



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

Report Nos. 50-369/92-13 and 50-370/92-13

Licensee: Duke Power Company
P. O. Box 1007
Charlotte, NC 28201-1007

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 19, 1992 - May 16, 1992

Inspector: W. H. Miller, Jr. 5-29-92
for P. K. Van Dorn Date Signed

Inspector: W. H. Miller, Jr. 5-29-92
for T. A. Cooper Date Signed

Inspector: W. H. Miller, Jr. 5-29-92
W. H. Miller, Jr. Date Signed

Approved by: A. R. Hendt 5/29/92
for A. Belisle, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

This routine, resident inspection was conducted in the areas of plant operations safety verification, surveillance testing, maintenance activities, followup on Licensee Event Reports and engineered safety features walkdown.

Results:

In the areas inspected, one violation and one apparent violation were identified. The violation involved an engineered safety features actuation of main steam isolation valves when operators failed to follow a procedure (paragraph 2.d.). The apparent violation involved air entrainment in the nuclear service water system

which could have disabled the auxiliary feedwater system (paragraph 7.). The apparent violation is being considered for escalated enforcement.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

D. Baxter	Support Operations Manager
*A. Beaver	Operations Manager
*J. Boyle	Work Control Superintendent
*D. Bumgardner	Unit 1 Operations Manager
*B. Caldwell	Training Manager
*T. Curtis	System Engineering Manager
J. Foster	Station Health Physicist
F. Fowler	Human Resources Manager
*G. Gilbert	Safety Assurance Manager
P. Guill	Compliance Engineer
*R. Hall	Engineering Manager, Mechanical
B. Hamilton	Superintendent of Operations
B. Hasty	Emergency Planner
*P. Herran	Engineering Manager
*L. Kunka	Compliance Engineer
*T. McConnell	Station Manager
T. McMeekin	Site Vice President
R. Michael	Station Chemist
*K. Mullen	Compliance Engineer
M. Nazar	Performance Manager
*T. Pederson	Safety Review Supervisor
*N. Poore	Instrument and Electrical Superintendent
*R. Sharpe	Regulatory Compliance Manager
J. Silver	Unit 2 Operations Manager
*B. Travis	Component Engineering Manager
R. White	Mechanical Maintenance Superintendent

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

*Attended exit interview

2. Plant Operations (71707)

a. Observations

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 (TS). The inspectors also reviewed Problem Investigation Reports (PIRs) and Operations Incident Reports (OIRs) to determine whether the licensee was appropriately documenting problems and implementing corrective actions.

Plant tours taken during the reporting period included, but were not limited to, the turbine buildings, the auxiliary building, electrical equipment rooms, cable spreading rooms, and the station yard zone inside the protected area.

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

b. Unit 1 Operations

The unit began the inspection period at approximately 98 percent power due to spiking problems with the overpressure delta temperature instrumentation. On April 21, 1992, while performing a routine swap from the "A" control area chiller to the "B" control area chiller, the control room temperature increased to approximately 79 degrees F. This was sufficient to cause heat related problems with the "B" channel of the solid state protection system (SSPS). With one channel of SSPS inoperable, unit shutdown began, per Technical Specification (TS) requirements. The TS required shutdown and the channel of SSPS inoperable resulted in an Unusual Event being declared.

When reactor power was approximately 58 percent, the channel of SSPS was returned to operation. The load reduction was terminated and the Unusual Event was exited. A load increase began and 98 percent power was reached on April 21, 1992, at 9:13 p.m.

On May 4, 1992, concerns were raised regarding steam generator tube integrity. Reviews of eddy current test data from September

1991, indicated that several steam generator tubes had crack indications which had not been previously identified. The licensee's management made a decision to bring the unit to cold shutdown for additional inspection. The unit reached cold shutdown on May 5, 1992. Extensive eddy current inspections were planned along with changes in the analysis process (see NRC Inspection Report Nos. 50-369,370/92-14 for additional detail). The projected duration of the outage is 49 days.

c. Unit 2 Operations

The unit began the inspection period at 100 percent power and has maintained that level.

Due to the concerns on the Unit 1 S/G tube integrity, the unit was scheduled to be shut down on or about May 22, 1992 for a S/G tube inspection.

d. ESF Actuation

On May 6, 1992, while performing licensee procedure OP/1/A/6250/03A, Steam Generator Cold Wet Layup Recirculation, an Engineered Safety Features (ESF) actuation occurred. The licensee was in the process of filling the 1D steam generator (S/G) to wet layup conditions when a main steam isolation on high pressure negative rate change was received.

During the filling process, with the wide range level instruments indicating approximately 98 percent, the control room operator noticed the S/G pressure increasing. The maximum pressure noted was approximately 350 psig. The operators responded by closing the fill valve. Pressure in the S/G decreased rapidly due to the main steam isolation valve bypass being open. The pressure decrease was rapid enough to actuate the ESF circuitry.

Licensee procedure OP/1/A/6250/03A, Enclosure 4.1, Establishing BW (Wet Layup Recirculation), Step 1.3 of the initial conditions requires that the condensate booster pumps be off. During shift turnover, the operator had been told that the plans included leaving the condensate system up. The operator interpreted that as meaning leaving the condensate booster pumps on. This decision was not discussed with other control room personnel, such as other operators or senior reactor operators. The operator was aware that the initial conditions required the pumps to be off, but he thought that the plans

allowed him to leave the pump on. This resulted in the pressurization of the 1D S/G and the subsequent ESF actuation.

The failure to adhere to procedure OP/1/A/6250/03A is identified as violation 369/92-13-01: Failure to Follow Procedure Resulting in an Engineered Safety Features Actuation.

This violation appears to be repetitive in nature. Licensee Event Report 370/92-02 describes an ESF actuation, 2B Diesel Generator (DG) Load Sequencer actuation, resulting from a failure to follow a procedure regarding paralleling the DG to the normal offsite power source. Non-cited violation 369/92-10-01 was written on an ESF actuation, the swap of the auxiliary feedwater suction valves to the secured source, caused by a failure to follow the procedure for removing the system from operation for maintenance.

Within these areas, one violation was identified.

3. Surveillance Testing (61726)

Selected surveillance tests were analyzed and/or witnessed by the resident inspection staff to ascertain procedural and performance adequacy and conformance with the applicable TS.

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 acceptance criteria were met.

The selected tests listed below were reviewed or witnessed in detail:

<u>PROCEDURE</u>	<u>EQUIPMENT/TEST</u>
PT/0/A/4600/16A	Fire Detection System Operational Test (Zones 103,104,106)
CP/2/A/8600/41	Recirculating and Sample 2 FD B Diesel Fuel

Within this area, no violations or deviations were identified.

4. Maintenance Observations (62703)

a. Observation

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

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.

The selected maintenance activities listed below were reviewed or witnessed in detail:

<u>WORK REQUEST</u>	<u>ACTIVITY</u>
147383	Investigate and repair problem with "B" Train of SSPS
147384	Trouble shoot and repair control room ventilation system chiller 1YC
954436	Modify diesel fuel tank vents per MEVN-2725
08518D	Repair atmospheric steam dump valve 2SV-32
506201	Repair leak and tighten loose handwheel to main steam line valve 2CM-228
147429	Repair/replace motor for instrument air compressor OMVICP0051
146373	Repair Inverter OEPFBIKXA, by replacing defective frequency detector card
06650E PM	Perform PM on ICCM-86 Train A
06651E PM	Perform PM on ICCM-86 Train B

601972

Replace diesel 1A fuel oil drip tank pump motor

b. Steam Dump Valves

In observing maintenance activities associated with atmospheric steam dump valve No. 2SV-32 (Work Request 08518D), the inspectors noted that maintenance employees were working on the steam dump valve without the next adjacent dump valves being secured or tagged out. This is a normal industry personnel safety practice. When the inspectors pointed this out, the maintenance foreman immediately stopped work and did not resume work until the adjacent valves were properly secured.

c. Fuel Oil Drip Tank Pump Motor

During observation of diesel generator 1A fuel oil drip tank pump motor replacement, the inspector was informed that the motor given to the technicians was the wrong horsepower. The motor had been specially modified for the application before this was realized. The inspector asked if an incident report was being written and technicians indicated that they were not aware of the lower tier incident program. The person who coordinates the program indicated that all the technicians should be aware of the program through training. A later review determined that a report was written. The inspector informed licensee management of the apparent lack of understanding by some technicians regarding the lower tier program.

Within these areas, no violations or deviations were identified.

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

The below listed LERs were reviewed to determine if the information provided met NRC requirements. The determination included: adequacy of description, verification of compliance with Technical Specifications and regulatory requirements, corrective action taken, existence of potential generic problems, reporting requirements satisfied, and the relative safety significance of each event. Additional inplant reviews and discussion with plant personnel, as appropriate, were conducted for those reports indicated by an (*). The following LERs are closed:

*370/92-02	Unit 2 Train B Experienced an Inadvertent Engineered Safety Features Actuation Resulting From a Defective Procedure and Inappropriate Actions
369/92-01,R.1	TS Violation Occurred Because of Failure to Remove a Steam Generator Tube From Service (Violation No. 369/92-05-01)
*369/92-03	TS Violation Caused by a Containment Isolation Valve Being Inoperable Due to a Missed Surveillance
*370/92-03	Train B of Unit 2 RHR System Inoperable Due to a Degraded Flow Path
370/92-05	Containment Pressure Control System Was Inoperable Due to an Unknown Cause (Violation No. 369,370/92-08-03 and NRC Report No. 369,370/92-10)

Within this area, no violations or deviations were identified.

6. Engineering Safety Features Walkdown (71710)

The inspectors conducted a walkdown of the Unit 2 Emergency Diesel Generator Auxiliary Systems. These systems consisted of the Diesel Starting Air System (VG), Lube Oil System (LD), Fuel Oil System (FD), and the Diesel Engine Cooling Water System (KD). The walkdown inspection verified that the system lineup procedures conformed to the plant drawing and as-built configurations. Equipment conditions and items that might degrade plant performance were also reviewed. These included verifying that the systems' hangers and supports were properly installed; acceptable housekeeping and the control of combustibles and other fire hazards were being maintained; components of the systems were properly labeled; and no system leakage existed. Each valve in the flowpath of the system was inspected to verify that the valve was in the position specified by the lineup procedure and that the valves were appropriately locked where required.

Procedure OP/2A/6350/02 Diesel Generator, Enclosures 4.5 and 4.6; and Drawing Nos. MC-2609-1.0 and 1.1, MC-2609-2.0 and 2.1, and MC-2609-4.0 were used during this walkdown inspection.

In general, the systems were found to be well maintained, in conformance with the drawings and aligned in accordance with the lineup procedures. Several minor discrepancies, such as a missing pipe cap on two drain lines, one missing component tag, seven improperly locked valves and two leaking safety relief valves were identified. These items were pointed out to the Shift Supervisor and prompt corrective action was initiated. The poorly locked valves were Nos. 2FD-69, 2FD-71, 2VG-77, 2VG-81, 2VG-82 and 2VG-97. The chains used on these valves could be removed without opening the lock. These valves are 'T' handle valves which are difficult to lock with a chain. Operations Management Procedure 1-8, Valve and Breaker Position Verification and Operation, Step 6.1.B.2 states, "Locks on valves are for administrative control only and are not intended to maintain valve position." The inspector requested that operations management evaluate their method and intent of locking valves. Management made field observations and reviewed procedural requirements. The inspector was informed that procedure wording would be strengthened and that improved methods of locking would be evaluated for use on key valves.

Within this area, no violations or deviations were identified.

7. Review of Air Entrainment Resulting in Degraded Auxiliary Feedwater System (93702)

The Auxiliary Feedwater System (CA) provides a feedwater supply to the steam generators for decay heat removal if the normal systems are not available through loss of power or other malfunctions. The CA is provided with two 100 percent capacity motor driven pumps (MDPs) supplied by separate trains of emergency power and one 200 percent turbine driven pump (TDP). Suction sources, in order of preference, are Upper Surge Tanks (USTs) Auxiliary Feedwater Condensate Storage Tank (CST), Condenser Hotwell and Nuclear Service Water System (RN). The RN system is the safety-related source. Three sources of RN supply are provided. One supply provides water to all three pumps via valve Nos. CA-161 and CA-162 which are controlled at the Standby Shutdown Facility. An 'A' Train supply is provided for the TDP and the 'A' MDP. A 'B' Train supply is provided for the TDP and the 'B' MDP. A low suction pressure signal opens valves associated with all three RN supplies. Valves from USTs and the CST are maintained open during operations.

On or about April 3, 1992, while attempting an inspection of RN piping, the licensee's system engineer discovered air between valve 1CA-162 and the RN piping on Unit 1. The licensee began periodic venting of this piping. On April 7, 1992, the licensee determined that this air could possibly effect operability of the CA system and initiated a PIR. Also, the licensee began an

inspection of the RN system for other areas of air accumulation. Three other areas were found on the discharge side of RN which were initially evaluated as not affecting operability. The licensee indicated that periodic venting of these areas had also started. On April 9, 1992, valve 1CA-161 was failed shut to assure isolation of the initially discovered air entrainment. On April 30, 1992, the licensee's evaluation was concluded and resulted in operability being deemed as indeterminant. A report was made to NRC on this date that Unit 1 CA pumps may have been inoperable for an extended period of time.

On May 2, 1992, the licensee discovered that air in one of the other locations may effect operability. The 'A' train RN supply is taken from a return line from the diesel generator jacket water cooling heat exchanger. This return line connects to the RN line where air entrainment was also found. Flow in the return line is typically 900 gallons per minute (gpm). Design flow for the TDP is 900 gpm and the MDP is 450 gpm. The combined pump flow could therefore create reverse flow in the return line moving the air to the TDP and 'A' MDP suction. This problem was found on both Units. A followup phone report was made to the NRC on May 2 describing this additional scenario. Also, on May 2, the licensee isolated the TDPs from the RN source and declared both TDPs inoperable. On May 5, 1992, the licensee installed a continuous vent where the return line connects to RN and made appropriate procedure changes. The TDPs were then declared operable.

The licensee's evaluation showed that flow was sufficient in each case to move air into the suction of the pumps. Discussions with the pump designer indicated that only four to five percent air would damage the pumps. Therefore, three pumps on Unit 1 were in effect degraded for an extended period of time and possibly inoperable. In addition, two pumps on both Units were degraded and possibly inoperable for an extended period of time. Technical Specification 3.7.1.2 requires that three independent steam generator auxiliary feedwater pumps and associated flow paths be operable in Modes 1 through 3. With one pump inoperable, the pump is required to be restored to operable status within 72 hours or be in at least Hot Standby within the next six hours and in Hot Shutdown within the following six hours. With two pumps inoperable, the plant is required to be in at least Hot Standby within six hours and in Hot Shutdown within the following six hours. With three pumps inoperable, the licensee is required immediately to initiate corrective action to restore one pump to operable status.

This situation which is an apparent violation of the above requirements, is being considered for escalated enforcement. An enforcement conference to discuss this matter is scheduled for June 8, 1992. This is identified as

Apparent Violation 369,370/92-13-02: Failure to Meet Technical Specifications for Auxiliary Feedwater Pumps.

Within this area, one violaton was identified.

8. Exit Interview (30703)

The inspection scope and findings identified below were summarized on May 18, 1992, with those persons indicated in paragraph 1 above. The following items were discussed in detail:

Violation 369/92-13-01: Failure to Follow a Procedure Resulting in an Engineered Safety Features Actuation (paragraph 2.d.)

Apparent Violation 369,370/92-13-02: Failure to Meet Technical Specifications for Auxiliary Feedwater Pumps (paragraph 7.)

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.