



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
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December 31, 2001

Duke Energy Corporation  
ATTN: Mr. H. B. Barron  
Vice President  
McGuire Nuclear Station  
12700 Hagers Ferry Road  
Huntersville, NC 28078-8985

**SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
50-369/01-04 AND 50-370/01-04**

Dear Mr. Barron:

On December 15, 2001, the NRC completed an inspection at your McGuire Nuclear Station. The enclosed report documents the inspection findings which were discussed on December 13, 2001, with you and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

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Sincerely

/RA/

Robert C. Haag, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

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

Enclosure: NRC Integrated Inspection Report 50-369/01-04, 50-370/01-04

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-369, 50-370

License Nos: NPF-9, NPF-17

Report No: 50-369/01-04, 50-370/01-04

Licensee: Duke Energy Corporation

Facility: McGuire Nuclear Station, Units 1 and 2

Location: 12700 Hagers Ferry Road  
Huntersville, NC 28078

Dates: September 16, 2001 - December 15, 2001

Inspectors: S. Shaeffer, Senior Resident Inspector  
E. DiPaolo, Resident Inspector  
E. Lea, Project Engineer (Section 1R01)  
R. Gibbs, Senior Reactor Inspector (Section 1R12.2)

Approved by: Robert Haag, Chief,  
Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000369-01-04, IR 05000370-01-04 on 09/16 - 12/15/2001, Duke Energy Corporation, McGuire Nuclear Station, Units 1 & 2, Quarterly Integrated Resident Inspection Report.

The inspection was conducted by resident inspectors, a regional project engineer, and a regional senior reactor inspector. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>

A. Inspector Identified Findings

No findings of significance were identified.

B. Licensee Identified Violations

No findings of significance were identified.

## Report Details

### Summary of Plant Status:

Unit 1 operated at approximately 100 percent power during the inspection period. Unit 2 began the inspection period at 100 percent. On October 19, reactor power was briefly reduced to approximately 96 percent to facilitate repair of a leak on the main turbine hydraulic oil system. On December 14 and 15, the licensee reduced reactor power from 100 percent to approximately 20 percent in order to allow the addition of oil to the 2B reactor coolant (NC) pump. At the end of the inspection period, the unit was returning to 100 percent power following a successful oil addition.

## **1. REACTOR SAFETY**

### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

Based on a review performed by an NRC Region II Senior Reactor Analyst, the inspectors selected portions of two risk-significant systems that are required to be protected during adverse weather conditions. Specifically, the refueling water storage tank (FWST) and the switchyard were selected to determine if the licensee had established and implemented procedures necessary to mitigate the effects of cold weather and/or tornado/hurricane conditions on system operability. The inspectors evaluated whether procedures adequately identified actions the licensee should implement to assure system/component readiness prior to seasonal susceptibilities and during periods of actual adverse weather conditions. The inspector reviewed selected documentation, performed area walkdowns, and interviewed licensee personnel to evaluate the effectiveness of the licensee's adverse weather program. The inspector also reviewed documentation to determine if problems were identified during the implementation of the procedures and if corrective actions had been identified/implemented to correct the problems to assure the systems/components would function as required by the Updated Final Safety Analysis Report (UFSAR) and Technical Specifications (TS).

##### b. Findings

No findings of significance were identified.

## 1R04 Equipment Alignment

### a. Inspection Scope

For the systems identified below, the inspectors reviewed plant documents to determine correct system lineup, and conducted walkdowns to verify that the systems were correctly aligned when the redundant trains were inoperable or out of service.

- Unit 2 Motor Driven Auxiliary Feedwater (CA) System
- Unit 1 Component Cooling Water (KC) System
  
- Standby Shutdown Facility (SSF)

The SSF walkdowns were performed in conjunction with periods of maintenance and testing of the turbine driven CA pumps for both units. The inspectors assessed conditions such as equipment alignment (i.e., valve positions, damper position, and breaker alignment) and system operational readiness (i.e., control power and permissive status) that could affect operability of these systems.

In addition, a complete walkdown of the Units 1 and 2 spent fuel pool cooling (KF) systems was performed. The inspector reviewed the UFSAR, associated attachments and procedures of Operating Procedure OP/1/2/A/6200/005, Spent Fuel Cooling System, Revisions 060 (Unit 1) and 043 (Unit 2), and system drawings in determining correct system lineup. The inspectors reviewed pending design and equipment issues through review of: (1) the operator workaround list; (2) the temporary modification list; (3) outstanding maintenance work requests/work orders; (4) operator turnover sheets; and (5) engineering operability evaluations. The inspector verified that identified system material deficiencies were properly addressed by the licensee. The following related system Problem Investigation Process reports (PIPs) were reviewed to assure that the licensee had properly characterized and prioritized equipment problems in the corrective action program:

- M-01-2769                      Unit 1 spent fuel pool fuel rack boraflex degradation
- M-0103958                    Inappropriate spent fuel pool boron concentration monitoring for Maintenance Rule Program function
- M-01-0093                    Unit 2 B spent KF pump motor discovered to have internal oil leak
- M-01-1123                    Foreign material discovered in Unit 1 spent fuel pool decontamination area

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

To assess the adequacy of the fire protection program implementation, the inspectors toured the following risk significant areas to assess transient combustible material control, visible material condition and lineup of fire detection and suppression systems, status of manual fire equipment, and condition of passive fire barriers:

- Unit 2 motor driven CA pump room
- Unit 2 steam driven CA pump room
- SSF
- Vital battery and charger areas
- Main fire pump areas within the circulating water pump house
- Penetration rooms containing reactor trip breakers

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On November 20, 2001, the inspectors observed operator performance in the plant simulator and the subsequent crew and evaluator's critique during licensed operator requalification training. The inspection focused on high-risk operator actions, emergency plan implementation and lessons learned from previous plant experiences. Specifically, the inspectors reviewed activities concerning the requalification training for Emergency Procedure (EP) FR-S.17, Response to Nuclear Power Generation/ Anticipated Transient without Scram.

b. Findings

No findings of significance were identified.



1R12 Maintenance Rule Implementation

.1 Maintenance Effectiveness - Quarterly

a. Inspection Scope

For the equipment issues described in the PIPs listed below, the inspectors reviewed the licensee's implementation of the Maintenance Rule (10 CFR 50.65) with respect to the characterization of failures, the appropriateness of the associated a(1) or a(2) classification, and the appropriateness of either the associated a(2) performance criteria or the associated a(1) goals and corrective actions.

<u>PIP Number</u>	<u>Title/Description</u>
M-01-2676	Recurring ground alarm on Unit 1 600V essential load center ELXA
M-01-3958	Inappropriate spent fuel pool boron concentration monitoring for Maintenance Rule Program function
M-01-4101	Unit 2 containment spray (NS) pump B discharge containment isolation valve 2NS15B failure to satisfy a pump start permissive interlock during testing due to valve auxiliary contact alignment
M-01-4201	Unit 1 pressurizer heater bank C found tripped
M-01-2656	Supply breaker for auxiliary control power battery charger CXA found tripped
M-01-4193	Functional failure of Unit 1 power range detector N-41 failed high

b. Findings

No findings of significance were identified.

.2 Periodic Evaluation - Biennial

a. Inspection Scope

The inspector reviewed the licensee's periodic assessment, "Maintenance Rule Periodic Assessment for Maintenance Rule Implementation McGuire Nuclear Station July 1, 1999 - December 31, 2000," which was issued in accordance with paragraph a(3) of the Maintenance Rule (10 CFR 50.65). Inspection criteria included determination that the assessment was issued in accordance with the time requirements of the Rule, and also that the assessment included all required areas including balancing reliability and unavailability, review of a(1) activities, review of a(2) activities, and consideration of industry operating experience. The inspector reviewed the goals and monitoring for a sample of a(1) systems, structures, and components (SSCs), verified appropriate changes were made in a(2) SSC performance criteria, and determined that balancing of

reliability and availability met the industry guidance. The inspector reviewed PIPs and corrective actions for self-assessments (see listing at end of report) to determine that corrective actions for programmatic problems had been adequately addressed.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's control of plant risk and configuration as related to removing from service (due to emergent or planned work activities) the SSCs listed below, which were within the scope of the maintenance rule or which were otherwise risk-significant. Emphasizing potential high risk configurations and high priority work items, the inspectors evaluated the following: (1) effectiveness of the work prioritization and control; (2) assessment of integrated risk of the work backlog; and (3) safety assessments and/or management activities performed when SSCs are taken out of service. The inspectors reviewed the licensee's implementation of Maintenance Rule (10 CFR 50.65) a(4), with respect to risk assessments for work activities.

<u>PIP Number/ Work Order (WO)</u>	<u>Title/Description</u>
M-01-4193	Unit 1 entered Abnormal Procedure (AP) 16, Malfunction of Nuclear Instrumentation for Power Range Trouble Alarm (emergent)
M-01-4486	Unit 1 AP 8, Malfunction of NC Pump (emergent)
M-01-3931	Incorrectly installed Cutler-Hammer relay terminations (planned)
WO 98206525	Troubleshooting associated with Unit 2 A emergency diesel generator (EDG) DC control power trouble and battery bus ground alarms (emergent)
WO 98210178	Loss of Unit 1 digital rod position Indication (DRPI) Data A (emergent)
M-01-1975	Unit 2 power reduction to 20 percent to address 2B NC pump motor oil leakage (planned)

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutionsa. Inspection Scope

The inspectors reviewed the operating crews' performance during the following non-routine evolutions and/or transient conditions to determine if the response was appropriate to the event and in accordance with procedures and training. Operator logs, plant computer data, and associated operator actions were reviewed.

<u>PIP Number</u>	<u>Title/Description</u>
M-01-1975	Unit 2 power reduction to 20 percent to address 2B NC pump motor oil leakage
M-01-4486	Operator response to Unit 1 NC pump alarm and entry into AP 8, Malfunction of NC Pump
M-01-4193	Operator response for Unit 1 entry into AP 16, Malfunction of Nuclear Instrumentation for Power Range Trouble Alarm

b. Findings

No findings of significance were identified.

1R15 Operability Evaluationsa. Inspection Scope

The inspectors reviewed selected operability evaluations affecting risk significant SSCs listed below to assess the technical adequacy of the evaluations. Where compensatory measures were involved, the inspectors also determined whether the compensatory measures were in place, would work as intended, and were appropriately controlled.

<u>PIP Number</u>	<u>Title/Description</u>
M-01-4409	Control room area ventilation damper 0VCDO0059 found failed in the open position
M-01-4804	1A2 KC pump discharge check valve 1KC-8 abnormal noise
M-01-4842	Unit 1 EDG halon system abort pushbuttons stuck in off position
M-01-5001	Reactor coolant system temperature and thermal power decrease during refueling water storage tank addition
M-01-5018	Control room air handling Unit B bearing vibration problem

M-01-5099                      Service water flow balance requirements for the Unit 2 A  
EDG heat exchanger not met

c. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors evaluated the operator workaround described in PIP M-01-3148, Potential closing force problem with turbine driven auxiliary feedwater pump steam admission valves (operator work around 01-07), for potential effects on the functionality of mitigating systems. The workaround was reviewed to determine: (1) if the functional capability of the system or human reliability in responding to an initiating event was affected; (2) the effect on the operators' ability to implement abnormal or emergency procedures; and (3) if operator workaround problems were captured in the licensee's corrective action program.

In addition, the inspectors reviewed the cumulative effects of all identified operator workarounds on the reliability, availability, and potential for misoperation of the identified systems; the potential for increasing an initiating event frequency; and impact on the ability of operators to respond in a correct and timely manner to a plant transient and accident. Aggregate impacts of the identified workarounds on each individual operator watch station were also reviewed.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

b. Inspection Scope

The inspectors reviewed the following modifications to: (1) verify that the design bases, licensing bases, and performance capability of risk significant SSCs have not been degraded through the modification; and (2) verify that the modification performed during risk significant configurations did not place the plant in an unsafe condition.

NSM52172                      Replacement of 125 VDC Auxiliary power batteries (CBX)

MGMM11380                    Installation of voltage and ampere instrumentation on the safe  
shutdown diesel generator exciter

c. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT)a. Inspection Scope

The inspectors reviewed PMT procedures and/or observed testing activities for the equipment below to ensure the equipment was returned to service satisfactorily. The inspectors evaluated the PMT to ensure it properly addressed the work performed and that equipment functional capabilities were adequately verified.

<u>Procedure Number</u>	<u>Title/Description</u>
WO 98193963	Unit 2 containment spray (NS) pump B discharge containment isolation valve 2NS15B motor operator replacement PMT
WO 980892091	Unit 1 A high head centrifugal charging (NV) pump power supply breaker replacement, motor cooler heat exchanger maintenance (WO 98342718), and gearbox oil replacement (WO 98405570) PMT
WO 98384195	Unit 2 B motor-driven CA pump coupling preventive maintenance PMT
WO 98369443	Unit 2 NS pump B suction from FWST isolation valve 2NS3B motor operator replacement PMT
WO 98429255	Unit 1 power range detector N-41 replacement of fine gain potentiometer PMT
WO 98046332	Replacement of RN1A pump breaker PMT

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing.1 Routine Surveillance Testinga. Inspection Scope

The inspectors witnessed surveillance tests and/or reviewed test data of selected risk-significant SSCs listed below, to assess, as appropriate, whether the SSCs met TS requirements, UFSAR, and licensee procedure requirements. The inspectors also determined if the testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions. Compensatory measures, where applicable, were also verified.

<u>Procedure/WO</u>	<u>Title/Description</u>
CIV/PT/1/A/4200/01J	Local leak rate testing for numerous containment purge and ventilation containment isolation valves
WO 98415889	2R cylinder exhaust temperature monitoring on the 1A EDG
WO 98012787	1B EDG operability test
PT/0/A/4350/038A	Battery service test on vital battery EVCA (125VDC GNB Vital Battery Service Test using BCT-2000)
WO 98208753	Testing and Inspection for the Unit 1 1B bypass reactor trip breaker
PT/1/A/4208/01B	1B NS Pump performance test

b. Findings

No findings of significance were identified.

.2 Inservice Testing

a. Inspection Scope

The inspectors observed the performance of Periodic Test PT/1/A/4209/001C, Unit 1 Standby Makeup Pump Flow Periodic Test, Revision 26, performed on October 4, 2001. The inspectors evaluated the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing program to determine equipment availability and reliability. The inspectors evaluated selected portions of the following areas: (1) testing procedures; (2) acceptance criteria; (3) testing methods; (4) compliance with the licensee's in-service testing program, TS, Selected Licensee Commitments, and code requirements; (5) range and accuracy of test instruments; and (6) required corrective actions. The inspectors also verified that corrective actions were taken as applicable.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary McGuire modifications (MGTM) to determine whether system operability and availability were affected, that configuration control was maintained, and that post-installation testing was performed.

<u>Modification Number</u>	<u>Title/Description</u>
MGTM-0192	DRPI failure monitoring on Data AF8
MGTM-0205	1NI-100B limit switch alarm deletion

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed the licensee’s emergency preparedness training evolution conducted on September 26, 2001. The inspectors reviewed the drill scenario narrative to identify the timing and location of classification, notification, and protective action recommendation (PAR) development activities. The inspectors verified the adequacy of event classification and notification activities. The licensee’s drill critique was also attended and observed by the inspectors. The inspectors verified that the licensee properly evaluated drill performance with respect to performance indicators. The inspectors verified that identified drill performance deficiencies were entered into the licensee’s corrective action program.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors verified the following three Reactor Safety PIs for accuracy:

<b><u>Cornerstone</u></b>	<b><u>PI</u></b>
Barrier Integrity	Reactor coolant system specific activity
Mitigating Systems	Safety system unavailability, high pressure safety injection
Mitigating Systems	Safety system unavailability, auxiliary feedwater system

To verify the PI data, the inspectors reviewed control room and chemistry logs, TS Action Item Log entries, and maintenance rule data for the previous 12 months of submitted data.

b. Findings

No findings of significance were identified.

4OA3 Event Followup

(Closed) Licensee Event Report (LER) 50-369/01-01: Emergency Personnel Hatch Not Fully Secured in Closed Position. On June 21, 2001, the McGuire Unit 1 Emergency Personnel Hatch door was found not fully sealed. The event described in this LER was previously reviewed and dispositioned in NRC Inspection Report 50-369, 370-01-03, Section 4OA7. No new issues were revealed by the LER.

4OA6 Meetings

The inspectors presented the inspection results to Mr. Brew Barron, McGuire Nuclear Station Vice President, as well as other members of licensee management and staff, at the conclusion of the inspection on December 13, 2001. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

### **PARTIAL LIST OF PERSONS CONTACTED**

Licensee

Barron, B., Vice President, McGuire Nuclear Station  
 Bradshaw, S., Superintendent, Plant Operations  
 Bryant, J., Site Licensing Specialist  
 Byrum, W., Manager, Radiation Protection  
 Thomas, J., Manager, Regulatory Compliance  
 Dolan, B., Manager, Safety Assurance  
 Evans W., Security Manager  
 Geer, T., Manager, Reactor Electrical Systems Engineering  
 Jamil, D., Station Manager, McGuire Nuclear Station  
 Patrick, M., Superintendent, Maintenance  
 Peele, J., Manager, Engineering  
 Loucks, L., Chemistry Manager  
 Smith, D, Maintenance Rule Coordinator  
 Thomas, K., Superintendent, Work Control  
 Travis, B., Manager, Mechanical Civil Engineering



**ITEMS CLOSED**Closed

50-369/01-01      LER      Emergency Personnel Hatch Not Fully Secured in Closed Position (Section 4OA3)

**LIST OF ACRONYMS**

AP	-	Abnormal Procedure
ASME	-	American Society of Mechanical Engineers
CA	-	Auxiliary Feedwater
DRPI	-	Digital Rod Position Indication
EDG	-	Emergency Diesel Generator
EP	-	Emergency Procedure
FWST	-	Refueling Water Storage Tank
IR	-	Inspection Report
KC	-	Component Cooling Water
KF	-	Spent Fuel Pool Cooling
LER	-	Licensee Event Report
MGTM	-	McGuire Temporary Modifications
NC	-	Reactor Coolant
NI	-	Safety Injection
NS	-	Containment Spray
NV	-	High Head Charging
OTDT	-	Over Temperature Delta Temperature
PAR	-	Protective Action Recommendation
PI	-	Performance Indicators
PIP	-	Problem Investigation Process (report)
PMT	-	Post-Maintenance Testing
PT	-	Periodic Test
SSC	-	Structures, Systems, Components
SSF	-	Standby Shutdown Facility
TS	-	Technical Specifications
UFSAR	-	Updated Final Safety Analysis Report
WO	-	Work Order

**LIST OF DOCUMENTS REVIEWED (for Section 1R12.2)**Problem Investigation Process Reports

PIP M-01-03619      Degraded Hoses and Electrical insulation of the driven diesel instrument air compressors.

PIP M-01-04017      FW System Function for Maintaining the FWST Water Temperature between 70 and 100 degrees is not included in the Maintenance Rule Program.

PIP M-01-03958	KF System Function for Maintaining the Required Boron Concentration in the Spent Fuel Pool Needs to be Evaluated for Inclusion in the Maintenance Rule.
PIP M-01-03969	The Fuel Storage Racks are not Included in the Maintenance Rule.
PIP M-99-02492	EMF System Requires Classification as "A1" Status Due to Repetitive Failures.
PIP M-99-04519	YC System Requires Classification as "A1" Status Due to Repetitive Failures.
PIP M-00-01340	The Instrument Loop Lambda Power Supplies Requires Classification as "A1" Status Due to Repetitive Failures.

#### Self-Assessments

NED-01-03, Maintenance Rule Reliability Determination Self Assessment.  
MSE-SA-0006, Assessment of PIP Threshold for Equipment Reliability Issues.  
OPS-SA00-14, Operations Self Assessment.  
RC-SA01-01, MNS Compliance with Maintenance Rule a(4).