



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

DEC 04 1985

Report Nos.: 50-369/85-39 and 50-370/85-40

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: October 15 - November 8, 1985

Inspectors: George B Kuzo 2 December 1985  
G. B. Kuzo Date Signed

W. B. Gloersen 2 December 1985  
for W. B. Gloersen Date Signed

Approved by: W. E. Cline 12/2/85  
W. E. Cline, Section Chief Date Signed  
Emergency Preparedness and Radiological  
Protection Branch  
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This special announced inspection involved 85 inspector-hours in the areas of preoperational testing and adequacy of surveillance activities regarding control room and auxiliary building ventilation systems.

Results: One deviation was identified - failure to complete preoperational testing of the Control Room Area Ventilation (CV) system in accordance with FSAR commitments.

8512100203 851204  
PDP ADOCK 05000369  
Q PDR

## REPORT DETAILS

## 1. Persons Contacted

## Licensee Employees

- \*R. L. Gill, Licensing
- \*\*D. J. Rains, Superintendent of Maintenance
- \*\*B. H. Hamilton, Superintendent of Technical Services
- \*\*M. Sample, Superintendent of Integrated Scheduling
- \*\*R. A. Johansen, Test Engineer, Surveillance
- \*\*D. S. Marquis, Performance Engineer
- \*\*N. McCraw, Compliance Engineer
- \*\*P. Roberson, Associate Engineer, Performance

Other licensee employees contacted included technicians, and office personnel.

- \*Attended exit interview October 17, 1985
- \*\*Attended exit interview October 17, 1985, and November 6, 1985

## 2. Exit Interview

The inspection scope and findings were summarized on October 17, 1985, with those persons indicated in Paragraph 1 above. The inspectors discussed the need for evaluation of preoperational filter system testing of the auxiliary building ventilation system (Paragraph 5) to ensure adequacy of Technical Specification (TS) surveillance requirements to demonstrate operability. The inspectors informed licensee representatives that the status of preoperational testing of the control room area ventilation system would be considered an unresolved item subsequent to review of all testing and engineering evaluation records by cognizant NRC management. Licensee representatives acknowledged the inspectors' comments. On November 6, 1985, the inspectors informed licensee representatives that the unresolved item concerning failure to conduct a proper air-aerosol uniformity mixing test for the control room area ventilation system as detailed in the FSAR was a deviation (Paragraph 5). Licensee representatives acknowledged the inspectors' comments and did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

## 3. Licensee Action on Previous Enforcement Matters

(Open) Deviation 50-369/85-30-02 & 50-370/85-32-01: VA Filter Testing not performed per the FSAR and Regulatory Guide 1.52. This item will remain open subsequent to receipt of formal response from licensee.

(Closed) 50-370/85-30-03 & 50-370/85-32-02: VA Filter Testing Adequacy. Following review of data provided from supplemental filter testing of the Unit 1 & 2 VA systems (Paragraph 8.a), the VA system was deemed adequate to

perform its intended function and surveillance activities were deemed acceptable to demonstrate system operability as specified by Technical Specifications.

#### 4. Unresolved Items

Unresolved items were not identified during the inspection.

#### 5. Filter Testing (92702)

- a. The inspectors reviewed Unresolved Item (50-369/85-30-03, 50-370/85-32-02) concerning preoperational nuclear air-cleaning filter testing for the Auxiliary Building Filtered Exhaust Systems (VA). The inspectors noted that the Unit 1 VA system failed the Air Distribution Test and testing was not conducted for the Unit 2 system as described in Section 8.3.2 of ANSI N510-1975, Testing of Nuclear Air-Cleaning Systems. Section 9.4.2.3 of the McGuire Nuclear Plant FSAR detailed in-place testing of the VA systems to be in compliance with Regulatory Guide 1.52, Design, Testing, and Maintenance Criteria for Post-Accident Engineered Safety Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light Water Cooled Nuclear Power Plants. Furthermore, Regulatory Guide 1.52 obligated the licensee to ANSI N510-1975.

The inspectors reviewed preoperational test procedure TP/O/A/1450/02, Preoperational Filter Test for Auxiliary Building Filtered Exhaust Trains 1 & 2, dated 1/27/81, and noted that airflow distribution tests were not within the  $\pm 20\%$  of the average velocity for the Unit 1 system as required by ANSI N510-1975. Furthermore the inspectors noted that airflow distribution tests had not been conducted for the Unit 2 VA system. The licensee responded to this air distribution test failure by contracting a vendor to perform an engineering evaluation of the VA system. The evaluation consisted of a laboratory study of HEPA filter efficiency as a function of air velocity. The inspectors reviewed the laboratory test results and noted that the completed tests did verify HEPA filter efficiency but did not evaluate the adequacy of the airflow distribution as required. The inspectors informed cognizant licensee representatives that the laboratory study did not meet the preoperational air distribution test requirement of Section 8.3.2 of ANSI N510-1975. In addition the inspectors noted that this air distribution test was a prerequisite for in-place leak testing of the installed system required by Technical Specification 4.7.7.b to demonstrate operability.

The inspectors discussed with cognizant licensee representatives the revised ANSI N510-1980 and its guidance on performing the air distribution test. Differences between the 1980 Standard relative to the 1975 Standard for conducting the air distribution test are: (1) velocity measurements are preferably made downstream of the HEPA filters to improve air flow distribution entering the charcoal absorber beds; (2) for filter banks containing ten or more filters, the

minimum number of velocity measurements will be one in the center of each filter; and (3) for systems containing fewer than ten HEPA filters in a single bank, the minimum number of velocity measurements will be ten and will include one reading in the center of each filter in the bank. Following telephone discussions among NRC Region II, Office of Nuclear Reactor Regulation, and cognizant licensee representatives a Confirmation of Action Letter (CAL) detailing use of ANSI N510-1980 for evaluation of air distribution in the VA systems was issued (Paragraph 6).

- b. In addition, the inspectors reviewed the preoperational filter testing for the following systems: Annulus Ventilation, Containment Purge, Spent Fuel Pool, and Control Room Area. For all systems, excluding the Control Room Area Ventilation (CV), the required preoperational tests were conducted in accordance with ANSI N510-1975.
- c. From review of TP/1/A/1450/01, Preoperational Filter Test for Control Area Outside Pressure Train 1 & 2, dated 1/19/81, the inspectors noted that both the air distribution and the air-aerosol mixing uniformity tests as described in Sections 8 and 9 of ANSI N510-1975 were deleted from the procedure. Licensee representatives informed the inspectors that a thorough search was in progress to determine the status of completion and/or if any engineering evaluations regarding preoperational testing of the CV system was conducted. Following discussion between NRC and cognizant licensee representatives, a CAL requesting verification of completion of all prerequisite tests pursuant to ANSI 510-1975 for the CV system (Paragraph 6) was issued.

In a letter dated October 29, 1985 to NRC Region II, licensee representatives stated that the CV systems contain only one HEPA filter and the air distribution test was deemed unnecessary. Cognizant NRC Region II and NRR personnel concurred with this interpretation for elimination of the air distribution test. However, the inspectors informed licensee representatives that valid in-place testing of the Control Room Area Ventilation system would not be possible without a uniform air-aerosol tracer-air mixture. In their response dated October 29, 1985, cognizant licensee representatives deemed the air-aerosol mixing uniformity test unnecessary based upon the updated ANSI N510-1980 standard. The inspectors informed licensee representatives that Sections 6.4.3 and Table 6.2.3.-4 of the FSAR stipulated that in-place testing of the Control Room Area Ventilation (CV) Systems was in compliance with Regulatory Guide 1.52 (Revision 2, March 1978) which in turn obligated the licensee to ANSI N510-1975. Furthermore, the inspectors informed licensee representatives that Section 9 of ANSI N510-1975 Air-aerosol Mixing Uniformity Test is required and considered a prerequisite for required surveillance tests described by Technical Specifications. In view of the above findings, the inspectors informed licensee representatives that the preoperational tests performed on the CV systems were not performed as documented in the FSAR and would be considered a deviation to documented FSAR commitments (50-369/85-39-01, 370/85-40-01).

One deviation was identified - failure to conduct preoperational testing of the CV system as committed to in the FSAR.

6. Confirmation of Action Letters (92702)

After discussion and review of the VA and CV systems preoperational filter testing records among NRC and licensee representatives, the following Confirmation of Action Items were issued:

- a. During a telephone conversation on October 22, 1985 between NRC Region II management and Duke Power Company General Office representatives, the following Confirmation of Action items were discussed:
  - ° Conduct air flow distribution tests for the auxiliary building ventilation filter systems and submit written test results to the Regional Office by October 28, 1985. These tests will be conducted in accordance with ANSI N510-1980, unless other criteria are established with the Office of Nuclear Reactor Regulation.
  - ° If acceptance criteria for the air flow distribution tests are not met, provide an analysis of the adequacy of the systems capability to meet the design function including the appropriateness of the surveillance program. This analysis will be provided to the NRC by October 29, 1985.
  - ° Review past test records to verify that all prerequisite tests pursuant to ANSI N510-1975 for the control room ventilation system have been conducted. Advise NRC by October 29, 1985, of the results of this review.

Licensee representatives concurred with the action items and a Confirmation of Action Letter was transmitted to the licensee on October 23, 1985.

- b. During a telephone conversation between cognizant NRC and Duke Power Company representatives on November 1, 1985, additional action items regarding the CV systems were discussed. Following the discussion, licensee representatives agreed to conduct the air-aerosol mixing uniformity test for the CV filter systems by November 8, 1985, in accordance with ANSI N510-1975. A CAL to the licensee regarding this item was issued November 5, 1985.

Two Confirmation of Action Letters were issued during this inspection.

7. Procedures, Records and Engineering Evaluations (92702)

The inspectors reviewed selected procedures, records, and engineering evaluations applicable to determination of the adequacy of preoperational in-place filter testing for plant ventilation systems. The procedures, records and evaluations reviewed are as follow:

- (1) TP/1/A/1450/01 Preoperational Filter Test for Control Area Outside Air Pressure Filter Trains 1 & 2, 11/12/80 - 1/15/81.
- (2) TP/2/A/1450/23 Containment Air Release and Addition Ventilation System Filter Train Acceptance Test, 2/28/83.
- (3) TP/1/A/1450/18 Preoperational Filter Test for Spent Fuel Ventilation Exhaust Filter Train, 11/3/80 - 12/30/80.
- (4) TP/0/A/1450/19 Annulus Ventilation System Filter Train Acceptance Test 3/4/83 - 4/15/83.
- (5) PT/0/A/4450/01 In-Place Test of HEPA and Carbon Absorber Filters, 8/17/81
- (6) PT/0/A/4450/17 Safety Related Filter System Run Time 4/30/84.
- (7) MP/0/A/7450/09 CVI Charcoal Filter Removal and Replacement, Rev. 2, 1/29/85
- (8) TT/0/A/9100/104 Air/Aerosol Mixing Uniformity Test for OAPFTs 1 & 2, 11/6/85
- (9) TT/1/A/9100/101A Auxiliary Building Ventilation System Air Flow Distribution Measurements I, 10/23/85.
- (10) TT/1/A/9100/101B Auxiliary Building Ventilation System Air Flow Distribution Measurements II, 10/23/85.
- (11) TP/0/A/1450/02 Preoperational Filter Test for Auxiliary Building Filtered Exhaust Trains 1 & 2, 11/3/80-1/24/81.
- (12) Memo to File MC-1211.00-14 Supplemental Testing of High Efficiency Air Filter Elements, 1/27/81
- (13) Auxiliary Building Ventilation System Engineering Evaluation of Supplemental Filter Testing, Letter to Mr. H. R. Denton, Director, Office of Nuclear Reactor Regulation from Mr. H. B. Tucker, Vice President Nuclear Production, Duke Power Company dated October 28, 1985.
- (14) Letter to Dr. J. N. Grace, Regional Administrator, US NRC Region II from H. B. Tucker, Vice President Nuclear Production dated October 29, 1985.

No violations or deviations were identified.

#### 8. Review of Filter Testing Results (92702)

The inspectors reviewed and discussed selected ventilation system test data as noted in the following paragraphs.

a. Auxiliary Building Filtered Exhaust Trains

Licensee representatives conducted velocity distribution measurements for the auxiliary building ventilation systems on October 25-26, 1985. Velocity measurements were conducted at the following ventilation system component areas: prefilter-upstream, HEPA filter-downstream, and charcoal absorber bed-upstream. A summary of the results for the VA systems for both units is presented in Table 1. Velocity measurements were slightly outside of the established ANSI N510-1980 guidelines of  $\pm 20\%$  deviation from the mean value at the HEPA filter exit for both units. However, following review and evaluation of the individual flow distribution measurements at both the HEPA exit (-29 to +26%) and carbon absorber bed inlet areas (-9 to +12%) by cognizant NRC-NRR and Region II personnel, the air flow distribution was deemed adequate for the VA system to meet its intended function and all surveillance test results as required by Technical Specification were deemed acceptable.

b. Control Room Area Ventilation (CV) Air-aerosol Mixing Uniformity Testing

On November 6-7, 1985, licensee representatives completed air-aerosol mixing uniformity testing for the CV systems. A Region II inspector observed and verified that testing was conducted in accordance with ANSI N510-1975. Results of the tests for both ventilation systems were within the acceptance criteria of  $\pm 10\%$  deviation from the mean value as specified in the standard. A summary of the results for the two filter systems is presented in Table 2.

No violations or deviations were identified.

TABLE 1

Summary of Supplemental Auxiliary Building Ventilation (VA) Air Distribution  
Tests for McGuire Nuclear Plant October 1985.  
(% Deviaiton From Mean Value)

	HEPA Downstream (% Deviation)	Charcoal Bed Entrance-Upstream (% Deviation)
Unit 1	-29 to +23	-9 to +12
Unit 2	-22.0 to +26.0	-7 to +9

TABLE 2

Summary of Air-Aerosol Mixing Uniformity Tests (% Deviaton From Mean Value) for the Control Room Area Ventilation (CV) System at McGuire Nuclear Plant November 1985

	Upstream (% Deviation)	Downstream (% Deviation)
Unit 1	-4.66 to 5.7	-8.05 to 9.20
Unit 2	-8.55 to 9.93	-7.09 to 7.58