



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

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Report Nos.: 50-369/88-16 and 50-370/88-16

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

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection Conducted: June 20-24, 1988

Inspectors: C. M. Hosey 7/26/88
 F. N. Wright Date Signed

W. B. Gloersen 7/26/88
 W. B. Gloersen Date Signed

Approved by: C. M. Hosey 7/26/88
 C. M. Hosey, Section Chief Date Signed
 Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of occupational exposure during extended outages.

Results: In the areas inspected, there were no violations or deviations identified. Continued improvement in the licensee's ALARA program is needed to reduce the facilities person-rem totals to those comparable with the national averages.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *N. Atherton, Compliance Engineer
- C. Bailey, Dosimetry and Records Supervisor
- W. Byrum, Supervising Scientist (HP)
- L. Criminger, Health Physics Shift Supervisor
- J. Drew, Senior Specialist (HP)
- *D. Ethington, Compliance Engineer
- *J. Foster, Station Health Physicist
- *G. Gilbert, Technical Assistant
- P. Huntley, Health Physics Supervisor
- S. Lacey, Senior Specialist (HP)
- *S. LeRoy, Licensing
- *T. McConnell, Station Manager
- T. McGee, ALARA Supervisor
- L. McKenzie, Associate Instructor
- R. Norcutt, Maintenance Outage Coordinator
- C. Taylor, Director Training Support
- L. Weaver, Station Training Manager

Other licensee employees contacted during this inspection included engineers, operators, technicians, and administrative personnel.

NRC Resident Inspectors

- *R. Croteau
- *D. Nelson
- *W. Orders

*Attended exit interview

2. Training And Qualifications (83723)

Technical Specification 6.3.1 requires each member of the unit staff to meet or exceed the minimum qualifications of ANSI N18.1-1971 for comparable positions, except for the Radiation Protection Manager who shall meet or exceed the qualifications of Regulatory Guide 1.8, September 1975. Additionally, Paragraph 4.5.2 of ANSI N18.1 states that technicians in responsible positions shall have a minimum of two years working experience in their speciality.

The inspectors determined from a selective review of records and discussions with licensee representatives that the licensee had 186 ANSI N18.1 qualified health physics technicians as of the week of June 20, 1988. Of the 186 ANSI qualified HP technicians, 118 technicians were contractors and 68 technicians were Duke Power Company employees.

The inspectors also reviewed the licensee's training organization and its relationship with the radiation protection organization. The health physics training group was part of the technical services division. The inspector observed that the licensee's health physics training group and the radiation protection organization had established a good working relationship which resulted in an effective health physics training program. Lesson plans, on-the-job training guides, section-specific standards, and scheduling for health physics personnel were approved by the Station Health Physicist. Additionally, the inspector ascertained that the licensee received its INPO Accreditation in March 1987. Re-certification will be due in March 1991. The licensee also prepared periodic self-evaluation reports for INPOs review.

The licensee's formalized Employee Training and Qualification System (ETQS) consisted of the following five disciplines in which a technician could become qualified: (1) receipt of shipments of radiological material; (2) surveillance and control (operations, maintenance, outage); (3) respiratory protection and instrument calibration; (4) effluent control; and (5) count room activities. The inspectors noted that ALARA concepts were included as part of the 14-week initial training program and that surveillance and control technicians were required to perform four tasks involving high radiation levels as part of their ALARA training.

An ETQS monthly report of employee progress are available for licensee management to track the status of completed tasks for the health physics technicians. The licensee provided a one-week per year refresher training covering the topics in the initial 14-week basic course.

The inspectors discussed with licensee representatives two new programs implemented in the training department, including the development of a task analysis program for identifying training deficiencies in order to improve the training program and the development of a case study training course based on health physics related violations at the licensee's facility as well as other facilities.

The inspectors also reviewed the contractor qualification program. Contractors were provided with a one week course, including: (1) general employee training; (2) contractor theory exam; (3) specialized tasks training (e.g. steam generator workers, reactor coolant pump workers, etc.); and (4) applicable case studies.

No violations or deviations were identified.

3. External Exposure Control And Personnel Dosimetry (83724)

The inspectors reviewed the licensee's external exposure control program including: posting, labeling, and control requirements for radiation areas, high radiation areas, airborne radioactivity areas and radioactive material.

The inspectors utilized NRC and licensee portable radiation survey equipment to make radiation surveys in the licensee's auxiliary and containment buildings. Through independent surveys, the inspectors verified that areas surveyed were properly posted. The inspectors reviewed the results of surveys performed by the licensee. The inspectors made contamination surveys in clean walkways, selected equipment rooms in the auxiliary building, and containment. These surveys indicated that the areas surveyed were properly posted and controlled. The inspectors verified that all high radiation doors examined were properly secured. The licensee appeared to have a sufficient number of whole body personnel friskers at RCA exits and lower containment. The inspectors observed the use of the whole body friskers and personnel surveys made by plant personnel with thin window GM probes.

The inspectors reviewed the licensee's procedure for calculating radiation exposures for personnel who have been contaminated by radioactivity. The licensee's procedures did not describe the dose methodology. However, the inspectors determined that the methodology is described in corporate health physics documents.

No violations or deviations were identified.

4. Internal Exposure Control And Assessment (83725)

a. Process and Engineering Controls

10 CFR 20.103(b) requires the licensee to use process or other engineering controls to the extent practical, to limit concentrations of radioactive material in air to levels below that specified in 10 CFR Part 20, Appendix B, Table 1, Column 1 or limit concentrations when averaged over the number of hours in any week during which individuals are in the area, to less than 25 percent of the specified concentrations.

The use of process controls and engineering controls to limit airborne radioactivity concentrations in the plant was discussed with licensee representatives and the use of high efficiency particulate air filters with charcoal banks were observed in the licensee's containment building for processing air in steam generator work areas.

No violations or deviations were identified.

b. Respiratory Protection

10 CFR 20.103(b) requires that when it is impracticable to apply process or engineering controls to limit concentrations of radioactive material in air below 25% of the concentrations specified in Appendix B, Table 1, Column 1, other precautionary measures should be used to maintain the intake of radioactive material by any individual within seven consecutive days as far below 40 MPC hours as is

reasonably achievable. The inspectors observed the use of respirators in the auxiliary building and lower containment. The inspectors determined that the licensee's breathing air for use with supplied air respirators met the requirements for Grade D air as specified in American National Standard Commodity Specification for Air, ANSI Z86.1-1973. 10 CFR 20, Appendix A, Footnote h stated, in part, that when air supplied hoods are used and a protection factor credit is taken during the use, calibrated gauges or flow measuring devices shall be used to ensure proper air flow rates are maintained. During tours of the licensee's facility, the inspectors verified that pressure gauges utilized on air distribution manifolds were controlled and calibrated as required.

No violations or deviations were identified.

c. In-Vivo Monitoring

The inspector examined the licensee's whole-body counting facility including both a review of procedures used for the operation, maintenance, and calibration of the whole-body counting systems and calibration records. The licensee utilized a Nuclear Data Chair geometry system with three sodium iodide detectors for the thyroid, lung, and lower torso.

The inspectors reviewed the following procedures:

- ° HP/O/B/1001/16: Calibration and Quality Assurance of ND-680 Body Burden Analysis System, Rev. 1, April 29, 1988.
- ° Health Physics Manual Section 11.2: Bioassay Selection and Action Criteria, Rev. 8, February 4, 1988.
- ° Health Physics Manual Section 12.9: Operation of the ND-6800 Body Burden Analysis System, Rev. 7, June 1, 1988.
- ° Health Physics Manual Section 12.16: Body Burden Analysis System and Maintenance, Rev. 2, December 8, 1987.

Health Physics Manual (HPM) Section 11.2 described the controls that were in place which required all station employees, vendors, and visitors to have a body burden analysis performed prior to entry to the radiation control area (RCA) and after their last entry to the RCA. Additionally, HPM Section 11.2 required that each quarter 10 percent of personnel exceeding 25 maximum permissible concentration (MPC-hours) shall be given a body burden analysis. Based on a review of an MPC-hours data report, no individuals exceeded the 25 MPC-hour criteria during the last two quarters. The highest individual for that reporting period was 18.6 MPC-hours.

The inspectors reviewed the calibration records dated March 22, 1988, for the whole-body counting system. The inspectors also reviewed the quality assurance program and records, for the period covering April 12, 1988 - June 23, 1988. Additionally, the inspectors reviewed the licensee's interlaboratory cross check program for the whole-body counting system which was conducted during March 1988. The licensee's corporate office provided blind spiked samples of I-131 for the thyroid detector and Cr-51, Mn-54, and Zn-65 for both the lung and lower torso detectors. All comparisons were in agreement with the known values. The inspectors also discussed with licensee representatives any changes which had occurred or were planned in the area of whole-body counting. The licensee indicated that an order had been placed for a Nuclear Data "People Mover" in-vivo monitoring system with a delivery date expected in August 1988.

No violations or deviations were identified.

5. Maintaining Occupational Exposures As Low As Reasonably Achievable (ALARA)(83728)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures as low as reasonably achievable. The recommended elements of an ALARA program are contained in Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be ALARA and Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures ALARA.

The inspectors reviewed the status of the licensee's ALARA program activities and goals for 1988.

The licensee was approximately midway through the refueling outage on Unit 2 during the inspection. The licensee had made modifications to the reactor coolant system and was removing resistance temperature detector (RTD) manifold and connecting piping. The licensee had also scheduled a significant amount of steam generator work which included U bend heat stress relief, eddy current testing and plug removal. The licensee's ALARA goal for the RTD modification was 154 person-rem. The licensee completed the job with 152.86 person-rem. The licensee established a goal of 83 person-rem for extensive steam generator work and completed the work with 141 person-rem. The licensee experienced technical problems with steam generator tube plugging and plug removal tooling which doubled the expected exposure for tube plugging and removal to 27 person-rem and expended 19 more person-rem than planned for tube sheet eddy current work.

Collective radiation dose goals were established by the corporate staff utilizing industry and utility averages of person-rem per task planned. In order to meet the station ALARA goal, for 1988, of 1043 person-rem, the licensee would have to reduce the plants estimated dose of 1600 person-rem by 37 percent. In discussions with licensee representatives, the inspectors determined that the Plant ALARA staff had requested plant

sections to submit plans to the ALARA group specifying how each section would reduce its exposure to meet the goal. The inspectors reviewed ALARA dose reduction plans submitted to the ALARA coordinator. Many of the plans submitted by the section supervisor were superficial and did not include specific activities that would reduce the estimated exposures. The inspector discussed with the Plant Manager the lack of support given by many section supervisors in making meaningful ALARA dose reduction plans with the ALARA staffs request. The Plant Manager acknowledged some poor participation in the original request, but believed that the supervisors had made a serious effort to arrive at dose reduction plans which could reduce plant exposures. The licensee had established a goal of 430 person-rem for the outage. As of June 20, 1988 (the 25th day of the 60 day outage), the licensee had accumulated 305 person-rem or 71% of its goal the licensee expected to exceed its outage goal. The total collective radiation dose for the year was 373 person-rem.

In the review of Quality Assurance Audit NP-88-04 (MC) Health Physics, Environmental and ODCM Activities conducted in February and March 1988, the inspector noted that the audit identified a deficiency concerning ALARA Committee attendance and made a recommendation concerning job planning interface problems. The licensee's ALARA Manual, Section II.B states in part that the ALARA Committee is responsible for conducting and appraising the effectiveness of the ALARA Program at each station and that the Committee meets a minimum of once per quarter. The station Health Physics Manual states that the ALARA Committee serves as the focal point for the ALARA program and is made up of each department at the station. The audit deficient item identified poor attendance for the mechanical maintenance, operations, planning, production support department, training and the quality assurance departments. The licensee had prepared a corrective action response, for the ALARA Committee meeting attendance deficiency, which had not been evaluated by the Quality Assurance staff. The response stated that the Operations staff had higher priorities than ALARA Committee Meetings and that it was unreasonable to expect the named ALARA representative from every group to be physically present at every meeting and therefore, substitutes will have to be appointed to attend the meetings. The corrective steps taken to prevent recurrence included preparing a memorandum listing potential attendees at ALARA meetings, removing the training representative from the Committee, and an evaluation by the operations staff to discuss moving ALARA Committee responsibilities higher in priority for the operations representatives.

The licensee's audit team reviewed dose per group and noted that the planning section had a small cumulative dose of 870 mRem (0.08% of station dose) during 1987. The audit report noted that the exposure appeared to be low based upon the planners' responsibilities which included planning job assignments and interfacing with job locations in the plant. During the audit teams' evaluation, of the planners low exposure, the auditors interviewed personnel from the Health Physics and Planning group. The audit report documented a lack of cohesion between the Planning Group and ALARA Health Physics Group. As a result, the audit report recommended that management evaluate the ALARA planning process and job planning

interface between the two groups to determine if a more active role in planning work activities is needed. In a meeting with the Plant Manager on June 23, 1988, the inspectors discussed 1988 ALARA person-rem goals and the findings documented in the licensee's audit NP-88-04. The inspectors discussed the importance of strong management support for an effective ALARA program which included the establishment of realistic ALARA goals and objectives. The inspectors also discussed the lack of sufficient corrective action in the licensee's response to the ALARA Committee Meeting deviation in a memorandum from the Plant Manager to the Manager of Quality Assurance dated May 12, 1988. The Plant Manager did not agree to make any commitment concerning the establishment of ALARA goals or ALARA Committee Meetings with the inspectors but did acknowledge that the interface problem between health physics and planning groups had been recognized and management was reviewing potential solutions. The inspectors stated that the licensee's evaluation and corrective action for the job planning interface between the Health Physics and Planning Sections and improving attendance at ALARA Committee Meetings would be reviewed during a subsequent inspection. The NRC is tracking completion of the corrective actions as an IFI 50-369/88-16-01 and 50-370/88-16-01.

No violations or deviations were identified.

6. Action On Previous Inspection Findings (92701)

- a. (Closed) Violation 50-369/88-06-01 and 50-370/88-06-01: Failure to properly post and barricade a high radiation area by personnel without radiation detection devices.

The licensee committed to reemphasize the importance of technical specification compliance to health physics personnel and to develop and present a case study to point out what happened, where it happened, potential causes, short term preventative action taken, most probable root cause, and to provide an opportunity for group analysis. The inspectors reviewed the licensee's case study lesson plan for non-compliance with Technical Specification 6.12 and verified that all health physics personnel attended the training during May 1988. This item is considered closed.

7. Exit Interview

The inspectors scope and findings were summarized on June 24, 1988, with those persons indicated in Paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Description and Reference</u>
369,370/88-16-01	IFI - Review the licensee's corrective action for improving ALARA Committee attendance and for evaluating and improving the job planning interface between Health Physics and Planning. Deficient item identified in Departmental Audit NP-88-04 (MC).