



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

Report Nos.: 50-369/87-43 and 50-370/87-43

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: November 21, 1987 - January 20, 1988

Inspector: *W. Orders*  
W. Orders, Senior Resident Inspector

2/18/88  
Date Signed

Accompanying Personnel: D. Nelson

Approved by: *T. A. Peebles*  
T. A. Peebles, Section Chief  
Division of Reactor Projects

2/18/88  
Date Signed

SUMMARY

Scope: This routine, unannounced onsite inspection involved the areas of operations, safety verification, surveillance testing, maintenance activities, and review of licensee actions pertaining to Generic Letter GL 81-21 Natural Circulation Cooldown.

Results: In the areas inspected, one violation was identified involving an inaccurate electrical print and failure to follow procedure (see paragraph 9).

## REPORT DETAILS

### 1. Person Contacted

#### Licensee Employees

- \*T. McConnell, Plant Manager
- \*B. Travis, Superintendent of Operations
- \*D. Rains, Superintendent of Maintenance
- B. Hamilton, Superintendent of Technical Services
- N. McCraw, Compliance Engineer
- M. Sample, Superintendent of Integrated
- \*L. Firebaugh, OPS/NPE/MNS
- \*L. Weaver, McGuire Training
- \*D. Baxter, OPS/MNS/NPD
- \*D. McGinnis, McGuire Training Scheduling
- R. Banner, Compliance
- J. Snyder, Performance Engineer
- \*N. Atherton, Compliance
- \*R. White, IAE Engineer

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

\*Attended exit interview

### 2. Exit Interview (30703)

The inspection scope and findings identified below were summarized on January 29, 1988, with those persons indicated in paragraph 1 above. One violation consisting of two examples was discussed in detail. The licensee representatives present offered no dissenting comments, nor did they identify as proprietary any of the information reviewed by the inspectors during the course of their inspection.

### 3. Unresolved Items

There were no unresolved items identified in this report.

### 4. Plant Operations (71707, 71710)

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

Activities within the control room 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 taken during the reporting period included, but were not limited to, the turbine buildings, the auxiliary building, Units 1 and 2 electrical equipment rooms, Units 1 and 2 cable spreading rooms, and the station yard zone inside the protected area.

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

a. Unit 1 Operations

Unit 1 began the reporting period at full power. On November 24, power was reduced to 90% due to vibrations/oscillations of main turbine governor valve 4 (GV-4). Licensee efforts to solve the problem with the unit on line were unsuccessful and GV-4 was closed. On November 25 power was raised to approximately 97%, the maximum attainable with the three remaining turbine governor valves fully open.

On December 28, during testing of steam generator water level instrumentation, use of an incorrect print resulted in a reactor trip. Details concerning this incident are given in paragraph 9. The unit was restarted the following day after a post trip review and scheduled testing were completed. Power operation continued without interruption until the morning of January 7 when a main generator voltage regulator failure resulted in a reactor trip. The unit was restarted the following day and operated through the end of the report period.

b. Unit 2 Operations

Unit 2 began the inspection period operating at 100 percent power. On November 24, a 50 percent run back occurred when the A feedwater pump turbine speed controller malfunctioned causing speed oscillations. The problem was corrected but the unit was maintained at 50 percent power due to grid demand. The unit returned to full power operation on November 30.

On November 30 an apparent spike in the main generator stator cooling flow caused a reactor trip. The generator protection circuitry, designed to initiate a turbine runback on low stator cooling flow and a turbine trip on low-low flow after a time delay did not operate correctly. A wiring error had cross connected the low and low-low flow functions such that the turbine trip occurred first resulting in the reactor trip. The unit was restarted December 1 and reached full power the following day.

PT/2/A/4252/01	Turbine Driven Auxiliary Feedwater Pump Test
PT/2/A/4252/01B	B Motor Driven Auxiliary Feedwater Pump Test
PT/2/A/4601/01	SSPS Channel 1 Functional Test
PT/2/A/4200/28	Slave Relay Test
PT/2/A/4450/04A	Hydrogen Recombiners A & B
PT/1/A/4201/05A	Train A Containment Pressure Control Test
PT/1/A/4206/01A	A Safety Injection Pump Test
PT/1/A/4208/01A	A Containment Spray Pump Test
PT/1/A/4209/01B	B Charging Pump Performance Test

#### 6. Maintenance Observations (62703)

Routine maintenance activities were reviewed and/or witnessed by the resident inspection staff to ascertain procedural and performance adequacy and conformance with applicable Technical Specifications.

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

No violations or deviations were identified.

#### 7. AEOD Diagnostic Evaluation Observations (37702, 35702, 40700)

During the first two weeks in December, an 18 member AEOD team evaluated the McGuire facility and Duke corporate support to the station. On January 22, a meeting was held in the Duke corporate offices during which the AEOD team management relayed to the licensee the results of the evaluation.

The team observed a number of strengths and identified some weaknesses in the McGuire programs.

Program strengths observed by the team included:

- ° Overall Corporate Leadership/Oversight/Involvement
- ° Staff Technical Capabilities
- ° Functional Area Technical Programs
- ° Programs For Improved Engineering Support
- ° Organizational Climate/Culture/Attitude

Weaknesses identified by the team included:

- ° Design Engineering Involvement at McGuire
- ° QA Contributions to Enhancing Plant Safety Performance

- ° Specific Operations, Maintenance, and Testing Issues
- ° Specific Management and Organizational Issues

The specifics of the evaluation will be documented in a report to the licensee.

#### 8. Natural Circulation Cooldown (25586)

During the inspection period, the licensee's actions to implement Generic Letter GL 81-21, Natural Circulation Cooldown were reviewed. This review included the following documents:

Licensee response to GL 81-21, dated 1/20/82  
 NRC response to licensee's letter of 1/20/82, dated 9/30/83  
 Employee Training & Qualification System Manual, Standards:  
 301.0 Rev 1 Operations Training and Qualifications Overview  
 302.1 Rev 3 Basic Operations Training Program  
 303.0 Rev 2 License Preparatory Reactor Operator Program  
 304.0 Rev 2 License Preparatory Senior Reactor Operator Program  
 306.0 Rev 2 Periodic Training Licensed Operator Requalification  
 310.0 Rev 0 Periodic Training SRO/RO Certified Inspector  
     Requalification  
 312.0 Rev 2 Maintenance of an Active NRC License (RO/SRO)  
 Licensed Operator Requal Training Schedule, 1-86  
 Hot License Preparatory Class 1087 Training Schedule  
 Licensed Operator Training Schedule, 1-86  
 Licensed Operator Requal Training Segments 87-1,-2,-3,-4  
 OP-MC-SAO-A09, dated 6/14/83, Instructor Simulator Exercise Guide  
     For Abnormal Procedure on Natural Circulation  
 OP-MC-SEO-E02, dated 10/16/84, Instructor Simulator Exercise  
     Guide for Emergency operation during Natural Circulation  
     Cooldown  
 OP-MC-SIM-T03, dated 11/27/84, Instructor Simulator Exercise Guide  
     for St. Lucie Natural Circulation Cooldown Event  
 OP-MC-SRT-R01, dated 1/4/85, NRC License Requalification Exercise  
     Guide Worksheets Segment 2 day 2  
 Personnel (SRO/RO) Training Records  
 OP-MC-TA-AM, dated 2/8/82, Accident Mitigation Lesson Plan  
 OP-MC-TA-PTS, dated 4/28/83, Reactor Material & Pressurized  
     Thermal Shock Lesson Plan  
 OP-MC-EP-EP1, dated 8/14/84, Emergency Procedure 1 (SI,  
     NC,SIT) Lesson Plan  
 OP-GA-SPS-THF-HT, dated 2/29/84 Heat Transfer Lesson Plan  
 OP-CN-THF-T1, dated 5/15/86, Heat Transfer Lesson Plan  
 EP/1/A/5000/1.1, dated 11/6/87, Natural Circulation Cooldown

EP/2/A/5000/1.1, dated 6/6/86, Natural Circulation Cooldown  
 EP/1/A/5000/16.3, dated 8/22/86, Response to Void in Reactor  
 Vessel  
 EP/2/A/5000/16.3, dated 6/6/86, Response to Void in Reactor  
 Vessel  
 AP/1/A/5500/09, dated 12/3/84, Natural Circulation  
 Response to Supplement 1 to NUREG-0737, Vol. 2, PGP  
 EPG ES-0.2, Rev. 2, Natural Circulation Cooldown  
 EPG FR-1.3, Rev. 1, Response to Void in Reactor Vessel

The inspectors determined from their review of the training program, that classroom and simulator training on natural circulation cooldown is included in RO and SRO certification training and in the operator retraining program. The inspectors also noted that this training includes other power reactor operating events.

Additionally, Emergency procedures (EP) procedures were reviewed to ensure they followed the Westinghouse Owners Group (WOG) Guidelines with respect to step content, addition of specific plant parameters, cooldown rates, subcooling temperatures, temperature limitations, and documentation of step deviations. The inspectors determined from their review of the EP that the licensee had implemented the requirements to GL 81-21.

Three examples of procedural deficiencies were noted during the review. Step 13 of EP/1/A/5000/1.1 (Initiate NC System Depressurization) had substeps b and c reversed. This would cause the operator to establish a 100 degree subcooling margin and then reduce the margin to a 50 degree subcooling margin. This is not the intent of these steps. The licensee indicated that they had previously identified this discrepancy. Step 2b of EP/1/A/5000/16.3 and EP/2/A/5000/16.3 (Charging Flow Established) does not contain the IF NOT, THEN statement which would direct the operator to establish excess letdown and skip the next step if charging cannot be established. Step 14 of EP/1/A/5000/16.3 and EP/2/A/5000/16.3 (Prepare Containment for Reactor Vessel Venting) does not contain the Action/Expected Response substep for checking the Containment Hydrogen concentration less than 6 %. The incorporation of these changes into the procedures will be tracked as an inspector followup item (50-369/370-87-43-01) and will be reviewed during a subsequent inspection.

No violations or deviations were identified in this area.

#### 9. Unit 1 Reactor Trip of December 28, 1987

Unit 1 tripped at 1:22 p.m. on December 28, 1987 due to a false Low-Low level in B steam generator. Instrumentation and Electrical (IAE) technicians had been performing calibration testing on channel II of narrow range B steam generator level instrumentation. During the test it was determined that an adjustment to the channel's lead-lag circuit was required. The electrical schematic drawing for channel II (MCM 1399.03-0368 001) incorrectly identified the channel II lead-lag card as being located in the channel IV cabinet. The IAE personnel questioned this



arrangement, but proceeded with the adjustment. In actuality, the card in the channel IV cabinet was a channel IV component. When the adjustment was made, the 2 of 4 logic for the unit trip on Low-Low steam generator level was satisfied (channel II was in a tripped condition) and the reactor tripped. After the trip the IAE technicians realized the error and informed Operations (OPS) of the cause of the trip. The correct lead-lag card was subsequently located in the channel II cabinet therefore verifying the error on the drawing. The licensee has determined that the drawing error occurred when the drawing was revised for a Nuclear Station Modification to add the lead-lag circuit. The same error existed on the corresponding drawing for Unit 2. The drawing errors constitute a violation for inadequate procedures.

During the restart effort on December 24, an additional trip occurred during the source range detector calibration. At approximately 10:14 p.m. IAE and OPS personnel were conducting pre-startup testing on Nuclear Instrumentation (NI) channel N-31 and the Manual Reactor Trip systems simultaneously. Operations personnel racked in and closed the B Train Reactor Trip Bypass Breaker which gave a train B General Warning signal on the Solid State Protection System (SSPS). When IAE personnel completed testing on NI channel N-31 their procedure PT/OA/4600/14C, Nuclear Instrumentation System Source Range Functional Test, required that a check be made to verify that General Warning lamps are not lit on SSPS trains A or B prior to positioning the train A Multiplexer Test Switch from A + G to NORMAL. In doing so, the switch must pass through the INHIBIT position, momentarily generating a General Warning. Two simultaneous General Warning signals will generate a trip signal. The IAE technician determined that a train B General Warning was present due to OPS testing but believed that rotating the switch quickly through the INHIBIT position would not generate an A train General Warning. This was based on their experience that rotating the switch quickly would not illuminate the General Warning light. The train A Multiplexer Test Switch was rotated rapidly enough not to illuminate the General Warning lamp, but the general warning circuitry still generated a Reactor Trip Signal. This constitutes a violation for failure to follow a procedure.

These two examples, incorrect drawings and failure to follow a procedure collectively constitute a violation. This is Violation 369/87-43-02.