors' questions, the cognizant engineer said that no torque wrench had been used in either of the above cases, but that the force applied probably exceeded the specified values. The inspectors cited the failure to follow the operating procedure as noncompliance with Technical Specification 6.4.1, which requires that the station be operated and maintained in

accordance with approved procedures (269/270/78-15-01;287/78-16-01). Licensee representatives straightened the tie-down bracket, secured it nearly flush to the trailer, and torqued the nuts to the specified values.

- e. The inspectors reviewed Certificate of Compliance No. 6698, Rev. No. 5 for the NFS-4/NAC-1 cask. In comparing this with Procedure OP/O/A/1510/4, the inspectors noted that the Certificate specified a maximum decay heat generation of 11.5 kw, whereas the procedure step specified determining the rate of cask cavity temperature rise. The cognizant engineer said that a separate curve was used to verify that the rate of temperature rise represented an acceptable heat generation. Based on the inspectors' comments, a change to the OP, incorporating the cask cavity water heatup curve, was approved on 8-1-78.
- f. Prior to departure of the shipment on July 28, the inspectors verified that the cask and truck were labelled and posted in accordance with Department of Transportation (DOT) requirements, that radiation and contamination limits were within DOT requirements, and that the appropriate documentation had been completed. After receipt of the shipment at its destination, Region II was notified by Florida Power Corporation (FPC) that contamination swipes on the cask indicated general beta-gamma levels of about 30,000 dpm/100 cm² and a maximum of about 100,000 dpm/100 cm². Tests conducted by FPC were inconclusive, but did not appear to indicate that the excessive surface contamination resulted from any leakage of cask contents. Licensee representatives speculated that the increased surface contamination resulted from leaching or migration of sub-surface contamination during transit. Region II contacts with other licensees and persons experienced with large cask shipments confirmed that this phenomenon has been experienced.
- g. The inspectors were also on site during the preparation and shipment of the second assembly, which departed Oconee on August 4. About 85 swipes were initially taken on the cask after it was loaded on the truck. (The cask had been decontaminated prior to loading on the trucks.) About 25 of these swipe results were above 2,000 dpm/100 cm² beta-gamma. Decontamination was continued until all results were less than 2,000 dpm/100 cm². At this time, an inspector took 12 independent swipes on the cask. These were counted at the Region II office on August 7, using a portable scaler with HP-210 pancake probe. The results indicated that seven of the swipes were above 2,000 dpm/100 cm² beta-gamma, with a maximum of about 4,200 dpm/100 cm². The inspector provided

these results to a licensee representative by telephone on August 8, and stated that the licensee's counting and instrument calibration procedures would be reviewed during a subsequent inspection (269/270/78-15-04; 287/78-16-04). The inspector noted that there was about a 12 hour time lapse between his swipes and most of those taken by the licensee. After receipt of this second shipment, Region II was again notified by FPC that contamination on the cask was above the 10 CFR 20.205 reporting limits of 22,000 dpm/100 cm². FPC reported general levels of 15,000-20,000 dpm/100 cm² with hot spots of about 30,000 and 118,000 dpm/100 cm².

- h. A licensee representative stated by telephone on August 9 that the cask for the third assembly was being swiped with cloth-type swipes, which appeared to have a greater removal efficiency than the Whatman-41 paper previously used.
- i. The greater contamination removal efficiency of the cloth-type swipes apparently resulted in a more thorough decontamination of the casks used for the shipment of the third and fourth assemblies. FPC reported that these casks both arrived at Crystal River with loose surface contamination levels that were less than the reporting limit of 22,000 dpm/100cm².

12. Exit Interview

The inspectors met with management representatives (denoted in paragraph 1) on July 28, 1978 and again on August 4, 1978 and summarized the scope and findings of the inspection. Items discussed included two items of noncompliance and one unresolved item identified during this inspection.