



UNITED STATES
NUCLEAR REGULATORY COMMISSION

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

Report Nos.: 50-369/83-33 and 50-370/83-40

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 at McGuire site near Charlotte, North Carolina

Inspectors: A. J. Ignatonis 10/18/83
for W. Orders Date Signed
A. J. Ignatonis 10/18/83
for R. Pierson Date Signed
A. J. Ignatonis 10/18/83
A. Ignatonis Date Signed
Approved by: V. L. Brownlee 10/18/83
V. L. Brownlee, Chief Date Signed
Division of Project and Resident Programs

SUMMARY

Inspection on July 20 - August 30, 1983

Areas Inspected

This routine, announced inspection involved 144 inspector-hours on site in the areas of operation, surveillance testing, maintenance activities, followup on IE information notices, evaluation of reportable occurrence reports, and review of nuclear station modifications.

Results

Of the six areas inspected, no violations or deviations were identified in four areas; two items of noncompliance were found in two areas (Violation: Failure to maintain control rods within withdrawal limits (50-370/83-40-01) - paragraph 5; Violation: Failure to follow procedures during surveillance test resulting in loss of feedwater to one generator (50-369/83-33-01)) - paragraph 6).

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *M. McIntosh, Station Manager
- G. Cage, Superintendent of Operations
- E. Estep, Project Engineer
- *M. Sample, Project Engineer
- B. Barron, Operations Engineer, Unit 2
- G. Gilbert, Operations Engineer
- *D. Mendezoff, Licensing Engineer
- C. Van Vynckt, Staff Engineer

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on September 2, 1983, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspector's findings and expressed concern over the issues presented.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Plant Operations

The inspector reviewed plant operations throughout the report period, July 20 - August 30, 1983, to verify conformance with regulatory requirements, technical specifications, and administrative controls. 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 on day and night shifts.

Activities within the control rooms were monitored during shifts and at shift changes. Actions and/or activities observed were conducted as prescribed in Section 3.1 of the Station Directives. The complement of licensed personnel on each shift met or exceeded the minimum required by Technical Specification. Operators were responsive to plant annunciator alarms and appeared to be cognizant of plant conditions.

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

- Turbine Buildings
- Auxiliary Buildings
- Units 1 and 2, Electrical Equipment Room
- 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 report period operating at full power, and maintained that power level until 7:01 p.m., on Friday, July 22, when the unit was shut down in order to repair a leaking RTD manifold valve (1NC-18), a leaking feedwater check valve, and a faulty reactor coolant flow transmitter. The repair efforts were only partially successful on 1NC-18 resulting in a reduction in the leak rate from 1.50 GPM to 0.75 GPM.

The unit achieved criticality at 4:56 a.m., on Monday, July 25; was placed on line at 7:06 a.m.; and was escalated to and maintained at full power until 4:37 p.m., Saturday, July 30, when a unit trip resulted from the loss of both feedwater pumps. The resulting trip investigation revealed that the trip was caused by a relay that was inadvertently jolted when a nuclear equipment operator was performing surveillance in the area. The unit re-achieved criticality at 8:30 a.m., on Sunday, July 31; was placed on-line at 5:59 a.m. the following day; and was subsequently escalated to full power. The unit operated virtually unencumbered until 7:15 p.m. on Friday, August 5, when the unit was once again shut down in order to attempt repairs on 1NC-18. Once again the repair efforts were only partially successful. In both the discussed repair efforts, the repair attempts consisted of the injection of a sealing compound into the seal ring area.

The unit achieved criticality once again on 4:05 p.m. on Saturday, August 6, 1983, and was placed on-line at 5:17 p.m., only to be taken off line at 6:23 p.m., due to malfunctioning steam generator blowdown valves. The unit operated virtually uninhibited until 6:14 p.m. on Friday, August 12 when the unit tripped from full power during the performance of a loss of electrical load test. The decision was made to remain shutdown in order to replace 1NC-18 and effect other necessary repairs. The unit achieved criticality at 5:59 a.m. on August 26; was placed on line at 9:58 a.m.; and was escalated to 100% power by 6:45 p.m. The unit operated throughout the remainder of the report period with no major problems.

McGuire Unit 2 began the report period in a planned maintenance/modification outage which began on June 17. The major objective of the outage was the modification of the Westinghouse steam generators incorporating the new feedwater flow manifold. For details of the modification refer to report 50-369/83-16.

On August 9, at 4:37 a.m., the unit achieved criticality ending the 53-day outage. The unit operated at or below 50 percent power throughout the remainder of the report period, undergoing power escalation testing, and awaiting the repair of the A feedwater pump.

On August 9, when McGuire Unit 2 achieved criticality, the unit was made critical with a boron concentration of 1242 PPM with D control rod bank at 87 steps. At 8:40 a.m. that morning, licensee performance personnel detected that the reactor had been taken critical with a control rod configuration which violated Technical Specification (TS) 3.1.1.3 and the withdrawal limits established by the startup procedure. An investigation of the incident revealed the following:

- a. During zero power physics testing on McGuire Unit 2, it was determined that the unit displayed a positive all rods out moderator temperature coefficient of $+0.54 \text{ pcm}/^{\circ}\text{F}$.
- b. Pursuant to TS 3.1.1.3, rod withdrawal limits had been developed and incorporated into the Data Book (a reference document) which is employed by Operations personnel when performing a reactor startup to preclude conditions leading to a positive moderator temperature coefficient.
- c. The controlling procedure for Unit 2 startup (OP/2/A/6100/01) contained a caution statement just prior to step 3.2.50 which instructed the operator, "Do not exceed withdrawal limits per the Data Book curve."
- d. The controlling procedure for unit startup refers, in step 3.2.50, to procedure OP/0/A/6100/06, Reactivity Balance Calculation, which in turn refers to the Data Book for information essential in determining an estimated critical position (ECP).

In interviews with licensee personnel it was determined that the operator, who performed the ECP did not refer to rod withdrawal limit curve as directed by the controlling procedure for startup leading to the critical rod position, which violated both procedural and TS requirements.

TS 3.1.1.3 requires that the moderator temperature coefficient (MTC) be less positive than $0 \text{ delta K/K}/^{\circ}\text{F}$ for all the rods, beginning of cycle, and hot zero power condition. With a MTC more positive than above, the action statement of the requirement allows operation to continue in modes 1 and 2 provided that control rod withdrawal limits are established and maintained sufficient to restore the MTC to less positive than zero $\text{delta K/K}/^{\circ}\text{F}$... and that the control rods are maintained within these withdrawal limits until the MTC has been restored to within its limit for all rods withdrawn condition.

A review of the withdrawal curve provided in the Data Book, revealed that for the criticality in question with a boron concentration of 1242 ppm, control rod bank D should have been fully inserted. The actual critical position was 87 steps withdrawn. Due to the conservatism factored into the

curves, it appears that even with the rod position in violation of the withdrawal limits, the MTC remained very slightly negative.

It appears that the major causes of this event are twofold:

1. The control operator failed to abide by the instructions of the caution statement of the controlling procedure for startup, OP/2/A/6100/01.
2. Procedure OP/0/A/6100/06, Reactivity Balance Calculation, contained no reference to rod withdrawal limits in the Data Book.

These cases in turn led to the violation of the action statement of TS 3.1.1.3 in that the control rods were not maintained within the withdrawal limits established pursuant to that specification.

This is a Violation (50-370/83-40-01).

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 TS's and procedural requirements, they appeared to have received the required administrative review and they apparently were performed within the surveillance frequency specified.

The inspector employed one or more of the following acceptance criteria for evaluating the above items:

10 CFR
ANSI N18.7
McGuire Technical Specifications
McGuire Station Directives

Procedure

PT-1-A-4252-01-A

Title

Motor Driven Auxiliary Feedwater Pump 1A
Performance Test

PT-1-A-4252-01-B	Motor Driven Auxiliary Feedwater Pump 1B Performance Test
PT-1-A-4200-20-A	Unit 1 Airlock
PT-1-A-4200-19	Emergency Core Cooling System and Containment Spray Valve Verification
PT-1-A-4150-01-B	Reactor Coolant Leakage Calculation
PT-1-A-4601-01	Protection System Channel 1 Functional Test
PT-1-A-4209-01-B	Centrifugal Charging Pump 1B Performance Test
PT-1-A-4601-03	Protection System Channel 3 Functional Test
PT-1-A-4150-14	Power Operated Relief Valve (PORV) Channel Functional Test
PT-1-A-4600-07	Nuclear Instrumentation Cold Leg Accumulator Pressure Functional Test
PT-1-A-4600-56	Manual Reactor Trip Functional Test

On August 9, at 11:57 a.m., with McGuire Unit 1 operating at 100 percent power, 1B steam generator "Low-Low Level" alert was received in the control room. The operator took manual control of the 1B steam generator feedwater regulator and reopened the feedwater regulator valve, feeding the generator and recovering normal level. Investigation revealed that an electronic technician who was performing a PORV Channel Functional Test, PT-1-A-4150-14 had placed a jumper on the wrong card in cabinet 2, protection channel II causing steam flow channel II to fail low, which in turn caused the feedwater valve to shut.

The inspector interviewed the technician who performed the test, reviewed the procedure and observed the electronic equipment involved. The procedure appears adequate in the information/guidance afforded and the card is clearly identified.

Step 12.2.4 of the procedure requires that a jumper be placed from pin 1 to pin 13 of card C2-773 in cabinet 2/channel II.

The technician placed the jumper on card C2-772 in violation of the procedural requirement, which in turn resulted in the transient.

TS 6.8.1 requires that written approved procedures be implemented to control surveillance testing of safety related equipment.

Contrary to those requirements the technician failed to abide by the requisites of procedure PT-1-A-4150-14 as described in the foregoing paragraphs.

This is a violation (50-369/83-33-01).

7. Maintenance Observations

The maintenance activities categorized below were analyzed 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 Specification and procedural requirements and appeared to have received the required administrative review.

<u>Work Request</u>	<u>Equipment</u>
115254	2 RNPT 5020
412241	EMF 41
115104	2-CF-125
54157	TP-2-A-1200-27
114012	Unit 2 MSR
84852	Unit 2 NC Loop B T-AVE
115253	NV Pump 1A

8. IE Information Notices

The following IE Information Notices were reviewed to ensure their receipt and review by appropriate licensee management. IE Information Notices are considered closed upon receipt and review. The inspector has also noted that the licensee had taken or planned appropriate action for each notice.

<u>Information Notice No.</u>	<u>Subject</u>
83-49	Sampling and Prevention of Intrusion of Organic Chemicals into Reactor Coolant Systems
83-48	Gaseous Effluent Releases of Radioactive Iodine-125 and Iodine-131 in Excess of NRC Limits

- 83-46 Common-mode valve failures degrade Surry's recirculation Spray Subsystem.
- 83-44 Potential Damage to Redundant safety equipment as a result of backflow through the equipment.
- 83-43 Improper settings of Intermediate Range (IR) high flux trip setpoints.
- 83-39 Failure of Safety/Relief valves to open at BWR Interim Report.
- 83-38 Defective heat sink adhesive and seismically induced chatter in relays within printed circuit cards.
- 83-37 Transformer failure resulting from degraded internal connection cables.
- 83-36 Impact of Security Practices on safe operations.
- 83-34 Event Notification Information Worksheet.
- 83-33 Nonrepresentative Sampling of Contaminated Oil.
- 83-31 Error in Adlpipe Computer Program.
- 83-30 Misapplication of Generic Emergency Operating Procedures (EOP) Guidelines.
- 83-29 Fuel binding caused by Fuel Rack Deformation.
- 83-28 Criteria for Protective Action Recommendations for General Emergencies.
- 83-27 Operational Response to Events Concerning Deliberate Acts Directed against plant equipment.
- 83-26 Failure of Safety/Relief Valve Discharge Line Vacuum Breakers.
- 83-25 Standby Gas Treatment system heater high temperature trip setpoint adjustment.
- 83-24 Loose parts in the secondary side of steam generators at pressurized water reactors.
- 83-23 Inoperable containment atmosphere sensing systems.
- 83-21 Defective Emergency - use respirator.

83-01 Suppl.1	Ray Miller, Inc.
83-20	ITT Grinnell Figure 306/307 Mechanical Snubber Attachment interference.
83-19	General Electric Type HFA Relay Contact Gap and wipe setting adjustment.
83-18	Failures of the undervoltage trip function of reactor trip system breakers.
83-17	Electric Control Logic problem resulting in Inoperable auto-start of emergency diesel generator units.
83-16	Contamination of the Auburn Steel Property with cobalt-60.
83-15	Falsified pre-employment screening records.
83-14	Dewatered spent ion exchange resin susceptibility to Exothermal Chemical reaction.
83-13	Design misapplication of Bergen-Paterson standard strut restraint clamp.
83-12	Incorrect boron standards.
83-11	Possible Seismic Vulnerability of Old Lead Storage Batteries.
83-10	Clarification of Several Aspects Relating to Use of NRC-Certified Transport Packages.
83-08	Component Failures Caused by Elevated DC Control Voltage.
83-07	Nonconformities with materials supplied by tube line corporation.
83-06	Nonidentical replacement parts.
83-05	Obtaining Approval for disposing of Very-Low-Level Radioactive waste -10 CFR Section 20.302.
83-04	Failure of ELMA Power.
83-03	Calibration of Liquid Level.
83-02	Limiterque HOBC, H1BC, H2BC, and H3BC Gearheads.

83-01

Ray Miller, Inc.

9. Review of Licensee Event Reports

The inspector performed a review of nonroutine event reports to verify that the report details met license requirements, identified the cause of the event, described corrective actions appropriate for the identified cause, and adequately addressed the event and any generic implications. In addition, the inspector examined selected operating and maintenance logs, and records and internal incident investigation reports. Personnel were interviewed to verify that the report accurately reflected the circumstances of the event, that the corrective action had been taken or responsibility assigned to assure completion, and that the event was reviewed by the licensee. The following licensee event reports were reviewed with indicated status of whether they are considered to be closed or open:

(Closed) 50-369/LER 81-144: Shutdown bank "B" inoperable due to inaccurate rod position; cleared rod position by exercising the rod.

(Open) 50-369/LER 81-160: UHI low N2 header pressure. According to licensee reportable occurrence report, corrective action was to change alarm setpoint on pressure switch to 1250 psig from 1450 psig. However, this appears not to have been accomplished since operating procedure for annunciator indication still shows an alarm setpoint of 1450 psig and there is no apparent evidence that the setpoint was changed. This will remain as an Inspector Followup Item (369/83-33-01).

(Open) 50-369/LER 82-02: Pressurizer safety relief valve and PORV discharge temperature alarm setpoints were to be reset to higher limits following licensee's and Westinghouse investigation. Shortly after the end of this inspection period (September 1, 1983) the inspector noted that the alarms on Unit 1 were reset to greater than 20°F above ambient, in fact they were reset to 150°F and 220°F according to Work Request Nos. 114790 and 114791. Also, the inspector noted that procedure OP/1/A/6100/10G for annunciator panel 1AD6 was not revised for new setpoint changes. These findings will be followed up in the subsequent inspection period and will be carried as an Inspector Followup Item (369/83-33-02).

(Closed) 50-369/LER 82-13: Licensee made administrative changes to preclude use of wrong calibration procedure.

(Closed) 50-369/LER 82-04: Pressurizer PORV NC-32 leakage was terminated by work on valve during a subsequent outage.

(Closed) 50-369/LER 82-22: Pressurizer PORV valve time testing requirements were incorporated into a revision of procedure PT/1/A/4151/02. The inspector also verified that same revision was implemented in procedure PT/2/A/4151/02.

(Closed) 50-369/LER 82-29: Leaking pressurizer PORV 1NC-34 was repaired per Work Request no. 108424. The inspector reviewed the documentation and found

it to be acceptable. However, in review of the licensee incident investigation report the inspector noted that the licensee failed to generate removal and restoration documentation on the closing of valve INC-33. A R&R was generated three days later. This is a violation of Technical Specification 3.4.5. In that the violation meets the criteria set forth in current NRC enforcement policy designed to encourage licensee initiative for self-identification and correction of problems, a notice of violation will not be issued.

(Closed) 50-369/LER 82-48: Pressurizer PORV INC-32 position was undetermined in the control room due to wire grounding. Wire was found to be pinched and was repaired.

(Closed) 50-369/LER 82-17: UHI instrument fitting line was found loose; it was then tightened and problem was corrected.

(Open) 50-369/82-38: UHI level switch setpoint drifted. Licensee submitted proposed Technical Specification change for setpoints which was subsequently approved by the NRC. However, the licensee recently experienced another setpoint drift exceeding Technical Specification limits. Due to this recurrence this item will remain open.

(Open) 50-369/82-81: Modifications were partially completed for personnel airlocks to preclude inadvertent door seal inflation. Work Request No. 92334 pertaining to mechanical modifications was completed and reviewed by the inspector. Work Request no. 92335 pertaining to electrical work has not been completed.

10. Review of Design Changes and Modifications

Records packages of several design changes and modifications were reviewed to verify that reviews were made of the design according to the requirements of 10 CFR 50.59 and McGuire Technical Specifications. Nuclear Station Modification packages reviewed included:

NSM MG1-146 - Modification to Unit 1 personnel airlocks which required removal of hydraulic units, tapering of latching pins, and installation of door stops. Electrical modification will be performed later. Purpose of modification is to prevent inadvertent inflation of door seals.

NSM MG2-144 - Modification to Unit 2 personnel airlocks. Same modifications as for Unit 1 described above. All mechanical and electrical work was completed; modification was completed on August 8, 1983.

NSM MG-2-0048- Modification to Unit 2 UHI isolation valve actuators. Pressure transducers and gauges were added to the N2/oil hydraulic system.

It was determined that the changes were reviewed and approved in accordance with Part 50.59 and Technical Specifications; modifications were tested according to previously established procedure; drawings and/or procedures were changed to reflect the modifications as needed; QA reviews and QC signoffs were made as applicable; all necessary reviews and signoffs were made.