



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

Report Nos. 50-369/90-25 and 50-370/90-25

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

Facility Name: McGuire Nuclear Station Units 1 and 2

Docket Nos. 50-369 and 50-370 License Nos. NPF-9 and NPF-17

Inspection Conducted: November 20, 1990 - January 5, 1991

Inspector:		1/16/91
	P. K. van Doorn, Senior Resident Inspector	Date Signed
		1/16/91
	T. Cooper, Resident Inspector	Date Signed
		1/16/91
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Approved by:		1/16/91
	G. A. Belisle, Section Chief Division of Reactor Projects	Date Signed

SUMMARY

Scope: This routine, resident inspection was conducted on site in the areas of plant operations safety verification, maintenance activities, followup on Licensee Event Reports, followup on previous inspection findings, facility modifications and evaluation of licensee self assessment capability.

Results: In the areas inspected, one non-cited violation was identified involving inoperability of Control Room Ventilation System (paragraph 4). A self assessment evaluation disclosed a continuing improving trend in the quality of Quality Assurance Department evaluations and also confirmed weaknesses in documenting and tracking/trending of problems, which the licensee is addressing (paragraph 8).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *G. Addis, Superintendent of Station Services
- D. Baxter, Support Operations Manager
- J. Boyle, Superintendent of Integrated Scheduling
- *M. Brown, Security and Support Services
- D. Bumgardner, Unit 1 Operations Manager
- *S. Copp, Planning and Materials Manager
- J. Foster, Station Health Physicist
- D. Franks, QA Verification Manager
- G. Gilbert, Superintendent of Technical Services
- C. Hendrix, Maintenance Engineering Services Manager
- *C. Howard, K-Mac/Site Coordinator
- *L. Kunka, Compliance Engineer
- *T. Mathews, Site Design Engineering Manager
- *T. McConnell, Plant Manager
- R. Michael, Station Chemist
- *D. Mudock, McGuire Design Engineering Division Manager
- R. Pierce, Instrument and Electrical Engineer
- *J. Pope, Superintendent of Maintenance
- *J. Reeside, MSRG/HPES Coordinator
- W. Reeside, Operations Engineer
- R. Rider, Mechanical Maintenance Engineer
- *M. Sample, Superintendent of Maintenance
- R. Sharpe, Compliance Manager
- J. Snyder, Performance Engineer
- J. Silver, Unit 2 Operations Manager
- A. Sipe, McGuire Safety Review Group Chairman
- *B. Travis, Superintendent of Operations

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 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, Unit 2 containment 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.

While performing Auxiliary Building inspections, the inspectors noted the effort relative to housekeeping and material condition following the Unit 2 outage and the general improvement in the cleanliness of the plant. The area of most concern; however, are items that were not related to the outage. Examples of this are: broken site glasses on various gauges; bottles of snoop leak detection material with no labels on bottles; very old scaffolding in the field (no tags); a section of pipe cut out during a modification still left in place; old plant deficiency tags still on equipment (some up to 3 years old); and odd construction items (tape, tools, foam kits, etc.) have been found in not readily assessable areas. Particulars from these walkdowns have been discussed with the licensee and both the licensee and the inspectors are following up on this effort. The licensee recently formed a task group to address housekeeping and material condition problems and to develop improved programs as necessary.

b. Unit 1 Operations

At the beginning of the period the unit had resumed full power operations, following a reactor trip on November 17, 1990. Full power operations continued throughout the inspection period, except for routine small decreases in reactor power for performance testing.

c. Unit 2 Operations

The unit began the inspection period in Mode 5, following a 120 day refueling outage. Mode 4 was entered on December 21, 1990. Following routine performance testing, Mode 3 was entered on December 22, 1990. Mode 2 was entered and criticality was achieved on December 25, 1990.

On December 27, 1990, at 1:42 a.m., the reactor was manually tripped while performing low power physics testing (control rod worth test). While preparing for the test, the operator noticed that Shutdown Bank E (SDBE) was withdrawn to a demand of 225 steps while the rod position indication for SDBE showed one "LED" (position) higher than other banks withdrawn to 225 steps. When the operator tried to insert Shutdown Bank E one step, all rods on SDBE dropped. The operators noticed that they were in an unanalyzed condition and they manually tripped the reactor. All rods fully inserted following the trip and all safety systems functioned as required. The cause of the indication problem and the reason for the dropped bank was extensively investigated (see paragraph 3.a.) but the licensee was not able to determine the root cause at this time. Further followup with a team investigation to find the cause was planned by the licensee.

The unit entered Mode 2, following the trip, and the unit went critical on December 28, 1990. Mode 1 was entered and the generator was placed on-line on December 29, 1990. Start-up testing was performed at various power levels and full power was achieved on January 4, 1991.

No violations or deviations were identified.

3. 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 applicable Technical Specifications.

The following 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:

<u>Activity</u>	<u>Work Request/Procedure</u>
Post-Modification Test on NSM MG-22365, ND System Mini-Flow Line	98076/TT/2/A/9700/068
Perform PM on Diesel Intercooler Pump 2B	03863C PM
RCCA Movement Test	143885/PT/2/A/4600/01
Procedure for Trouble Shooting Rod Control System	143885/IP/0/B/3211/26

On December 27, 1990 at 1:42 a.m., the Unit 2 reactor was critical with Zero Power Physics Testing in progress. PT/O/A/4150/11A, Control Rod Worth Measurement Rod Swap, was being performed. Shutdown Bank B was at 29 steps withdrawn as required by PT/O/A/4150/11A. Reactor Operators were withdrawing Shutdown Bank E as directed by Reactor Group personnel. As Shutdown Bank E was pulled to the fully withdrawn position, Reactor Operators observed a position discrepancy between the demand counter and Digital Rod Position Indication (DRPI). Operations personnel decided to insert Shutdown Bank E one step and observed demand counter and DRPI during insertion. While attempting to insert Shutdown Bank E one step from the fully withdrawn position, Shutdown Bank E then fell into the core, causing the reactor to go subcritical. After a brief discussion with Operations and Reactor Group personnel, a manual reactor trip was initiated. The inspector observed followup of this problem which was performed under Work Request No. 143885. Analysis of the trip data indicated no unexpected or abnormal plant behavior. All systems functioned as required.

The following is a partial list of the efforts the licensee performed while trying to trouble shoot the trip: checked all Shutdown Bank E fuses, including buss duct fuses; replaced the detector, Group C phase control regulator and firing cards; moved all rods in all banks and recorded current traces for the banks; visually inspected for loose/broken wires and loose connections; stepped Shutdown Bank E in and out of the core 150 times while changing the bank selector switch position; and checked prints to identify potential intermittent failures that could cause only Shutdown Bank E to fail.

b. Review of Transmission Department Operating Agreement

The inspector reviewed the recently implemented Operating Agreement for the Conduct of Work by the Transmission Department at Nuclear stations and discussed the agreement with the new Transmission Department (TD) Superintendent -* McGuire. TD is currently responsible for preventive and corrective maintenance on equipment rated 4160 volts and higher including electrical metering and protective relaying. TD is also responsible for 600 volt metal-clad breakers and control rod drive (reactor trip) breakers.

The licensee recognized the need for improvements in TD interface with station personnel and in procedures due to problems which had occurred. TD was reorganized providing four new positions improving technical support. The new organization was matrixed to the Site Maintenance Superintendent. The TD personnel previously had system wide assignments with much of the work being non-safety related at fossil stations. The new organization provides for the core of the nuclear work being performed by personnel stationed permanently at

the station. An accredited training program has been established and TD personnel are receiving the same general and supervisory training as station personnel. Some procedure upgrades have been implemented. More are planned but the total scope of this work is still being reviewed. The Superintendent indicated that he was aware of past problems and recognized the need to do a quality job and be an integral part of the maintenance team supporting McGuire.

c. Steam Generator Tube Defect

Extensive eddy current testing of all of the steam generator tubes was completed during the recent outage. One tube was found with a 360 degree circumferential crack, portions of which appeared to be through wall. The licensee sleeved the tube. Information regarding this tube was forwarded to NRC/NRR.

No violations or deviations were identified.

4. Licensee Event Report (LER) Followup (92700)

The below listed Licensee Event Reports (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:

369/90-13, Rev. 1	Spent Fuel Pool Ventilation Systems were Declared Inoperable Because of Design Deficiencies.
*369/90-28	Ice Basket U-bolts Were Found Damaged or Missing Because of a Material Deficiency.
369/90-32	Unit 1 Experienced a Turbine Trip/Reactor Trip Because of a Temperature Instrument That Was Damaged Due to An Unknown Cause.

The inspector reviewed LER 369/90-16: Control Room Ventilation System Inoperability Because of Improper Installation. This event was described in NRC Report Nos. 369,370/90-24, paragraph 3.d. The licensee discovered that interaction between the Auxiliary Building Ventilation (VA) and Control Room Ventilation (VC) systems rendered both trains of VC inoperable relative to maintaining 1/8 inch positive pressure (required by TS) in the Control Room (CR) under certain conditions. The VC trains were only able to maintain neutral to slightly positive pressure in various alignments. Recent improvements in the VA system created an increased pressure effect on the adjacent VC system. System interaction testing had

not been performed previously. The licensee conducted extensive interaction testing and spent considerable effort in sealing leakage paths from the CR. The inspectors witnessed these activities. The event is minimally significant due to a conservative design and the fact that the system would have operated, although, not meeting the full positive pressure requirement. In addition, a CR radiation monitor would have warned the operators of high radiation. Self contained breathing apparatuses are available in the CR and protective clothing and filtered respirators could be provided as necessary.

Several violations were previously issued involving the VC system (See 369,370/89-24-03, 90-11-02 and 90-11-03), however, none of these involved improper installation. The licensee had formed a Ventilation Task Force prior to this situation being identified. Task force members were extensively involved in resolution of this issue. System interaction testing was an action item defined by the task force. This licensee identified violation is not being cited because criteria specified in Section V.G.1 of the NRC Enforcement Policy were satisfied. This is Non-Cited Violation 369,370/90-25-01: Failure to Meet TS for Control Room Ventilation due to Installation Deficiency. Corrective actions will be verified during followup of the LER.

One non-cited violation was identified.

5. Followup on Previous Inspection Findings (92701, 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) Inspector Followup Item 50-369,370/90-15-01: Failure to Define and Understand the use of Carolinas Medical Center Emergency Flight Service for Transporting Contaminated Injured Patients. The inspector reviewed a September 26, 1990, memo from the Vice President of Carolinas Medical Center to the licensee which defines and clarifies the use of its helicopter to transfer contaminated patients. The inspector also reviewed the changes to procedure RP/O/A/5700/05 which reflected this clarification and found the corrective actions satisfactory.

(Closed) Unresolved Item 369,370/90-18-02: Evaluation of Effect of Splash Guards on Safety Related Pumps. The licensee completed an analysis of the effect of the splash guards on the Residual Heat Removal (ND) pumps and the Containment Spray (NS) pumps. With the guards on the ND pumps, no ventilation path exists and bearing temperature will increase, but will peak within allowable ranges. The NS pumps are configured differently and will experience less of an impact from the splash guards. Operability was

not impacted by the splash guards, according to the analysis. The guards had been installed without using the modification process. They were installed using the WR process, a problem which the licensee had identified. The guards have been removed and will not be replaced without proper review. This item is being closed, based on the completion of the analysis and the continued operability of the pumps.

6. Management Meeting (30702)

Licensee management, NRC management and the inspectors met on December 11, 1990, to discuss items of interest and current license issue status. Subjects included the licensee's Integrated Safety Assessment, FSAR conversion to computerized bookmaster, compensatory measures guidance and an update of McGuire ventilation system issues. In addition, an overview of performance and major issues at the McGuire Station was presented by the Station Manager.

7. Facility Modifications (37701)

The inspector reviewed the licensee's application and the subsequent approval for the TS amendment for modification NSM 22238, Automatic Closure Interlock Program Removal - RHR Pump Suction. The new design conforms to industry codes and standards. All requirements delineated in the approved application and commitments made in the license amendment request were met in the final design.

The inspector verified that the modification was installed in accordance with the approved design by examining the completed work requests and related documentation. The inspector verified the results of the functional test and maintenance retests and verified adequate performance and post-test reviews.

All procedures requiring revisions, including those mandated by the Technical Specification amendment approval, were revised, approved, and implemented prior to the operation of the system following the refueling outage.

Operator training programs were revised and operators were trained on the modification.

All drawings related to the modification were revised to reflect the changes. The inspector confirmed that all changes were implemented properly and in a timely manner.

No violations or deviations were identified.

B. Evaluation of Licensee Self-Assessment Capability (40500)

a. Quality Assurance Review

The inspector reviewed Quality Assurance Department (QA) audits and surveillances to assist in evaluating the overall quality of QA oversight activities at the site. The inspector also held discussions with QA management regarding their oversight activities.

Audit No. NP-90-12 (MC) of Operations/Fire Protection activities and Audit No. NP-90-13 (MC) of Maintenance, Transmission, Construction and Maintenance, Refueling, In-Service Inspection, Performance, Quality Assurance and Correction Action areas were reviewed. Also reviewed was surveillance MC-90-23 of Emergency Procedures and the Surveillance Summary for April 1 through August 31, 1990. Both audits and surveillances appeared to include a high percentage of field observation time appropriate to the activity being audited. Findings were generally safety oriented and indicate a good understanding of site activities. Beneficial findings were developed relative to emergency procedures such as clarity of procedure steps, equipment locations, procedure references and incorporation of a plant modification. Other findings involved weaknesses in the Station Lubrication Manual, control of equipment in the decontamination facility, proper use of test equipment, failure to take appropriate corrective action for a flow indicator, numerous weaknesses in control of measuring and test equipment, numerous material condition problems, an inadequate operability evaluation, inadequacies in procedures used in defueling and corrective action weaknesses. Some good observations and recommendations were also made. These included procedural inconsistencies or weaknesses and recommendations for improved inter-departmental coordination. The most recent audit (NP-90-13) was an extensive team audit employing personnel from the site and corporate office and specialist technical experts. Also, QA does not appear constrained to typical areas of auditing as evidenced by an environmental audit and a fitness for duty audit.

Site Management appears sensitive to the value of the QA process as evidenced by appropriate corrective actions regarding findings and the fact that audits have been specifically requested by site management.

A Self Initiated Technical Audit of the Control Room Ventilation System was conducted in 1990. This audit appeared to be very thorough and resulted in 14 Problem Investigation Reports (PIRs) being generated.

A review of past and planned training of QA personnel indicates a continuing strong emphasis in this area. Training is provided in areas of systems, operations, engineering/professional, human performance and management.

b. Maintenance Engineering Review

The inspector reviewed the process for trending and root cause analysis for the mechanical maintenance group. Maintenance Management Procedure (MMP) 3.3 describes the Equipment Trending and Failure Analysis Program. This procedure requires a yearly review of Work Requests (WR). This review highlights equipment with a 50% or greater ratio of failures to preventive WRs, a 10% or less ratio of failures to preventive WRs and with three or more corrective WRs within a one year time period. The inspector reviewed MMP 3.3, reviewed a recent trend report and discussed the process with maintenance engineering management. As a trending program, this appeared to be a minimal effort in that it was a one time snap shot of one data base only. In addition, no formalized followup was required and the licensee had no record of any actions initiated from the process. The information is forwarded to the appropriate engineers for their use as deemed appropriate and the licensee has recognized generic problems. The licensee has recognized the need for a broader trending program as well as the need for improved data bases. A relief valve data base was recently established and the licensee is in process of developing a broader based equipment trending program. The engineering group is presently evaluating all of the activities performed by the group and expects to make significant changes. As part of the new program, the licensee intends to develop a more user friendly failure description process for use by field personnel. One of the goals is to allow engineers more time for evaluations and less time for routine WR review.

The licensee also has procedures for evaluation of failed surveillances and root cause analysis. Station Directive 3.2.0, Conduct of Periodic Surveillance Program, provides general guidelines for evaluation of failed surveillances. MMP 3.5, Failed Surveillance Analysis, provides more detailed guidance. MMP 3.6, Root Cause Failure Analysis, describes the root cause evaluation process for abnormal wear, mechanical failure, failed surveillances and loose parts of unknown origin. The root cause procedure is optional as deemed necessary by the engineers.

The inspector reviewed these procedures and the available documentation for root cause failure analyses. There were 17 documented analyses in 1989 but none in 1990. The licensee could not explain the absence of evaluations in 1990. The engineering group is also evaluating these processes for improvement as part of their general review.

c. Corrective Action Program

The station has implemented a corrective action program via Station Directive 2.8.1, Problem Investigation Process. This procedure requires documentation of problems on a PIR.

Several examples of failure to issue a PIR were previously identified (see NRC Report Nos. 369,370/89-01, 89-32 and 89-42). Licensee reviews confirmed this threshold problem in that a number of problems were not being documented for tracking, trending and informing management. The licensee has also recognized that many minor problems occur which should not require the extensive formal review process of a PIR but should be formally documented for tracking and trending. Some of these issues had been documented on PIRs, some were documented in various section specific documents and others were not documented at all. The licensee has recognized the need to formulate formal section specific threshold guidance for documenting problems on PIRs or other forms. An ad hoc committee has been formed to oversee development of the new program. A permanent committee is planned to oversee implementation of the new program when it is developed.

The inspectors attended a meeting of the ad hoc committee and discussed planned improvements with station management.

No violations or deviations were identified.

9. Plant Startup From Refueling (71711)

The inspectors observed plant startup and zero power physics testing to ascertain that startup activities were conducted in a well controlled manor in accordance with approved procedures. Three startup tests were witnessed in part as follows:

<u>Procedure</u>	<u>Activity</u>
IP/0/A/3207/02E	NIS Intermediate Range Compensation Voltage Adjustment
PT/2/A/4600/01	RCCA Movement Test
PT/0/A/4150/28	Criticality Following a Change in Core Nuclear Characteristics

No violations or deviations were identified

10. Exit Interview (30703)

The inspection scope and findings identified below were summarized on January 5, 1991, with those persons indicated in paragraph 1 above. The following item was discussed in detail:

Non-Cited Violation 369,370/90-25-01: Failure to Meet TS for Control Room Ventilation due to Installation Deficiency (paragraph 4).

The inspectors also discussed the housekeeping problems and results of the self assessment evaluation described in paragraphs 2 and 8, respectively.

The licensee's 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.