



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA ST., N.W., SUITE 3100  
 ATLANTA, GEORGIA 30303

Report Nos. 50-369/80-25 and 50-370/80-15

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

Facility Name: McGuire

Docket Nos. 50-369 and 50-370

License Nos. CPPR-83 and CPPR-84

Inspection at McGuire Site near Charlotte, North Carolina

Inspector:	<u>W. H. Miller, Jr.</u>	<u>9/25/80</u>
	W. H. Miller, Jr.	Date Signed
Approved by:	<u>F. E. Conlon</u>	<u>9-25-80</u>
	F. E. Conlon, Section Chief, RC&ES Branch	Date Signed

SUMMARY

Inspection on September 2-5, 1980

Areas Inspected

This special, unannounced inspection involved 27 inspector-hours on site in the area of fire protection/prevention.

Results

Of the area inspected, two items of noncompliance were found - (Infraction - Substandard fire damper installation - Paragraph 5.b(84); and, Infraction - Failure to follow fire prevention cutting and welding procedures - Paragraph 5.c.(1)); three apparent deviations were found - (Fire suppression systems for Reactor Building do not meet NRC single failure criteria - Paragraph 5.b.(3); Inadequate fire barriers for duct shafts - Paragraph 5.c.(2); and, Installation of fuel day tanks for diesel generators does not meet NRC guidelines - Paragraph 5.c.(3)).

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## DETAILS

### 1. Persons Contacted

#### License Employees

- \*J. C. Rogers, Project Manager
- \*T. E. Touchstone, Sr. Construction Engineer
- K. M. Elmore, Assistant General Superintendent
- E. M. Couch, Construction Engineer - Civil
- T. B. Bright, Construction Engineer - Mechanical
- W. R. Lovingood, Civil Engineer
- R. D. Hall, Civil Engineer
- R. Beam, Mechanical Engineer
- R. N. Askey, Mechanical Engineer
- \*T. L. Hunt, Sr. Planning and Facility Engineer
- P. D. Sykes, Safety Supervisor
- M. D. Ostendorff, Facility Engineering
- \*E. B. Miller, Sr. Quality Assurance Engineer
- \*D. F. James, Quality Assurance
- \*R. H. Ledford, Quality Assurance
- \*A. D. Harrington, Training and Safety/Production
- \*D. B. Lampke, Production
- \*G. E. Singletary, Production
- \*J. R. House, Safety/Production
- \*L. J. Bare, Production/Licensing
- \*J. R. Hendricks, Design Engineering
- S. G. Crews, Design Engineering

#### Other Organizations

N. Broome, McNeary Consulting Services (Fire Protection)

#### NRC Resident Inspector

\*T. J. Donat

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on September 5, 1980, with those persons indicated in paragraph 1 above.

### 3. Licensee Action on Previous Inspection Findings

- a. (Open) Deviation Item (367/79-34-05 and 370/79-20-05): Substandard automatic sprinkler system installation for battery room complex. The licensee reported that design is in process to provide additional sprinkler protection for this area to meet the commitments to the NRC/NRR. This item will remain open until completion of the modifications.

- b. (Open) Deviation Item (369/80-11-01 and 370/80-07-01): Substandard sprinkler system installations. The licensee has taken the following action:
- (1) Pendent sprinkler heads installed in upright position replaced with upright type heads.
  - (2) Ordinary degree rated sprinkler heads replaced with sprinkler heads of intermediate degree (212°F) rating in areas where the normal temperature exceeds 100°F.
  - (3) Licensee advised that ½-inch piping in the systems for the reactor coolant pumps replaced with piping of at least 1-inch in diameter. However, licensee advised that the ½-inch piping in the annulus areas systems will not be replaced with piping of at least 1-inch in size. This arrangement does not adhere to the criteria of National Fire Protection Association Standard No. 13 (NFPA-13), Sprinkler Systems, Sections 3-5, 3-6, 3-7 and 7-1.1.2. This item has been forwarded to NRR for further evaluation.
  - (4) Licensee in conjunction with a fire protection engineering consultant has conducted a site survey to review the obstructions to the sprinkler systems and additional protection has been provided for some areas. However, from minor to moderate obstructions continue to exist over many of the safety-related pumps in the Auxiliary Building. The licensee advised that the systems meet the intent of the design criteria, which is to contain a fire to the vicinity of the pumps with final extinguishment to be accomplished by the fire brigade.
  - (5) Installation of the water flow alarm devices does not fully meet the provisions of NFPA-13. Modifications to these installations is currently in process. However, the licensee does not plan to provide a means to test the flow alarm devices for systems that contain less than 20 sprinkler heads. This arrangement does not comply with the provisions of NFPA-13 Section 3-17.7. This item has been forwarded to NRR for review.
  - (6) A number of control valves in the sprinkler systems are not of the indicating type. The licensee does not plan to change the nonindicating valves to the reactor coolant pump sprinkler systems and the main control valves to the containment. This item is also being evaluated by NRR.

The above sprinkler system discrepancies and the following additional discrepancies are currently under review by NRR: fire suppression piping systems are not supervised; and, conflicts between the licensee's fire hazard analysis and NRC's fire protection safety evaluation report as to the sprinkler systems which are manually or automatically operated. Refer to paragraph 5.a.(3) for comments on the failure to meet the NRC single failure criteria.

This item will remain open pending completion of NRR's evaluation.

- c. (Open) Unresolved Item (369/80-11-02 and 370/80-07-02): Battery powered emergency lighting requirements for safety-related pumps. This item is being reviewed by NRR and will remain open pending the results of their evaluation.

4. Unresolved Item

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items identified during this inspection are discussed in Paragraph 5.b.(82) and 5.b.(95).

5. Fire Protection/Prevention Commitments

This inspection evaluated the licensee's progress and action on the fire protection commitments made to the NRC. The NRC (Fire Protection) Safety Evaluation Report, (FPSEER), Supplement No. 2 (Section 9.5.1 and Appendix D) for this facility dated March 1979 and the licensee's Fire Protection Review for McGuire Nuclear Station (FPR) dated September 1977 and Revised January 1979 were used in this evaluation. These documents describe the fire protection commitments, requirements and schedule dates of implementation. This portion of the inspection was limited primarily to Unit 1. The commitments and findings are as follows:

a. Commitments (Unit 1):

<u>Number</u>	<u>Location/Item</u>	<u>Status</u>
Reactor Bldg. (Fire Areas RB1-RB3)		
(1)	Fire detectors	
(1A)	Annulus	Closed
(1B)	Pipe corridor	Closed*
(1C)	Cable trays (inside crane wall)	Open
(2)	Sprinkler Systems	
(2A)	Annulus/manual	Open
(2B)	Pipe corridor/automatic	Open
(2C)	Reactor coolant pumps/manual	Open
(2D)	Charcoal filters-Lower containment/manual	Open
(3)	Hose stations	
(3A)	Pipe corridor	Open
(3B)	Elevations 725' and 738'	Open
(4)	Fixed repeaters/radio communication	**
Auxiliary Bldg. - 695' (Fire Area 1)		
(5)	Fire detectors/Rooms 500 - 508	Closed*
(6)	Sprinkler system/automatic	
(6A)	RHR Pump Rooms 500 - 501	Closed*

<u>Number</u> (Continued)	<u>Location/Item</u>	<u>Status</u>
(6B)	Corridor to RHR pumps	Open
(7)	Fire barrier penetrations	**
(8)	Hose stations	Closed*
(9)	Emergency lights for RHR Pump Room/8-hour battery	Open
Auxiliary Bldg. - 716' (Fire Areas 2 and 3)		
(10)	Fire detectors	
(10A)	Auxiliary feedwater pump room (600)	Closed*
(10B)	Photo-electric detector/turbine room	Closed*
(10C)	Cable trays	Closed
(11)	Sprinkler system	
(11A)	Auxiliary feedwater pump room (600)	Open
(11B)	Auxiliary feedwater pump room (601)	Open
(11C)	Service water pumps	Open
(11D)	Centrifugal charging pump rooms (627 and 630)	Open
(11E)	Cable shaft	Open
(12)	Halon system - AFWP Room 600B	***
(13)	Hose stations	Closed*
(14)	Cable tray fire barriers/turbine AFWP pump instrumentation - 1/2-hour barrier	**
(15)	Auxiliary shutdown panel - 1/2-hour fire barrier	Closed*
(16)	Fire barrier penetrations	**
(17)	Fire barrier - 1 1/2 hour/trains A and B nuclear service water pumps	**
(18)	Curb/control sprinkler discharge	**
(19)	Portable emergency lights/8-hour battery	
(19A)	AFWP Rooms	Closed*
(19B)	NSW pump rooms	Open
Auxiliary Bldg. - Diesel Generator Rooms (Fire Areas 5 - 8)		
(20)	Halon system	***
(21)	Hose stations	Closed*
(22)	Fire detection	Open
(23)	Fire barriers and doors	**
Penetration rooms (Fire Area 9 - 10 and 15 - 16)		
(24)	Fire detectors	Closed*
(25)	Hose stations	Closed*
(26)	Fire barriers (3-hour)	**
(27)	Penetrations of containment	**

<u>Number</u> (Continued)	<u>Location/Item</u>	<u>Status</u>
Switchgear rooms (Fire Areas 11 - 12 and 17 - 18)		
(28)	Fire detectors	Closed*
(29)	Hose stations	Closed*
(30)	Fire barriers/UL 3 hour doors	**
(31)	Penetrations	**
Battery rooms (Fire Area 13)		
(32)	Area fire doors/3 hour-UL	**
(33)	Battery room doors/3 hour UL	**
(34)	Fire dampers/3 hour	**
(35)	Hose stations	Closed*
(36)	Fire detectors/area and battery room cell	**
(37)	Sprinkler system beneath cable trays	Open
(38)	Fire barrier penetrations	**
Remainder of 733' (Fire Area 14)		
(39)	Fire detection (Rooms 722, 724, 723, 723A, 731 and 787)	Closed*
(40)	Sprinkler system/automatic over component cooling pumps	Open
(41)	Fire barrier between trains A and B component cooling pumps/1 1/2 hour	**
(42)	Hose stations	Closed*
(43)	Curbs for control of sprinkler discharge	**
(44)	Fire dampers - 1 1/2-hour - duct penetrations	***
(45)	Electrical penetrations	**
(46)	Portable emergency lights/8-hour battery	Open
Auxiliary Bldg. - 750' Cable spreading rooms (Fire Areas 19 and 20)		
(47)	Fire detectors (801)	Closed*
(48)	Water spray system/manual	Closed*
(49)	Hose systems	Closed*
(50)	Fire proofed angle iron ceiling support between cable spreading rooms	***
(51)	Fire doors/UL 3-hour	**
(52)	Fire damper	
(52A)	Between cable rooms/3-hour UL	Closed
(52B)	Other penetrations/1 1/2-hour UL	***
Penetration Room (802)		
(53)	Fire detectors	Closed*
(54)	Hose stations	Closed*
(55)	Fire barriers	**
(56)	Penetrations	**

<u>Number</u> (Continued)	<u>Location/Item</u>	<u>Status</u>
Switchgear rooms (803)		
(57)	Fire detectors	Closed*
(58)	Hose stations	Closed*
(59)	Fire barriers	**
(60)	Penetrations	**
Remainder of 750' (Fire Area 21)		
(61)	Fire detectors (806, 808, 815, 816 and 821)	Closed*
(62)	Sprinkler system/CCWP area	Open
(63)	Fire barrier between Train A and B CCWP	**
(64)	Fire doors/UL 3 hour	**
(65)	Fire barrier penetrations	**
(66)	Fire barriers - between rooms 807 and 808/1 1/2-hour with Class C - 3/4-hour fire door	**
(67)	Hose stations	**
(68)	Portable emergency lights/8-hour type at CCW/pumps	Open
Auxiliary Bldg. - 767' (Fire Areas 22)		
Electrical Penetrations (926 and 928)		
(69)	Fire detectors	**
(70)	Hose stations	Closed*
Control Room (925)		
(71)	Fire detectors	Closed*
(71A)	Room detectors	Closed*
(71B)	Exhaust fan from control panels	Closed*
(71C)	Peripheral rooms	Closed*
(72)	Fire doors/UL 3-hour	**
(73)	Fire dampers/UL 1 1/2-hour	**
(74)	Fire extinguishers	**
(75)	Portable emergency lights/8 hour	Closed*
(76)	Fire barrier (930 and 931)	**
(76A)	Fire rated ceiling/1 1/2-hour	**
(76B)	Fire doors/3/4 hour	**
Equipment Rooms (932, 944 and 946)		
(77)	Fire detectors/areas and HVAC units	**
(78)	Hose stations	Closed
(79)	Fire doors/UL-3 hour	**
(80)	Fire dampers/1 1/2 hour	**
(81)	Water spray system/charcoal filters	Open

<u>Number</u> (Continued)	<u>Location/Item</u>	<u>Status</u>
Auxiliary Bldg. - Fuel Pool (Fire Area 26 - 27)		
(82)	Fire detectors	Open
(83)	Hose stations	Closed
General Plant Areas		
(84)	Fire proof supports for HVAC ducts up to 5 feet from barrier	***
(85)	Fire pump	
(85A)	Pumps and controllers	**
(85B)	Manual start/control room	**
(85C)	Annunciator panel	**
(86)	Fire hydrants	**
(87)	Fire equipment houses	**
(88)	Fire protection valve supervision	**
(89)	Fire brigade equipment	**
(90)	Exhaust fans/portable type	**
(91)	Portable handlights	**
(92)	Protective clothing	**
(93)	Self contained breathing apparatus	**
(94)	Breathing apparatus -refill capability	**
(95)	Administrative control procedures	Open
(96)	Fire doors/locked or alarmed	**

Notes: \*Refer to IE Report Nos. 369/80-11 and 370/80-07.

\*\*This item not inspected.

\*\*\*Inspection incomplete.

"Closed". Visual inspection and random review of documentation records indicates that this item appears to be satisfactorily completed.

"Open". Item contains discrepancy. Refer to paragraph 5.b. for details.

b. Findings:

Additional information on the "Open" items in Paragraph 5.a is listed below. The below listed numbers correspond to the numbered items in Paragraph 5.a.

(1C) Fire detectors are not provided for all cable trays inside the crane wall. This item was previously identified as Inspector Followup Item 369/80-11-03 and 370/80-07-03.

(2) Refer to above paragraph 3.b.

- (3) The sprinkler systems (primary protection) for the hazardous areas within the Reactor Buildings and the fire hose standpipe systems (backup protection) are both supplied from a single pipe line. A failure in this piping system will impair both fire suppression systems within the Reactor Building. The licensee's FPR Section A.4 and NRC's FPSLR Section II.A state that a single failure in the fire suppression system will not impair both the primary and backup fire suppression capability. This discrepancy is a failure to meet a commitment to the NRC and is identified as Deviation Item (369/80-25-08 and 370/80-15-08), fire suppression systems for reactor buildings do not meet NRC single failure criteria.
- (6B) Sprinkler modifications are currently under design.
- (9) Refer to above Paragraph 3.c.
- (11) Refer to above Paragraph 3.b.
- (19B) Refer to above Paragraph 3.c.
- (22) The diesel generator rooms are not provided with ionization type fire detectors as stated in FPR Appendix C Table D-1.3. This item is currently under review by NRR and previously identified as Inspector Followup Item (369/80-11-03 and 370/80-07-03).
- (37) Refer to above Paragraph 3.a.
- (40) Refer to above Paragraph 3.b.
- (46) Refer to above Paragraph 3.c.
- (62) Refer to above Paragraph 3.b.
- (68) Refer to above Paragraph 3.c.
- (81) The normally closed manual valves for the water spray fire suppression systems for the charcoal filters are located adjacent to the HVAC units and must be manually opened in the event of fire within the HVAC unit. The licensee advised that design is in process to relocate these valves so that these valves will be accessible in the event of a fire in one of the units.
- (82) Fire detectors are not provided throughout the fuel pool complex. Also, the existing detector installation does not appear to take into consideration the possible effect of smoke stratification at levels below the ceiling/roof of the area due to the high ceiling. The licensee advised that additional detectors are to be installed in this area and that the existing installation would be evaluated for possible stratification effects. This item is identified as Unresolved Item (369/80-25-05 and 370/80-15-05), inadequate fire detector installation for fuel pool areas, and will be reviewed during a subsequent NRC inspection.

- (84) Many of the fire rated supports for the safety-related control room HVAC system ducts are installed directly over the fire damper service access doors in the duct. The licensee has identified this problem and is to provide additional access doors into the ducts. This discrepancy is identified as Inspector Followup Item (369/80-25-07), inadequate access doors in HVAC ducts for servicing fire dampers, and will be reviewed during a subsequent NRC inspection. These service openings are required by NFPA-90A, Air Conditioning Systems, Section 2-1.4.

The fire dampers installed in the safety-related control room HVAC system are not installed in accordance with the manufacturers requirements. To meet the design and installation fire resistance requirements, the dampers are required by manufacturer's (American Warming and Ventilating, Inc.) Drawing Nos. DAF-D-5170 and DAF-P-5171 to be installed within the duct and attached to a duct sleeve with 1-inch welds on 5-inch centers maximum spacing. The welds are required on both sides of the fire damper frame. The QC inspection procedure utilizes Duke Drawing Nos. FDI-1, FDI-2 and FDI-3 as the acceptance criteria for inspection of the damper installation. These drawings require the dampers to be welded with 1-inch welds on 8-inch centers, except weld and spacing requirements are not indicated on Drawing FDI-3. Criterion V of Appendix B to 10 CFR 50 states that "... activities affecting quality shall ... include appropriate quantitative or qualitative acceptance criteria...." The failure to provide acceptance criteria which adheres to the manufacturer's installation requirements is identified as Noncompliance (Infraction) Item (369/80-25-01 and 370/80-15-01), substandard fire damper installation.

Presently, the installed fire dampers do not meet Duke acceptance criteria, but these dampers have not been inspected by the QC group. The inspector reviewed four damper installations on the 750' elevation of the Auxiliary Building and found that the frames were welded to the duct assembly by 2-to-3-inch welds spaced approximately 12 inches apart on one side of the damper frame. The top of one damper was not welded to the duct.

All safety-related fire dampers are to be inspected by QC. The licensee is re-evaluating the existing inspection program to determine if fire dampers in other ventilation systems which pass through safety-related areas should also be included in the QC inspection program.

- (95) The following fire protection administration control procedures were reviewed and discrepancies from the NRC fire protection guidelines, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance", were noted:

- (a) Station Directive 2.11.1 - Fire Brigade Organization and Program

The procedure does not require each brigade member to satisfactorily complete a physical examination for performing strenuous activities as required by Paragraph 2.b of Attachment 1 of NRC fire protection guidelines.

- (b) Station Directive 2.11.3 - Control of Combustible Materials

No discrepancies were identified.

- (c) Procedure No. 1P/O/B/7650/09 - Cutting and Welding Safety

The procedure does not address other types of open flame ignition sources, fire watch requirements, and does not require the concurrence of the plant management if the person issuing the welding permit determines that a fire watch is not required. These items are required by Paragraphs 2.a., 2.b.,(3) and 2.c. of Attachment 4 of the NRC fire protection guidelines.

- (d) Fire Fighting Strategies

The procedures are presently being prepared by the licensee and will be reviewed during a subsequent NRC inspection.

The above discrepancies are identified as Unresolved Item (369/80-25-06), fire protection administrative procedures do not fully meet NRC guidelines, and will be reviewed during a subsequent NRC inspection.

c. Plant Tour

While touring the plant with licensee representatives the inspector noted the following:

- (1) Welding and Cutting Operations

Throughout the plant site welding and cutting operations were being conducted with the licensee's employees not observing normal good fire prevention safety practices. The licensee's Construction Procedure Nos. 54, Fire Protection During Cutting and Welding Operations, and 803, Protection of Machinery, Equipment, Piping, etc. establishes the fire prevention requirements which must be followed for all welding and cutting operations conducted. These procedures include the following requirements:

- removal of all combustible materials from floor within 15 feet of operations;

- move or cover all machinery and equipment subject to damage or ignition by sparks;
- cover floor openings to prevent passage of sparks to lower levels;
- assignment of fire watch with fire extinguisher for all cutting and welding operations; and,
- training of fire watchers in operation of fire extinguishers and in facilities for sounding an alarm in the event of fire.

The following discrepancies were noted by the inspector:

- (a) welding operation being conducted above cable trays which were not covered within Unit 1 cable spreading room which had paper trash on the floor and cable trays.
- (b) Welding and cutting operation in Room 807 directly over electrical cabling.
- (c) Cutting operation in top of Unit 1 lower containment without use of covering materials to prevent sparks and slag from falling to areas below.
- (d) Cutting operations in duct shaft adjacent to Unit 1 cable room without the use of covers to prevent sparks from falling to the bottom of the shaft at 733 foot elevation.
- (e) Failure to assign fire watchers to most welding operations throughout the site.
- (f) Apparent lack of training for fire watchers on how to sound an alarm in the event of fire.

This item is a failure to follow procedures affecting the quality of safety-related systems as required by Criterion V of Appendix B to 10 CFR 50 and is identified as Noncompliance (Infraction) Item (369/80-25-02 and 370/80-15-02), failure to follow fire prevention welding procedures. A similar item was brought to your attention in our letter of March 8, 1979.

(2) Duct Shaft Walls

The wall separating the cable spreading rooms and the adjacent duct shafts are of gypsum board construction with the metal studs exposed within the shaft. These walls do not appear to have a three-hour fire rating as stated by FPR Sections D.1.j and D.4.f. This is a failure to meet a commitment to the NRC and is identified as Deviation Item (369/80-25-03 and 370/80-15-03), inadequate fire barriers for duct shafts. It is possible that other shafts within the plant are also not of three-hour fire rated construction.

(3) Diesel Generators - Day Tanks

A 275-gallon day tank is provided for each emergency diesel generator. The tanks are located within each generator room adjacent to the generator. This is contrary to FPR Section D.2.(a)(1), which states that the day tanks for the diesel generator fuel tanks are located within three-hour barriers. Also, the tanks are provided with two-inch vents which terminate within the rooms. NFPA-30, Flammable and Combustible Liquid Code, Section 2.4.2 requires vents for tanks inside buildings to terminate outside of buildings. The FPR Section D.2.(d) states that the storage of flammable liquids will as a minimum comply with NFPA-30. The above items are identified as Deviation Item (369/80-25-04 and 370-15-04), installation of fuel day tanks for diesel generator does not meet NRC guidelines.

Except as noted above, within the areas examined no additional items of noncompliance or deviations were identified.