



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

JUN 24 1985

Report Nos.: 50-269/85-14, 50-270/85-14, 50-287/85-14, 50-369/85-19,
50-370/85-20, 50-413/85-21, and 50-414/85-20

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

Docket Nos.: 50-269, 50-270, 50-287
50-369, 50-370, 50-413
and 50-414

License Nos.: DPR-38, DPR-47,
DPR-55, NPF-9,
NPF-17, NPF-35 and
CPR-117

Facility Name: Duke Power Company's Environmental Radiological Laboratory
Oconee 1, 2, and 3, McGuire 1 and 2, and Catawba 1 and 2

Inspection Conducted: May 28-31, 1985

Inspector:

D. M. Montgomery
W. B. Gloersen

6-13-85
Date Signed

Accompanying Personnel: D. M. Montgomery
S. S. Adamovitz

Approved by:

D. M. Montgomery
D. M. Montgomery, Section Chief
Division of Radiation Safety and Safeguards

6-13-85
Date Signed

SUMMARY

Scope: This routine, unannounced inspection entailed 50 inspector-hours on site in the areas of radiological environmental and meteorological monitoring programs at the McGuire Nuclear Power Station and implementation of quality assurance at Duke Power Company's Environmental Radiological Laboratory including a review of the audits and appraisals, staffing, and training program.

Results: No violations or deviations were identified.

8507110172 850624
PDR ADOCK 05000269
Q PDR

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *T. McConnell, Station Manager (MNS)
- **W. Adair, Manager, Production Environmental Services (DPC)
- ***P. Wingo, System Environmentalist (DPC)
- ***W. Carter, Supervisor, Radiological Health Subunit (DPC)
- **S. Jones, Junior Health Physicist (DPC)
- *N. McCraw, Compliance Engineer (MNS)
- *W. McDowell, Licensing
- B. Propst, Junior Engineer, I&E (MNS)
- M. Majure, Environmental Engineer (DPC)
- M. Hayden, Engineering Specialist (DPC)
- B. Broadway, Health Physics Specialist (DPC)
- L. McDermid, Health Physics Specialist (DPC)
- C. Bonus, Junior Health Physicist (DPC)

NRC Resident Inspectors

- *W. Orders
- *R. Pierson
- *Attended exit interview
- **Attended pre-exit interview at the Environmental Radiological Laboratory
- ***Attended both pre-exit and exit interviews

2. Exit Interview

The inspection scope and findings were summarized on May 31, 1985, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. One inspector follow-up item concerning procedural changes (paragraph 6.b) was discussed. Licensee management acknowledged the inspector's comments and expressed no contrary opinions. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters (92702)

(Closed) 50-269/84-19-02, 50-270/84-18-02, and 50-287/84-20-02, Failure to meet applicable sensitivity limits for environmental radiochemical analyses. The licensee stated that the reasons for the violation were mainly due to large quantities of solids in the water samples resulting in not meeting

several gross alpha sensitivities, sample backlog problems at the Environmental Radiological Laboratory due to a shortage of trained personnel resulting in excessive count times for Sr-89 analyses, and variation in the temperature and humidity in the laboratory possibly causing instrument abnormalities during the period from January through December 1983. The inspectors reviewed the licensee's response to the violation and the corrective actions taken to avoid further noncompliance. The licensee implemented a program to ensure adequate sample volumes are collected and that samples are shipped promptly to the laboratory. Additionally, appropriate environmental limits for radioanalytical instrument operations were defined and an engineering evaluation was made to determine the necessary ventilation modifications. Additional staffing positions for the Environmental Radiological Laboratory were approved and partially filled. An evaluation of the analysis procedures for water samples with large quantities of solids present was conducted to provide guidance on the actions taken when that type of sample was encountered. This item is considered closed.

4. Employee Concerns, Discussions and Findings

a. Concerns

The following employee concerns were identified: (1) adequate temperature control could not be maintained in the Environmental Radiological Laboratory (ERL); (2) the Body Burden System at the ERL was experiencing problems and was out of service since November 1984; and (3) the Environmental Radiological Laboratory was understaffed and lab technicians were inexperienced in the environmental monitoring area and in evaluating nuclear data.

b. Discussion

The employee concerns were based on an approximately 2 1/2 year time period. During this time period the employee noted reluctance on the part of supervision to act in a timely manner to correct problems identified in the laboratory even though these problems were brought to supervision's attention. The inspector interviewed laboratory personnel and determined that temperature and humidity controls in the laboratory were not adequate in that temperature differentials of ten degrees were typical. As an interim fix, the licensee installed an automatic condenser by-pass on the facility (verified by letter dated April 1, 1985). As a permanent fix, the licensee had drafted plans to upgrade the entire ventilation system. At the time of this inspection, environmental conditions in the laboratory were adequate.

The inspector determined that the Body Burden System was experiencing problems during the latter part of 1984 and had been out of service intermittently since that time. The Body Burden System was out of service at the time of this inspection. The Body Burden System at the

ERL was used mainly for General Office personnel and as a backup to the McGuire Nuclear Station. The inspector noted that the Body Burden System at the McGuire Nuclear Station was operable.

Through interviews with licensee personnel, the inspector determined that the Environmental Radiological Laboratory was understaffed which resulted in sample backlogging problems and an NRC violation for failure to meet required analytical sensitivities for a total of 42 samples during the period January through December 1983 (50-269/84-19-02, 50-270/84-18-02, and 50-287/84-20-02). The licensee's response to the violation indicated that some of the sensitivities were not met due to both environmental conditions in the laboratory possibly causing instrument abnormalities and a shortage of trained personnel due to personnel turnover resulting in a sample backlog which made some normal counting durations unacceptably long. During this inspection, the ERL was comprised of a Junior Health Physicist, who was the Laboratory Coordinator, and two Health Physics Specialists, all qualified to work in the radioanalytical lab. Additionally, there were three technicians in training who were hired during 1984. The licensee stated that the Environmental Radiological Laboratory was budgeted for two more positions in 1985. The licensee recently developed a comprehensive training and qualifications program described in the Radiological Health Physics Procedures Manual, Section 4.0 "Radiological Health Training and Qualification Program." The program was developed so that inexperienced technicians would become qualified to work independently in the radioanalytical lab. The licensee stated that the ERL staff was working overtime to meet the environmental sampling and analysis requirements described in the plant-specific technical specifications.

c. Finding

The employee concerns regarding inadequate temperature control in the ERL, electronic problems with the ERL's Body Burden System, and staffing problems at the Environmental Radiological Laboratory were all substantiated. Corrective actions are being implemented to alleviate the employee's concerns.

5. Audits and Appraisals (80721)

Technical Specification 6.5.2.9 required audits of station activities to be performed under the cognizance of the Nuclear Safety Review Board (NSRB), including the Radiological Environmental Monitoring Program and the results thereof at least once per twelve months. The inspectors reviewed selected portions of QA Departmental Audit, PS-84-2(PS) conducted April 24, 1984 - May 16, 1984, dated June 15, 1984. The inspectors reviewed the draft QA Departmental Audit findings for 1985 PS-85-1(PS), however the formal report had not been issued at the time of this inspection. The inspectors noted that the Environmental Radiological Laboratory (ERL) program was audited against Regulatory Guide 4.15. The inspectors noted that the licensee had

developed a radiological health training and qualification program in response to an audit finding in PS-84-2(PS). The inspectors also noted that the licensee developed a program to inventory the various radiological sources in the laboratory in response to an audit finding in PS-85-1(PS).

Additionally, the inspector reviewed an ERL audit conducted by the System Health Physics Unit of Nuclear Technical Services conducted February 19 - 20, 1985 (File: GS-750.05, 778.00, March 28, 1985). This comprehensive audit was more accurately described as a "program assessment" of the Environmental Radiological Laboratory. The assessment covered a broad range of activities including staffing, personnel communications, communications between the ERL and the nuclear stations, laboratory QC, and calibrations. The licensee stated that this was the first assessment of this type performed and that future assessments would be incorporated into the annual QA audit program. The inspectors noted that incorporation of this kind of assessment into the QA audit program would enhance the quality of the audit and improve the overall program. The ERL staff had prepared responses to the assessment findings and were tracking the items in a similar manner to the QA audit findings.

Within the areas inspected, no violations or deviations were identified.

6. Procedures (80721)

- a. McGuire Nuclear Station Environmental Technical Specification 6.8.1.g required written procedures to be established, implemented and maintained covering the quality assurance program for effluent and environmental monitoring. The inspectors selectively reviewed the following procedures:
 - (1) ER/O/B/1000/03 Preparation of Environmental Radiological Monitoring Program Annual Report, Rev. 1, February 24, 1984
 - (2) ER/O/B/1000/07 Annual Land Use Census for McGuire Nuclear Station, July 12, 1984
 - (3) ER/O/B/2100/01 Receipt, Storage, Analysis and Disposal of Environmental Samples, Rev. 2, February 11, 1984
 - (4) ER/O/B/2100/02 Shipment of Samples to Vendor for Analysis, Rev. 2, February 1, 1984
 - (5) ER/O/B/2200/02 Radiological Environmental Sample Collection Program for the McGuire Nuclear Station Rev. 1, May 23, 1985
 - (6) ER/O/B/2300/01 Preparation of Samples for Gamma Analysis, Rev. 2, February 23, 1984
 - (7) ER/O/B/2300/02 Preparation of Samples for Alpha and Beta Analysis, Rev. 1, February 2, 1984

- (8) ER/O/B/2300/03 Preparation of Samples for Low-Level Iodine-131 Analysis, Rev. 1, February 3, 1984
- (9) ER/O/B/2400/01 Preparation of Sample Analyses Reports and Unavailable Analysis Reports, and the Review and Distribution of Analysis Data, Rev. 2, February 2, 1984
- (10) ER/O/B/3000/01 Daily Instrument Linearity, Source and Background Check, Rev. 5, December 8, 1984
- (11) ER/O/B/3000/02 Radioactive Standard Preparation Rev. 4, September 4, 1984
- (12) ER/O/B/3000/03 Analysis of EPA Environmental Cross-Check Sample, Rev. 2, February 1, 1984
- (13) ER/O/B/4100/03 Operation of the Tennenlic Series II LB5100 Low Background Alpha/Beta Counting System, August 7, 1984
- (14) ER/O/B/4100/04 Operation of the Nuclear Data 6600 Computer-Based Gamma Analysis System, Rev. 3, February 1, 1984
- (15) ER/O/B/4200/01 Laboratory Radiation Measurement System Efficiency Calibration, Rev. 2, February 1, 1984
- (16) ER/O/B/4200/02 Calibration of Low Background Gas Flow Proportional Detector Systems, Rev. 3, December 18, 1984
- (17) ER/O/B/6000/01 Receipt, Storage and Disposition of Radioactive Material, Rev. 3, February 3, 1984
- (18) Radiological Health Procedures Manual, Duke Power Company, Production Support Department, Production Environmental Services, Health Sciences Unit,

- Section: 1.1 Organization and Responsibilities
- 4.1 Training Program Description
- 4.2 Qualifications Program Description
- 4.3 Training and Qualifications Administration
- 4.4 Documentation
- 5.1 Procedures Format
- 5.4 Procedure Preparation, Review and Approval
- 6.7 Basic Laboratory and Field Safety

The inspectors noted the procedures were being reviewed, updated and approved.

- b. The inspectors noted that ER/O/B/2200/02 Section 4.3 did not indicate mixing of the surface water in the collection drum prior to sampling. The inspectors informed licensee representatives that failure to mix the composite could result in inaccurate sampling. Licensee representative stated that the procedure in question would be evaluated. The inspectors noted that ER/O/B/2300/01 Step 4.1.1 stated that water samples were to be mixed thoroughly to distribute solids for gamma analysis. The procedure did not take into account the changes in counting geometry due to solids settling. Licensee representatives agreed to evaluate this area. The inspectors noted that the procedures did not adequately describe a formal means to review anomalous data with provisions for timely and appropriate followup. The licensee informed the inspectors that procedures were being developed to cover this area. These items will be reviewed during future inspections (50-369/85-19-01 and 50-370/85-20-01).

Within the areas examined no violations or deviations were identified.

7. Records, Reports, and Evaluations (80721)

- a. The inspectors reviewed selected portions of the following records:

- (1) EPA crosscheck results for 1984 and 1985 including:
 - ° Gross alpha, gross beta, and Cs-137 in air filters
 - ° Gross alpha, gross beta, I-131, and mixed gamma in water
 - ° I-131 and mixed gamma in milk
- (2) Quality control notebook for proportional counters which included results and evaluations of EPA cross-checks, low-level I-131 blanks and replicates.
- (3) Tennelec Series II LB5100 detector numbers SN340, 487, and 518 QC logs for 1984 to May 1985 including:
 - ° Gross alpha and beta calibrations - 1984
 - ° Alpha and beta daily background and reliability (source) checks
 - ° Equipment history logbook
- (4) Nuclear Data 6600 Ge(Li) Gamma Spectroscopy System Detectors A, B, and C daily quality control source checks for November 1984 to May 1985

- (5) Ge (Li) Gamma Spectroscopy Systems 1984 efficiency calibrations for the following geometrics: 47 mm filter, 2 inch planchet and filter, CP-100 charcoal cartridge, and 50 ml bottle for detectors A, B, and C
 - (6) Equipment history logbook for ND6600 Ge(Li) Gamma Spectroscopy Systems for December, 1984 to May, 1985
 - (7) Quality Control notebook for gamma detectors which included results and evaluations of blanks, calibration checks, EPA cross-checks, and replicates
 - (8) Interstation cross-check results for 1984 and 1985 including gamma in water charcoal cartridges, 2 inch air filters and alpha smears
 - (9) McGuire Nuclear Station Annual Radiological Environmental Operating Reports - January 1, 1983 - December 31, 1983 and January 1, 1984 - December 31, 1984
 - (10) TLD data for McGuire Nuclear Station for January to December 1984
 - (11) Task Skill Forms for three Environmental Radiological Laboratory employees
- b. In reviewing Daily Source Check Graphs for ND6600 Detectors A and B, the inspectors noted a negative trend for Detector A from November 1984 to May 1985. Detector B showed a positive trend for the same time period. Although both trends were within the two-sigma limit, no mention of either trend was made in the Equipment History Logbook indicating the data was not being reviewed thoroughly. Licensee representatives agreed to evaluate this area.
 - c. Technical Specification 6.9.1.6 requires an Annual Radiological Environmental Operating Report covering operation of the unit during the previous calendar year to be submitted prior to May 1 of each year. The inspectors reviewed the McGuire Nuclear Station Annual Radiological Environmental Monitoring Program Operating Reports for January 1, - December 31, 1983 and January 1 - December 31, 1984. The inspectors reviewed the reports for omissions, obvious mistakes, anomalous measurements, observed biases, and trends in the data. The inspectors noted in the 1984 Annual Radiological Environmental Operating Report that prior to April 1984, air filter and cartridge samples were counted as a composite as opposed to being counted separately. The licensee had identified this problem and subsequent to April 3, 1984, the air filter and cartridge samples were counted separately. The inspectors also noted that the licensee identified the need to perform weekly gross beta analyses on air filters in response to an interpretation of Technical Specification 3.12.1. These analyses began on September 1, 1984. The 1984 Radiological Environmental Monitoring Operating Report

also indicated that I-131 analyses for drinking water composites and surface water composites during October 1984 did not meet the lower limit of detection (LLD) specifications. As required by Technical Specifications 4.12.1, Table 4.12.1 and 6.9.1.6, the licensee identified and described the reasons for not meeting the LLDs. The licensee purchased two additional alpha/beta counters in 1984 to avoid future incidences of missed LLDs due to sample backlog. This area will be reviewed during future inspections.

8. Implementation Of The Radiological Environmental And Meteorological Monitoring Programs (80721)

The inspectors conducted a detailed review of the radiological environmental monitoring and surveillance program to determine if the status of the program was consistent with sampling, analytical requirements, and schedules defined in Table 3.12-1 of the Environmental Technical Specifications. The inspection included the following: (1) review and discussion of monitoring, surveillance, and radiological procedures; (2) review of selected sampling and analytical logs; (3) examination of all air particulate and radioiodine monitoring stations; (4) examination of selected area TLD stations (5) examination of a dairy farm for milk sampling; (6) examination of a continuous surface water sampler and a ground water sampling station, and (7) examination of a shoreline sediment sampling station and two vegetation sampling sites. The inspection disclosed that the radiological environmental monitoring and surveillance program was implemented in accordance with Environmental Technical Specification requirements.

The inspectors verified by direct observation and by record review that the meteorological monitoring instrumentation channels required by Technical Specification 3.3.3.4 were operable and maintained. The inspectors reviewed the meteorological monitoring instrumentation channel calibration records for the wind speed, wind direction, and air temperature - Delta T sensors. The inspectors verified that the sensors were calibrated semiannually during 1984 and the first half of 1985 as required by Table 4.3-5 in the technical specifications. The inspector verified that the meteorological readouts in the control room were functioning properly. The licensee used strip chart records to record wind speed, wind direction, and air temperature - Delta T. Meteorological data in the control room were also obtained by means of computer readout. The licensee performed weekly functional checks of the meteorological instrumentation channels by means of a voice relay between the control room and meteorological tower.

Within the areas examined, no violations or deviations were identified.

9. Facilities, Equipment and Supplies (80721)

The inspectors toured the Environmental Radiological laboratory facilities and noted an orderly laboratory with adequate cleanliness. Space and configuration of the wet chemistry laboratory and the counting room allowed for efficient processing and analyzing of environmental samples.

The inspectors noted recent additions to the laboratory counting room equipment. In 1984, two Tennelec proportional counters and one additional Ge(Li) gamma detector were acquired. Additionally, the ERL Staff was increased by hiring three entry-level technicians. It was noted that two positions were still open. Licensee representatives indicated that the additional equipment and personnel should alleviate previous sample backlog problems.

Within the areas inspected, no violations or deviations were identified.

10. Quality Assurance Program (80721)

The inspectors reviewed the licensee's quality assurance program for the Duke Power Company's Environmental Radiological Laboratory which was the corporate laboratory supporting the operational radiological environmental monitoring programs at the licensee's Catawba, McGuire, and Oconee facilities. The inspectors used the guidance contained in Regulatory Guide 4.15 (Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment - February 1979) to evaluate the licensee's program.

The licensee's organizational structure as it related to the management and operation of the monitoring programs, including quality assurance policy and functions, was defined. The duties responsibilities, and authorities of the positions within the organization were described in the Radiological Health Procedures Manual. Responsibilities for initiating, writing, reviewing, and approving procedures were also described in the Radiological Health Procedures Manual. The inspectors noted that the licensee was developing a procedure for the review and evaluation of environmental monitoring data and reports.

The qualifications of individuals involved in radiological monitoring and analysis activities were specified and documented. The indoctrination and orientation program for new technicians was described in the Radiological Health Procedures Manual Section 4.0. Laboratory technicians and analysts were qualified for selected radiochemical and analytical procedures after a formalized training check-off list was completed. Although presently the licensee does not have a formal requalification program, licensee representatives agreed that each qualified technician should participate in the EPA cross check program to maintain laboratory analytical skills.

The licensee had the ability to track and control various environmental samples by maintaining records for field collection of samples, radioactivity measurements of samples, and instrument background. Quality control records for laboratory counting systems included the results from measurements of radioactive check sources, calibration sources, backgrounds, and blanks. Daily QC logs were maintained and kept next to the appropriate laboratory counting systems. The inspectors noted that records were well organized and easily accessible.

The inspectors reviewed the Environmental Radiological Laboratory's procedures for environmental sample collection. In addition to sample analysis, laboratory personnel were responsible for McGuire Nuclear Station sample collection activities. The procedures specified sample types, sampling frequency, method of sample collection, and sample analyses.

The inspectors noted the Environmental Radiological laboratory quality control program included the use of NBS traceable reference standards to determine counting efficiencies for specific radionuclides and to determine counting efficiency as a function of gamma-ray energy for gamma-ray spectrometry systems. The licensee also conducted daily performance checks of laboratory counting system and the results of these measurements were recorded in a log and plotted on a control chart. The inspectors also noted that the licensee's QC program was involved with interlaboratory crosscheck analyses. The interlaboratory program included participation in EPA's Environmental Radioactivity Laboratory Intercomparison Program and the licensee's in-house intercomparison program.

11. Inspector Followup Item (92701)

(Closed) 50-413/84-21-01 and 50-414/84-13-01, Qualification Records of Laboratory Personnel. This item pertained to the inspection finding that qualification records for laboratory personnel were inadequate and that some qualification records were not available. The inspectors noted that the licensee had developed a radiological health training and qualifications program which included the completion of formalized training check-off lists as a technician became qualified to perform a particular radioanalytical procedure. The inspectors reviewed individual training and qualification records of selected laboratory personnel and determined that the records were complete and in order. This item is considered closed.