



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

Report Nos. 50-369/88-12 and 59-370/88-12

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

Facility Name: McGuire Nuclear Station 1 and 2

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Inspection Conducted: April 23, 1988 - May 20, 1988

Inspectors:	<u><i>W. Orders</i></u>	<u>5/27/88</u>
	W. Orders, Senior Resident Inspector	Date Signed
	<u><i>D. Nelson</i></u>	<u>5/27/88</u>
	D. Nelson, Resident Inspector	Date Signed
	<u><i>R. Croteau</i></u>	<u>5/27/88</u>
	R. Croteau, Resident Inspector	Date Signed
Approved by:	<u><i>T. A. Peebles</i></u>	<u>5-31-88</u>
	T. A. Peebles, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine inspection involved the areas of operations safety verification, surveillance testing, maintenance activities, and follow-up on previous inspection findings.

Results: In the areas inspected, three violations and one deviation were identified. One violation was identified which included four examples of inadequate procedures or failure to follow procedures during auxiliary feedwater pump testing, auxiliary feedwater turbine operability determination, or auxiliary feedwater equipment restoration. A second violation involves the inadequacy of a test program to test equipment in the as found condition. A third violation deals with inoperable fire doors. A deviation was identified which involves an operability determination which was made by a staff SRO instead of a regular shift SRO.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*T. McConnell, Plant Manager
- B. Travis, Superintendent of Operations
- J. Boyle, Superintendent of Integrated Scheduling
- B. Hamilton, Superintendent of Technical Services
- \*R. Sharp, Compliance Engineer
- M. Sample, Superintendent of Maintenance
- \*S. LeRoy, Licensing, General Office
- \*D. Baxter, OPS/MNS/NPD
- \*R. Broome, MNS-Integrated Scheduling
- \*R. Gill, NPD/Licensing
- \*J. Snyder, Performance Engineer
- \*N. Atherton, Compliance
- \*D. Ethington, NPD/Compliance
- \*R. Wagner, Design Engineering, McGuire Office
- \*G. Bost, Design Engineering, McGuire Office

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 findings identified below were summarized on May 19, 1988, with those persons indicated in paragraph 1 above. The following items were discussed in detail:

(OPEN) Violation 370/88-12-01, Fire Doors found blocked open (See Paragraph 4).

(CLOSED) Licensee Identified Violation (LIV) 369/88-12-01, Failure to calibrate 1A CA Pump Pressure Switch (See Paragraph 8).

(OPEN) Deviation 369,370/88-12-02, Failure to obtain concurrence of a shift SRO in an Operability Determination (See Paragraph 9.&.).

(OPEN) Violation 369,370/88-12-03, Failure to follow procedure/inadequate procedures with four examples (See Paragraphs 9, 10, and 11).

(OPEN) Violation 369,370/88-12-04, Inadequate surveillance test program for turbine driven auxiliary feedwater pump testing (See Paragraph 9).

(CLOSED) Licensee Identified Violation (LIV) 369,370/88-12-05, Failure to perform a TS required channel check (See Paragraph 8).

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

An unresolved item (UNR) is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation. 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 perused. 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.

During a routine tour of the auxiliary building on May 9, 1988, the inspector noted that Technical Specification Fire Doors 601C and 601D [doors to the Turbine Driven Auxiliary Feedwater (TDCA) Pump Room] were blocked open. Operations was unaware of the doors being blocked open therefore no fire watch was posted and no hourly fire watch patrol was established. A performance person in the area was questioned about the fire doors and informed the inspector the doors were not blocked open by him. Licensee personnel promptly unblocked and closed the doors.

Personnel working in the TDCA pump room may have blocked the doors open to cool the room down as temperature in the room was uncomfortably high. T.S. 3.7.11 states that all fire barrier penetrations (walls, floor/ceilings, cable tray enclosures and other fire barriers) separating

safety-related fire areas or separating portions of redundant systems important to safe shutdown within a fire area and all sealing devices in fire rated assembly penetrations (fire doors, fire windows, fire dampers, cable piping, and ventilation duct penetration seals) shall be OPERABLE.

With one or more of the required fire barrier penetrations and/or sealing devices inoperable, within 1 hour either establish a continuous fire watch on at least one side of the affected assembly, or verify the OPERABILITY of fire detectors on at least one side of the affected assembly, or verify the OPERABILITY of fire detectors on at least one side of the inoperable assembly and establish an hourly fire watch patrol.

Contrary to T.S. 3.7.11 two fire doors were blocked open making them inoperable for an undetermined period of time without taking the required action. This is an apparent violation (370/88-12-01).

a. Unit 1 Operations

Unit 1 operated throughout the report period with no major operational difficulties. On May 2, 1988, however the turbine driven auxiliary feedwater (TDCA) pump auto started when technicians dropped a lead touching a terminal board causing a fuse to blow in the circuitry while lifting a lead as part of a performance test to stroke time test 1CA-27A, A CA pump minimum flow valve. The TDCA pump tripped shortly after starting. The cause of the pump trip was not immediately known and the licensee postulates that the latch on the stop valve may have vibrated off to the trip condition on the start of the pump. The licensee stated the event would be investigated to determine the cause of the trip. The fuse was replaced and the TDCA pump was restarted several times to ensure proper operation.

Also, at 6:55 p.m. on the evening of May 19, 1988, during the performance of a diesel generator 1B load sequence test (PT/1/A/4350-04B), licensee personnel failed to perform certain actions required by the procedure which resulted in an inadvertent engineered safety features (ESF) actuation. Details of this event are entailed in paragraph 11.

b. Unit 2 Operations

Unit 2 operated throughout the report period with no major operational disturbances with the exception of a power reduction to approximately 10 percent power on May 13 to allow containment entry. Containment entry was necessary to add oil to the C reactor coolant pump motor. The unit returned to full power operation on May 16.

5. Surveillance Testing (61726)

Selected surveillance tests were analyzed and/or witnessed by the inspector to ascertain procedural and performance adequacy and conformance with applicable Technical Specifications.

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

Detailed below are selected tests which were either reviewed or witnessed:

<u>PROCEDURE</u>	<u>EQUIPMENT/TEST</u>
PT/2/A/4204/01B	Residual Heat Removal Pump 2B Performance Test
PT/2/A/4208/04A	NS Heat Exchanger Performance Test
PT/2/A/4350/04	4KV Unit 2 Sequence UV
PT/2/A/4403/07	RN Train 2A Flow Balance
PT/2/A/4206/01B	NI Pump 2B Performance Test
PT/2/A/4204/01A	ND Pump 2A Performance Test
PT/2/A/4252/01	CA Pump 2 Performance Test
PT/1/A/4208/01A	NS Pump 1A Performance Test
PT/1/A/4401/01B	KC Train 1B Performance Test
PT/1/A/4252/01A	Motor Driven CA Pump 1A Performance Test
PT/1/A/4252/01	CA Pump 1 Performance Test

See paragraph 9 for more information on PT/1/A/4252/01.

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. Follow-up on Previous Inspection Findings (92702)

The following previously identified items were reviewed to ascertain that the licensee's responses, where applicable, and licensee actions were in compliance with regulatory requirements and corrective actions have been completed. Selective verification included record review, observations, and discussions with licensee personnel.

(CLOSED) Unresolved Item 369/87-14-04, CA Pressure Switch CAL, Water Leg. This item is identified as a licensee identified violation in section 8 of this report.

(CLOSED) Inspector Followup Item 369,370/87-02-01, Review PIR on VC/YC Failures (PIR-0-M87-0006). This event involved the loss of both trains of control room ventilation/chilled water and was reported in LER 369/87-01. The subject PIR has been reviewed and corrective actions have been taken to prevent recurrence.

(CLOSED) Violation 369,370/87-11-01, Failure to Perform Trending of RTB Response Time Test Data. During regional inspection of March 16 - 20, 1987, the licensee could not show evidence that reactor trip breaker response time was being trended. The licensee immediately reviewed previous test data and provided plots of trend curves. Subsequently, the licensee has established a formal trending program which requires the review of response time data for trends that may indicate breaker degradation. Examination of records revealed that the licensee is continually trending reactor trip breaker response time data. This item is closed.

8. Licensee Event Report (LER) Followup (90712, 92700)

The following LER's were reviewed to determine whether reporting requirements have been met, the cause appears accurate, the corrective actions appear appropriate, generic applicability has been considered, and whether the event is related to previous events. Selected LER's were chosen for more detailed followup in verifying the nature, impact, and cause of the event as well as corrective actions taken.

(CLOSED) Licensee Event Report 369/87-08, Missed Channel Surveillance on Unit 1 and 2 Reactor Vessel Instrumentation Due to a Defective Procedure. Monthly channel checks on the "Dynamic Head (D/P)" on the reactor vessel level instrumentation system (RVLIS) had not been performed since RVLIS was installed in mid-1986 until April 10, 1987. The TS required checks were not done due to confusion caused by a difference in what the TS assumed would be installed as RVLIS instrumentation and what was actually approved and installed.

The original channel designations were upper plenum level, narrow range level, and wide range level and the TS requirements refer to narrow range and wide range levels. The installed RVLIS channel designations are labeled upper level, lower level, and dynamic head. Personnel improperly assumed that the narrow range and wide range TS required instruments were the upper level and lower level installed instruments. The wide range channel in the TS actually related to the "Dynamic Head (D/P)". This confusion led to a failure to perform a TS required channel check and is identified as a Licensee Identified Violation (LIV 369,370/88-12-05).

The LER stated that a TS change had been submitted in February of 1987 to correct the improper terminology in the TS. The TS change is still under review by the NRC but should be issued shortly. This issue was discussed with the NRR Licensing Project Manager.

(CLOSED) Licensee Event Report 369/87-10, Incorrect Calibration of an Auxiliary Feedwater (CA) System Pressure Switch. The pressure switch in question (1CAPS5002) was discovered to be improperly set in that the water leg pressure had not been taken into account as required by procedure. Due to this error the 1A CA pump would not have automatically realigned suction to service water on low suction pressure. This made the 1A CA pump technically inoperable from February 15, 1983 to May 9, 1987. TS 3.7.1.2 requires that with one auxiliary feedwater pump inoperable, restore the required CA pump to operable status within 72 hours or be in at least hot standby within the next 6 hours and hot shutdown within the following 6 hours. The failure to properly calibrate the 1A CA pump pressure switch is identified as a Licensee Identified Violation (LIV 369/88-12-01) for exceeding TS 3.7.1.2. Other 1A pressure switches were verified to be correctly calibrated and appropriate personnel were retrained emphasizing inclusion of water legs in calibrations.

9. Turbine Driven Auxiliary Feedwater Pump Trip Followup

On May 2, 1988, the Unit 1 TDCA pump tripped for an unknown reason as described in paragraph 4.a of this report. The licensee initiated an Incident Investigation Report to evaluate the pump start and trip. In following up on this occurrence the inspectors reviewed the event; reviewed a recent Problem Investigation Report (PIR-0-M88-0089) written on existing and potential deficiencies with the Unit 1 and Unit 2 TDCA overspeed trip devices; reviewed performance test PT/1/A/4252-01, Auxiliary Feedwater Pump Number 1 Performance Test; and observed performance of PT/1/A/4252-01.

a. Previous Problem Investigation Report Review

Problem Investigation Report PIR-0-M88-0089 was written to document a broken tappet on the Unit 2 TDCA overspeed trip device and identify a question as to the amount of contact area between the emergency head lever and the tappet nut. Insufficient contact area may cause an unnecessary overspeed trip of the TDCA pump. The potential overlap problem was identified by the licensee when evaluating INPO "Operations and Maintenance Reminder (O & MR-316)" on defective head levers. The licensee initiated work requests to verify the amount of contact area during the next outages since disassembly of the overspeed trip mechanism is required to measure the contact area and the licensee does not wish to undertake this job during unit operation. An operability determination was performed which concluded that the TDCA pumps were operable. A review of the operability determination revealed; however, that a regular shift SRO was not listed as one of the persons involved in the determination. In a response dated May 29, 1987, to violation 87-04-01 issued on April 29, 1987, the licensee stated that "Training and staff licensed personnel are no longer permitted to make an operability determination. Operability determinations by training instructors and

staff SRO's must be made with the concurrence of a regular shift SRO". Only a staff SRO was listed as being involved with the operability determination. The licensee stated that the statement in the May 29, 1987, response was not intended to apply to all operability determinations but only those made by training and staff SRO's when they are performing a shift duty to maintain active licensed status. The licensee also stated that operability determinations done by engineering, design or other groups do not necessarily involve operations in the decision making. Licensee management acknowledged the Deviation during the exit interview and agreed to revise the commitment since it was not originally intended to apply to all situations.

The staff SRO involved with making the operability determination was unaware of the commitment the licensee made to obtain a regular shift SRO concurrence for operability determinations. The response dated May 29, 1987, stated that the actions in this area would be completed by March 1, 1987, and the licensee had previously stated that all corrective actions taken in response to this event had been completed. When the licensee was asked for the documentation for completion of this corrective action none was available. The licensee stated that no internal corrective action or tracking documentation is initiated when a corrective action is completed prior to issuing the response to a violation. This practice led to a failure to follow through with a NRC commitment and is an apparent deviation (DEV-369,370/88-12-02).

The operability determination done to address the issues raised in PIR-0-M88-0089 concerning the contact area between the emergency head lever and the tappet nut did not contain a technical discussion of why the concern raised does not prevent the component from fulfilling its intended safety function. Station Directive 2.8.2 Attachment 1 paragraph 8 specifies the requirements for justification of operability determinations. The operability determination stated that:

- (1) McGuire SA Turbines require 0.030 to 0.060 inch (contact area) with an overall minimum available contact area of 0.078 inch to allow for adjustment.
- (2) Work Requests (non-emergency) would be written to verify the amount of contact area that exists.
- (3) There is no feasible way to accurately determine the amount of contact area without disassembly of the overspeed trip mechanism.
- (4) All affected procedures would be changed to reflect this concern.

These items do not constitute a technical discussion of why the TDCA pump is operable with questionable contact area between the emergency head lever and the tappet nut as required by Station Directive 2.8.2.



The failure to perform the evaluation correctly as required by Station Directive 2.8.2 is an apparent violation (369,370/88-12-03) for failure follow procedure.

When the inspector discussed this shortcoming with the licensee a revision to the operability determination was initiated. The revision stated, in part, that monthly testing of these components (TDCA pumps) assures the operability of the turbines and the functional capacity of the overspeed trip mechanism. Also, on July 7, 1982, operations conducted a satisfactory overspeed trip test on the Unit 2 turbine but documentation for the Unit 1 overspeed test could not be located.

It is noted that personnel involved with identifying the concern with the contact area and following through with evaluating the potential problem should be commended. The NRC encourages the practice of identifying operability concerns and documenting operability evaluations, however the operability evaluation documentation in this case was not adequate.

b. Review of Test Procedure PT/1/A/4252/01

During review of the monthly performance test of the TDCA pump (PT-1-A-4252-01) concerns were identified by the inspector relating to preparations for the test and acceptance criteria. In preparation for the test the steam lines are drained of any condensate by cycling valves 1SA-39 and 1SA-40 and therefore changing the as found condition. This practice may mask a possible problem with condensate remaining in the steam lines. This concern was brought to the attention of the licensee and the licensee committed to re-evaluate the practice of blowing down the steam lines prior to monthly testing. IE Information Notice 86-14 described situations where condensate in the steam lines led to overspeed trips of auxiliary feed water pump turbines at other facilities.

10 CFR 50, Appendix B, Criterion XI, requires that a test program shall be established to assure that all testing required to demonstrate that systems and components will perform satisfactorily in service is identified and performed in accordance with written test procedures. The test program established to demonstrate that the turbine driven auxiliary feedwater pumps will perform satisfactory in service was inadequate. The procedure used to test the pumps does not perform the test in the as found condition in that the steam lines to the pump turbine are drained of condensate prior to testing. This is an apparent violation (369,370/88-12-04).

The acceptance criteria for PT/1/A/4252/01 was compared to the values required by ASME Section XI IWP based on the baseline or reference readings obtained in TT/1/A/9100/41, Auxiliary Feedwater Pump #1 Baseline Test. The acceptance criteria for pump bearing horizontal vibration was incorrect based on the IWP requirements. The

"Acceptable Range" would have been less than 1.6 Mils rather than 1.0 Mils specified. The "Alert Range" should have specified 1.6 to 2.4 Mils rather than 2.0 to 3.0 Mils and the "Required Action Range" should have specified greater than 2.4 Mils rather than greater than 3.0 Mils. It is noted that the acceptable range was more conservative than required however the "alert" and "required action" criteria was less conservative. Previous test results were reviewed by the inspector to verify that test results and actions taken were satisfactory. The licensee initiated a change to this PT and was in the process of reviewing other PT's to ensure that the acceptance criteria was properly specified.

T.S. 6.8.1 states that written procedures shall be established, implemented, and maintained covering the procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978 including surveillance tests of the auxiliary feedwater system. T.S. 4.0.5 requires that inservice testing of ASME Code Class 1, 2, and 3 pumps shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code as required by 10 CFR 50, Section 50.55a(g). Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition, Subsection IWP, Article IWP-3000, Inservice Test Procedures, Table IWP-3100-2, Allowable Ranges of Test Quantities, specifies vibration ranges to be used to determine if inservice test results are acceptable or if actions are required. Procedure PT/1/A/4252/01 was inadequate in that horizontal vibration ranges did not meet the requirements of ASME Section XI. This is a second example of apparent violation (369,370/88-12-03).

c. Observation of Test Procedure PT/1/A/4252/01 Performance

Portions of the performance of PT/1/A/4252/01 on May 9, 1988, were witnessed by the inspector. The personnel performing the test were not aware that the acceptance criteria for horizontal vibration was in error although this error was brought to the attention of the licensee of May 6, 1988. A change had been initiated at that time however the information was not communicated to personnel performing the test. Test results were satisfactory.

10. Automatic Realignment of Auxiliary Feedwater Suction

On May 12, 1988, the Unit 2 Auxiliary Feedwater (CA) Pump B was being restored to service following oil sampling and suction check valve inspection when the CA supply valves from Nuclear Service Water (RN) opened on low B CA pump suction pressure. The pump was not running and no service water reached the steam generators.

RN to CA supply is the assured makeup to the steam generators. The valves from the RN system open on low suction pressure to align the assured supply in the event of a loss of normal CA supply from the upper surge tank, condenser hotwell, and CA storage tank. The RN to CA valves 2CA-18B and 2RN-162B opened on low suction pressure because the Removal and

Restoration (R and R) procedure was performed out of sequence. The suction valve to the B CA pump was required to be opened prior to closing the breakers to energize 2CA-18B and 2RN-162B but the operator did not follow the R and R procedure in that he closed the breakers before opening the suction valve. This caused 2CA-18B and 2RN-162B to open on low suction pressure.

The licensee isolated the lines, drained the service water from the CA lines, and restored the system to normal. Station Directive 3.1.19, Safety Tags, paragraph 7.4.4, step 2 states that tag removal shall be done in the designated sequence. The R and R record sheet specifies the required sequence. The failure to follow the Station Directive Procedure, R and R, sequence is another example of apparent violation (369/370/88-12-03).

#### 11. Inadvertent ESF Actuation

At 6:55 p.m. on the evening of May 19, 1988, during the performance of a diesel generator 1B load sequence test (PT/1/A/4350/04B), licensee personnel failed to perform certain actions required by the procedure which resulted in an inadvertent engineered safety features (ESF) actuation.

Step 12.9 of PT/1/A/4350/04B, D/G 1B Load Sequence Test, required that the performance technician who was physically at the local panel, have operations reset the load sequencer. This did not occur. The technician proceeded to perform step 12.10 which in essence took the sequencer out of test. The technician then detected that a local indicator light did not reflect that the sequencer had been reset. He in turn called the control room to have operations reset the sequencer, which they did. Since the blocks inserted by the test switch had been removed in step 12.10, resetting the sequencer resulted in the inadvertent actuation of train B of auxiliary feedwater (CA), train B of nuclear service water (RN) and train B of control room ventilation (VC). Failing to perform the requirements as stated in the procedure constitutes a fourth example of apparent violation (369,370/88-12-03).