



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

Report Nos.: 50-369/84-04 and 50-370/84-04

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 Nuclear Station Units 1 and 2

Inspection at McGuire site near Charlotte, North Carolina

Inspectors: *A. J. Squatone* 3/22/84
 for W. T. Orders Date Signed

A. J. Squatone 3/22/84
 for R. C. Pierson Date Signed

Approved by: *V. L. Brownlee* 3/29/84
 V. L. Brownlee, Section Chief Date Signed
 Division of Project and Resident Programs

SUMMARY

Inspection on January 20 - February 20, 1984

Areas Inspected

This routine, unannounced inspection involved 150 inspector-hours on site in the areas of operations safety verification, surveillance testing, maintenance activities, and TMI action items review.

Results

Of the four areas inspected, no violations or deviations were identified in two areas; one item of noncompliance was found in two areas (failure to follow procedure resulting in destruction of 2A NV pump and failure to follow procedure resulting in reactor trip (50-370/84-04-01) - paragraphs 6 and 8).

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *M. McIntosh, Station Manager
- *G. Cage, Superintendent of Operations
- *M. Sample, Project Engineer
- *D. Mendezoff, Licensing Engineer
- *B. Travis, Operating Engineer

Other licensee employees contacted included electronics technicians, operators, and mechanics.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 5, 1984, with those persons indicated in Paragraph 1 above. The licensee expressed cognizance of and concern over the issues detailed in the meeting.

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, January 20 - February 20, to verify conformance with regulatory requirements, Technical Specifications (TS) and administrative controls. Control room logs, shift supervisor's 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 TS. 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 include but were not limited to the following:

Turbine Buildings

Auxiliary Building

Units 1 and 2, Electrical Equipment Rooms

Units 1 and 2, Cable Spreading Room

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 operating at 94% power in an elevated T-AVE mode. Power was restricted to 94% due to an inoperable main turbine governor valve as discussed in previous reports. Power was maintained at this level through January 30, 1984, when a reactor trip occurred at 4:03 p.m. Channel A overtemperature delta temperature (OT Δ T) and over pressure delta temperature (OP Δ T) bistables were tripped because Channel A had been declared inoperable due to erroneous indication. During this time, a spike occurred on the loop "C" Δ T circuit resulting in a reactor trip. All systems responded as expected during the trip.

Following necessary repairs of the solid state protection system, the reactor was started up, achieved criticality at 5:17 a.m. on January 31, 1984, and the turbine placed on-line at 6:45 a.m. Power was subsequently increased and maintained at 94% in an elevated T-AVE mode through the rest of the reporting period.

McGuire Unit 2 began the report period recovering from a planned maintenance outage with primary system (NC) pressure and temperature at 317 psig and 230°F, respectively. Preparations were underway to restart the unit. While performing a primary system leak test during the heatup and pressurization of the unit, a reactor trip occurred at 11:24 p.m., January 22, 1984, due to operations personnel monitoring the incorrect NC pressure indication in the control room. NC system pressure was allowed to reach 2340 psig; the pressurizer pressure high pressure reactor trip setpoint is 2385 psig. At the time of the trip, the primary plant temperature was 557°F and the reactor was subcritical with only the shutdown banks withdrawn. All systems responded normally. The startup was reinitiated and the reactor reached criticality at 5:10 a.m. on January 23, 1984. The turbine was placed on line at 7:08 a.m. the same morning. Power was subsequently increased to and maintained at 90% power, limited to that power level due to a reactor coolant (NC) flow inadequacy as previously reported. On January 28, 1984 at 2:25 p.m., the unit was shut down to repair a hydraulic leak in the turbine control system. The unit was subsequently restarted and reached criticality at 6:15 a.m. on January 29, 1984, the unit was placed on the grid at

6:37 a.m. Power was maintained at or about 89% until February 2, 1984, when a reactor trip occurred at 11:20 a.m. An SSPS (Solid State Protection System) Train A periodic test was in progress. A portion of the test calls for the Train B Reactor Trip Bypass Breaker to be opened. Instrumentation and Electronics personnel inadvertently opened the Train B Reactor Trip Main Breaker resulting in the trip. All systems responded normally. While attempting to restart the reactor, the Digital Rod Position Indication (DRPI) "Data A Failure" alarm was received. Twenty-seven minutes later, the Data B failure alarm was received along with DRPI Urgent alarm. The Control Operator opened the reactor trip breakers in accordance with TS requirements. The unit was in Mode 3 with the control banks inserted and the shutdown banks withdrawn when the reactor trip breakers were opened. Two DRPI circuit cards were replaced, a display card and a control card. The reactor was subsequently started and was critical at 4:35 p.m., February 3, 1984; power was increased to, and maintained at 89% until 3:00 p.m. February 6, 1984. At that time, a TS change to allow 100% reactor power with the existing NC flow was implemented. Power was escalated to and maintained at 100% reactor power until February 17, 1984, when the unit was shutdown to facilitate a short planned maintenance outage. Upon completion of repairs to a Channel III pressurizer level instrument and a pressurizer spray valve, the unit was restarted on February 19, 1984, was critical at 8:30 p.m. and the generator was placed on line at 10:00 p.m. The unit was maintained at 100% reactor power through the end of the reporting period. An operational inadequacy associated with energizing an NV pump is detailed in paragraph 6.

6. Centrifugal Charging Pump Destruction

On the evening of January 15, 1984, McGuire Unit 2 was in Mode 5 with decay heat (ND) Pump 2A and charging (NV) Pump 2A running. The unit was being prepared for startup, with reactor coolant (NC) fill and vent underway. At 10:07 p.m. that evening, valves 2ND-1B and 2ND-2A, the NC loop 3 discharge valves to the ND system inadvertently closed. (This loss of ND was detailed in a previous report.) ND pump 2A and NV pump 2A were stopped. In their efforts to re-establish a letdown flowpath operations personnel opened valves 2NV-1A and 2NV-2A, the NC letdown isolation valves and 2NV-458A, 459A and 457A, the letdown orifice isolation valves. It was at this time 10:36 p.m., that 2NV-141A, one of two valves in series off the VCT to the NV pumps suction header closed as was determined from an alarm typer printout. (It was not determined during subsequent licensee investigation how or why the valve shut.)

With 2NV-141A closed, there was no suction supply to the NV pumps. At 10:58 p.m., NV pump 2A was started. At 11:01 p.m., a low NV pump 2A discharge pressure warning was received on the OAC (operator aid computer). Between 11:02 and 11:14, twelve high VCT level alarms and six high VCT pressure alarms were received on the OAC. At 11:15 p.m., the McGuire fire detection system initiated a fire warning for the NV pump 2A room. The pump was stopped at 11:17 p.m. Subsequent investigation revealed that the pump had been destroyed.

This placed the unit in the Action Statement of TS 3.1.2.1 and 3.1.2.3 which requires, in part, at least one operable NV pump. (The B NV pump was also

inoperable, undergoing a station modification.) The action statements of these specifications required only suspension of core alterations and/or reactivity charges. The B NV pump was returned to service at 10:45 p.m. on January 16, 1984.

In assessing this incident, several items of concern were noted:

- a) When valve 2NV-141A closed, a status light illuminated on Monitor Panel 2MD4-7-2 and audible alarm sounded, yet the valve closure went undetected by operations personnel.
- b) Procedure OP-2-A-6200-01, Chemical and Volume Control System requires, in part, that 2NV-141A be verified open prior to starting an NV pump for volume control, yet the valve was not verified prior to pump start.
- c) During a 12-minute period, immediately prior to the fire warning in the pump room, twelve high VCT level alarms and six high VCT pressure alarms were received on the OAC with no action taken; not to mention the applicable indication available in the control room, i.e., pump flow, etc.

TS 6.8.1 requires that current written approved procedures be established, implemented and maintained covering a) the startup of the chemical and volume control system and b) annunciator/alarm response.

In the case of the former, as previously stated, procedure OP-2-A-6200-01 requires that valve 2NV-141A be verified open, prior to starting an NV pump. This did not occur.

Further, Station Directive 3.1.4, Conduct of Operations, Licensed Operator Duties, Item 4 requires the operator at the controls to monitor instrumentation displays and alarms to assure safe operating conditions for his assigned unit. Moreover, Item 7 requires that the operator at the controls shall acknowledge all alarms and initiate prompt corrective action on receipt of any indication (instrument movement or alarm) of an irregular operating condition in accordance with applicable operating, alarm or emergency procedures.

It appears that neither the requirements of operating procedure OP-2-A-6200-01 nor Station Directive 3.1.4 were performed.

This constitutes a violation of the requirements of TS 6.8.1.

In as much as there is another example of failure to follow procedure entailed in Paragraph 8, the two examples above as well as the example in paragraph 8 will collectively constitute a violation (50-370/84-04-01).

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

An inadequacy associated with the performance of a solid state protection system surveillance is detailed in paragraph 8.

Procedure

| | |
|-----------------|---|
| PT-1-A-4601-02 | SSPS Channel 2 Functional |
| PT-1-A-4601-03 | SSPS Channel 3 Functional |
| PT-1-A-4252-01 | Turbine Driven Auxiliary FDWP Performance |
| PT-1-A-4208-02 | NS valve stroke |
| PT-1-A-4252-01B | 'B' Motor Driven Auxiliary FDWP Performance |
| PT-1-A-4403-01B | Nuclear Service Water Pump 1B Performance |
| PT-1-A-4209-01A | Centrifugal Charging Pump 1A Functional |
| PT-1-A-4401-01B | Component Cooling Water Pump 1B Performance |
| PT-1-A-4252-01A | 'A' Motor Driven Auxiliary FDWP Performance |
| PT-1-A-4209-01B | Centrifugal Charging Pump B Functional |
| PT-1-A-4150-14 | PORV Channel Functional |
| PT-2-A-4209-01A | Centrifugal Charging Pump 2A Functional |
| PT-2-A-4200-10C | ND Auto Isolation Verification |
| PT-2-A-4200-09A | ESF Actuation Periodic Test |
| PT-2-A-4252-01 | Turbine Driven Auxiliary FWDP Performance |
| PT-2-A-4252-07 | Auxiliary FDW System Performance Test |
| PT-2-A-4150-17A | Pressurizer Heater Functional |
| PT-2-A-4601-04 | SSPS Channel 4 Functional |
| PT-2-A-4206-01B | 'B' NI Pump Performance |
| PT-2-A-4204-01B | ND Pump B Performance |

8. Inadvertent Reactor Trip

On the morning of February 2, 1984, McGuire Unit 2 was operating at 89% power. At 11:11 a.m. that morning, the unit suffered a reactor trip when an instrument and electrical (IAE) technician inadvertently opened the Train "B" Reactor Trip breaker.

The IAE technician was performing a Solid State Protection System (SSPS) test employing procedure IP-0-A-3010-05 Solid State Protection System (SSPS) Periodic Test above NC System Pressure of 1955 psi. Step 10.6.2 of that procedure requires that the reactor trip BYPASS breaker for the train to be tested (Train B) be racked to the TEST position and closed. On the McGuire reactor trip breakers (DS-416), it is necessary to depress the trip push button in order to access the racking mechanism. The IAE technician inadvertently opened the door to the B REACTOR TRIP breaker instead of the B BYPASS breaker, directly next to it and depressed the trip button in preparation to rack the breaker to TEST. The unit tripped immediately.

The unit responded as expected during the trip with all systems performing as expected.

Discussions with the IAE technician involved, revealed that he considered the direction in the procedure to be adequate, that he simply erred, the result of which was failing to abide by the procedure. Had the instructions as delineated in Step 10.6.2 been followed the trip would not have occurred.

The above event constitutes a violation of TS 6.8.1 which requires that current, written approved procedures be followed covering the performance of surveillance tests on the reactor protection system.

This example of failure to follow procedure in conjunction with the examples detailed in paragraph 6 constitute a violation. (50-370/84-04-01)

9. Maintenance Observations

The maintenance activities categorized below were analyzed and/or witnessed by the resident inspector 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 are adequate.

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

| <u>Work Request</u> | <u>Equipment</u> |
|---------------------|---------------------------------|
| 117637 | Digital Rod Position Indication |
| 116677 | Motor Driven Aux. Feed Pump |
| 92470 | Centrifugal Charging Pump |
| 117483 | EVIC Vital Inverter |
| 117607 | 2 NI-244 |
| 117595 | Control Rod Bank B Group 2 |
| 117681 | Pressurizer Level Channel III |
| 117732 | NI - 41 |
| 117564 | 1B RN Pump |

10. NRC Task Action Plan Requirement Review (NUREG 0737) (Units 1 and 2)

The inspector has reviewed licensee implementation of requirements associated with the NRC Task Action Plan (TAP) in response to the Three Mile Island accident. The inspection verified the licensee's commitment to be completed via procedures, hardware installation or both. Item numbers refer to TAP line items.

- a) I.C.1.1 (OPEN) Short Term Accident
 I.C.1.2.B Analysis and Procedure Review
 I.C.1.3.B

These items remain open on both units with a target implementation date of November 1984. These items were entailed in NUREG 0737, Supplement 1. For more information, refer to Duke response to Supplement 1 of April 14, 1983.

- b) I.D.2.2. (OPEN) Safety Parameter Display System
 I.D.2.3

These items remain open on both units with a target implementation date of November 1984, pursuant to Duke commitment in response to NUREG 0737, Supplement 1, April 14, 1983.

- c) II.B.3.3 (CLOSED) Post Accident Sampling
 II.B.3.4

These items were previously closed on Unit 1, 50-369/82-10. The post accident sampling system is installed and operational with functional procedures.

- d) F.2.4 (OPEN) Inadequate Core Cooling

This item remains open with a target date of the first refueling outage on each unit.

- e) II.K.3.1.B (OPEN) PORV Isolation
II.K.3.5.B

This item remains open on both units pending NRR decision concerning WCAP 9804 applicability to McGuire.

- f) II.K.3.5.B (OPEN) Auto Trip of NC Pumps

This items remains open pending completion of owners group study.

- g) II.K.3.10 (OPEN) Proposed Anticipatory Trip Modifications

Reactor trip test was performed at 50% power on Unit 1; acceptance is pending review of NRR technical evaluation.