



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-369/84-30 and 50-370/84-27

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: September 20 - October 20, 1984

Inspectors:	<u>H C Dance / fa</u>	<u>11/27/84</u>
	W. Orders	Date Signed
	<u>H C Dance / fa</u>	<u>11/27/84</u>
	R. Pierson	Date Signed
Approved by:	<u>H C Dance</u>	<u>11/27/84</u>
	H. C. Dance, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine, unannounced inspection involved 214 (resident) inspector-hours on site in the areas of operations safety verification, surveillance testing and maintenance activities.

Results: Of the three areas inspected, no items of noncompliance or deviations were identified.

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PDR ADOCK 05000369
Q PDR

REPORT DETAILS

1. Licensee Employees Contacted

M. McIntosh, Station Manager
G. Cage, Superintendent of Operations
E. Estep, Project Engineer
G. Gilbert, Operations Engineer
*D. Mendezoff, Licensing Engineer
*D. Rains, Superintendent of Maintenance
*L. Weaver, Superintendent of Station Services
*R. Ruth, Senior QA Engineer

Other licensee employees contacted included technicians, operators, mechanics, security force members and office personnel.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on October 26, 1984, with those persons indicated in paragraph 1 above. The Unresolved Item discussed in paragraph 8 was discussed with the licensee who stated their agreement that the area may warrant attention.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items*

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 8.

5. Plant Operations

The inspection staff reviewed plant operations during the report period, September 20 - October 20, 1984, to verify conformance with applicable regulatory requirements. Control room logs, shift supervisors logs, shift turnover records and equipment removal and restoration records were routinely perused. Interviews were conducted with plant operations, maintenance, chemistry, health physics, and performance personnel.

Activities within the control rooms were monitored during shifts and at shift changes. Actions and/or activities observed were conducted as prescribed in applicable station administrative directives. The complement of licensed personnel on each shift met or exceeded the minimum required by technical specifications.

Plant tours were taken during the reporting period on a systematic basis. The areas toured included but are not limited to the following:

- Turbine Buildings
- Auxiliary Building
- Units 1 and 2, Electrical
- Equipment Rooms
- Units 1 and 2, Cable
- Spreading Rooms
- Station Yard Zone
- within the protected area

During the plant tours, ongoing activities, housekeeping, security equipment status and radiation control practices were observed.

McGuire Unit 1 began the reporting period in Mode 1 operating at 100% power. The unit was maintained at or about full power until Saturday, October 13, 1984, when power was reduced to 15% to effect repairs on valve 2CF-20 the "C" Steam Generator Feedwater Control Valve. Following repairs, power was increased to 100% and was maintained at or about that power level throughout the duration of the reporting period.

McGuire Unit 2 began the reporting period in Mode 1 operating at 100% reactor power. The unit was maintained at or about 100% power until Friday, October 19, when power was reduced in order to facilitate maintenance on the hydraulic operator of 2N1243, one of the Unit 2 upper head injection discharge isolation valves. As a precaution, power was reduced 10% per hour to facilitate an orderly shutdown of the unit if the maintenance effort was unsuccessful. The leaking solenoid valve was repaired when power was 72% and therefore, the unit was subsequently escalated to full power where it remained for the duration of the reporting period.

6. Surveillance Testing

The surveillance tests categorized below were analyzed and/or witnessed by the inspector to ascertain procedural and performance adequacy.

The completed test procedures examined were analyzed for embodiment of the necessary test prerequisites, preparations, instructions, acceptance criteria, and sufficiency of technical content.

The selected tests witnessed were examined to ascertain that current written approved procedures were available and in use, that test equipment in use was calibrated, that test prerequisites were met, system restoration completed and test results were adequate.

The selected procedures perused attested conformance with applicable Technical Specifications and procedural requirements; they appeared to have received the required administrative review and they apparently were performed within the surveillance frequency specified.

<u>Procedure</u>	<u>Title</u>
PT/2/A/4350/03A	Electrical Power Source Alignment Verification
OP/1/A/6200/10	Upper Head Injection Enclosure 4.3
OP/2/A/6200/09	Accumulator Operation Enclosure 4.2
OP/0/A/6100/17	Operation of the Standby Shutdown Facility
PT/0/A/4600/14/C	Nuclear Instrumentation System Source Range Functional Test
PT/0/A/6350/08	Operation of Station Breakers "1B" NS Pump Breaker to "Test" position "1B" CA Pump Breaker to "Test" Position
OP/1/A/6250/01	Condensate and Feedwater Systems

<u>Procedure</u>	<u>Title</u>
PT-1-A-4208 1B	NS Spray Pump 1B PT
PT-1-A-4601 02	Protection System Channel 2 PT
PT-1-A-4204 01A	ND Pump 1A PT
PT-1-A-4252 07	CA System PT
PT-1-A-4252 01A	Motor Driven CA Pump 1A PT
PT-1-A-4252 01B	Motor Driven CA Pump 1B PT
PT-1-A-4601 08B	SSPS Train B PT
PT-1-A-4350 17A	D/G 1A Fuel Oil Transfer Pump PT
PT-1-A-4601 04	Protection System Channel IV Functional Test
PT-1-A-4403 01B	RN Train 1B PT
PT-1-A-4252 01	CA Pump #1 PT
PT-1-A-4209 01A	NV Pump 1A PT
PT-1-A-4401 01B	KC Train 1B PT
PT-2-A-4209 01B	NV Pump 2P PT
PT-2-A-4401 01A	KC Train 2A PT
PT-0-A-4601 08A	SSPS Train A PT
PT-2-A-4252 01A	Motor Driven CA Pump 2A PT
PT-2-A-4252 01B	Motor Driven CA Pump 2B PT
PT-2-A-4403 01A	RN Pump 2A PT
PT-2-A-4601 04	Protection System Channel IV Functional Test

7. Maintenance Observations

The maintenance activities categorized below were analysed and/or witnessed by the resident inspection staff to ascertain procedural and performance adequacy.

The completed procedures examined were analyzed for embodiment of the necessary prerequisites, preparation, instruction, acceptance criteria and sufficiency of technical detail.

The selected activities witnessed were examined to ascertain that where applicable, current written approved procedures were available and in use, that prerequisites were met, equipment restoration completed and maintenance results were adequate.

The selected work requests/maintenance packages perused attested conformance with applicable Technical Specifications and procedural requirements and appeared to have received the required administrative review.

<u>Work Request</u>	<u>Title</u>
034737	Fire zones 43, 44, 51 Test of Smoke Detectors. Test one rate of rise detector per zone.
35111	Fire zones 33, 34, 35, 36, 38, 52. Test all smoke detectors. Test one rate of rise detector per zone.
035958	Monthly PM on Emergency SID Facility Diesel.
035867/035868	PM/PT Functional Test on Source Range Neutron Flux Channels.
035879/035880	PM/PT Intermediate Range Nuclear Instrumentation System Channels Including Operability of SSPS Input Status Lights on Control Board.
120829	Replace Sightglass on 1CA Turbine Driven Pump.

8. Fire Detection Design Analysis

On September 16, 1984, during the performance of PT/O/A/4600/16, Fire Detection System Semi-Annual Test, a number of failures occurred for the rate of rise fire detectors in the Unit 2B diesel generator (D/G) room. The failures apparently resulted from air leaking through degraded epoxy used as a sealant on the detector housing. The epoxy degraded when exposed to ambient temperatures of approximately 120°F for long periods of time (approximately 3 years). The defective "E-135C" detectors (manufactured by Edwards Company and distributed by Walter Kidde Company) were immediately replaced and the new ones functionally tested for operability.

The E-135C detectors are designed to alarm when the temperature rises at a rate of 15°F or greater per minute or when temperatures exceed 135°F (called the fixed rate). The rate of rise function is tested by spraying Quick Freeze on the detector housing and allowing the ambient temperature in the area (usually 100 - 110°F at floor level in 2B D/G) to cause the detector to alarm. As heated air inside the detector housing expands, it forces a diaphragm to deform, applying pressure on an electrical contact and creating a closed electrical circuit and alarm. The fixed rate function alarm actuates when a solder mixture melts (at 135°F) causing a spring loaded plunger to collapse and hold the diaphragm on the electrical contact, creating the closed electrical circuit and alarm.

During testing of the rate of rise detector in fire zone 51 (2B D/G), the detector failed to alarm and provide the signal for early warning and notification. Fire zone 51 has eight rate of rise detectors which can trip the diesel, its oil related auxiliaries and, the ventilation blower (if an automatic diesel start is not initiated) to prevent the spread of potential fires.

After replacing the defective detector and functionally testing the replacement for operability, IAE personnel decided to test another rate of rise detector in fire zone 51. When the second detector failed to alarm, two more were tested with the same results. A decision was made at that time to replace all 8 detectors, functionally test them for operability and take the defective detectors to the shop to determine why they had failed.

When 2A D/G room fire detectors were tested the following day, 5 of the 8 rate of rise detectors failed to alarm and were subsequently replaced and the new ones functionally tested.

IAE personnel determined that air inside the housing was escaping around the epoxy sealant that seals the housing to the plastic base plate. Since air was escaping, pressure could not build up causing the diaphragm to deform and the detector to alarm. The escaping air was verified using a bubble leak solution around the detector housing epoxy seal.

Representatives for Walter Kidde Company (the detector supplier) were contacted concerning the failures and were questioned about the application for which the detectors were designed. The supplier stated that the recommended application for the detectors was for areas where the ambient temperatures did not exceed 100°F. Further, Underwriters Laboratory (UL) Standard 521 suggests that all models of detectors with fixed rate set points of 135°F not be subjected to ambient temperatures in excess of 100°F.

The high failure rate of the detectors in the Unit 2 D/G rooms prompted IAE personnel to reschedule tests of detectors in D/G rooms for Unit 1 and immediately test them for operability. Two E-135C detectors failed to alarm in D/G 1A room and were immediately replaced and the new ones functionally tested. The remaining six detectors in D/G 1A as well as all eight of the detectors in D/G 1B alarmed satisfactorily. The acceptable detectors were

S-135 rate of rise detectors and were also supplied by Walter Kidde Company. This model detector is no longer available because the manufacturer has discontinued production.

In addition to the Unit 1 D/G rooms being tested, IAE personnel tested fire zones 70, 87, 91 and 102 and all E-135 detectors alarmed satisfactorily. These areas have ambient temperatures in excess of 100°F and are T.S. controlled areas.

This issue will be maintained as an Unresolved Item pending completion of component analysis by the vendor and completion of program evaluation (50-369/84-30-01).