



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931**

July 18, 2003

Duke Energy Corporation
ATTN: Mr. G. R. Peterson
Vice President
McGuire Nuclear Station
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

**SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT
05000369/2003003 AND 05000370/2003003 AND INDEPENDENT SPENT
FUEL STORAGE INSTALLATION INSPECTION REPORT 7200038/2003002**

Dear Mr. Peterson:

On June 21, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station. The enclosed report documents the inspection findings which were discussed on June 26, 2003, with Mr. D. Jamil and 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.

Based on the results of this inspection, there were two findings of very low safety significance (Green) identified in the report which were determined to be violations of NRC requirements. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest these non-cited violations, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the McGuire facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document

DEC

2

system(ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

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

Docket Nos. 50-369, 50-370, 72-38
License Nos. NPF-9, NPF-17

Enclosure: NRC Integrated Inspection Report 05000369/2003003, 05000370/2003003,
07200038/2003002 w/Attachment - Supplemental Information

cc w/encl:

C. J. Thomas
Regulatory Compliance Manager (MNS)
Duke Energy Corporation
Electronic Mail Distribution

County Manager of Mecklenburg County
720 East Fourth Street
Charlotte, NC 28202

M. T. Cash, Manager
Nuclear Regulatory Licensing
Duke Energy Corporation
526 S. Church Street
Charlotte, NC 28201-0006

Peggy Force
Assistant Attorney General
N. C. Department of Justice
Electronic Mail Distribution

Lisa Vaughan
Legal Department (PB05E)
Duke Energy Corporation
422 South Church Street
Charlotte, NC 28242

Anne Cottingham
Winston and Strawn
Electronic Mail Distribution

Beverly Hall, Acting Director
Division of Radiation Protection
N. C. Department of Environmental
Health & Natural Resources
Electronic Mail Distribution

DEC

3

Distribution w/encl:
R. Martin, NRR
RIDSNRRDIPMLIPB
PUBLIC
C. Evans, RII

OFFICE	RII:DRP	RII:DRP	RII:DRS	RII:DRS	RII:DRS	RII:DRP	RII:DRS
SIGNATURE	SMS	EMD	WMS	RCH for	LRM	ATS1	MXT2
NAME	SShaeffer	EDipaolo	WSartor	LMellen	LMiller	ASabisch	MThomas
DATE	7/15/2003	7/15/2003	7/12/2003	6/12/2003	7/11/2003	7/11/2003	7/15/2003
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
PUBLIC DOCUMENT	YES NO						

OFFICIAL RECORD COPY

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML032020537.wpd

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-369, 50-370, 72-38

License Nos: NPF-9, NPF-17

Report Nos: 05000369/2003003, 05000370/2003003, 07200038/2003002

Licensee: Duke Energy Corporation

Facility: McGuire Nuclear Station, Units 1 and 2

Location: 12700 Hagers Ferry Road
Huntersville, NC 28078

Dates: March 23, 2003 - June 21, 2003

Inspectors: S. Shaeffer, Senior Resident Inspector
E. DiPaolo, Resident Inspector
W. Sartor, Senior Emergency Preparedness Inspector (Sections 1EP1, 1EP4 and 4OA1.2)
L. Mellen, Senior Operations Engineer (Sections 1EP1, 1EP4 and 4OA1.2)
L. Miller, Senior Operations Engineer (Section 4OA5.2)
M. Thomas, Senior Reactor Inspector (Section 4OA2.2)

Approved by: Robert C. Haag
Reactor Projects Branch 1
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR05000369/2003-003, IR05000370/2003-003, IR 07200038/2003002; 03/23/2003 - 06/21/2003; McGuire Nuclear Station, Units 1 and 2; Maintenance Effectiveness and Identification and Resolution of Problems.

The report covered a three month period of inspection by resident inspectors, announced inspections by two regional emergency preparedness inspectors and one regional senior reactor inspector, and an in-office review by one regional operations engineer. Two Green non-cited violations (NCV) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

- Green. A self-revealing, non-cited violation of Technical Specification 5.4.1.a was identified for failure to follow maintenance instructions for work on the hydrogen mitigation system. This violation was caused by a human performance error which rendered a train of the hydrogen mitigation system inoperable while the redundant train was removed from service due to maintenance.

This finding is greater than minor because the safety function that this system provides to minimize containment pressure excursion in post accident environments was lost. This finding was of very low safety significance due to the short time interval when both trains were inoperable. (Section 1R12)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, for corrective actions that were not adequate to prevent a second fire from occurring on the roof of the Unit 1 emergency diesel generator (EDG) building when the EDG 1A was operated on two separate occasions. The licensee's immediate corrective action for the initial emergency diesel generator roof fire were inadequate to prevent a second fire from recurring.

This finding is greater than minor because it was associated with protection against one of the external factors (fire) attribute and affected the objective of the mitigating systems cornerstone to ensure the availability, reliability and capability of systems that respond to initiating events. In addition, this finding could have resulted in an unnecessary challenge to plant operators during response to initiating events requiring the EDGs for mitigation (i.e., loss of offsite power events). The additional challenge to operators could have resulted in reduced availability, reliability, and capability of the EDGs during these events. This finding was determined to be of very low safety significance because neither fire caused the EDG 1A to be inoperable. (Section 4OA2.2)

B. Licensee Identified Violations

None.

Report Details

Summary of Plant Status:

Unit 1 began the inspection period at approximately 100 percent rated thermal power (RTP). On April 18 and 19, power was reduced to approximately 40 percent to perform several repair activities. The primary focus for the downpower was to replace both of the main feedwater pump turbine trip solenoid valves which had caused a previous runback event on Unit 2. On May 2, power was reduced on Unit 1 to approximately 45 percent as a result of commencing a shutdown in accordance with Technical Specification (TS) Limiting Condition of Operation (LCO) 3.0.3 due to both trains of the hydrogen mitigation system being rendered inoperable. TS 3.0.3 was exited prior to completing the shutdown when repairs were made to one train. Unit 1 returned to approximately 100 percent on May 2 where it remained for the remainder of the inspection period.

Unit 2 began the inspection period at approximately 100 percent RTP. On May 30, power was reduced to 50 percent by operators due to decreasing control air pressure on the 2A Generator Breaker. Following repairs of a pressure regulator and a pilot valve, Unit 2 returned to 100 percent on June 1.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns

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 A containment spray (NS) train when B train was out-of-service
- Unit 1 A emergency diesel generator (EDG) when B EDG was out-of-service
- Unit 1 A residual heat removal (ND) train when the B train was out-of service

The inspectors assessed conditions such as equipment alignment (i.e., valve positions, damper positions, and breaker alignment) and system operational readiness (i.e., control power and permissive status) that could affect operability of these systems. The inspectors also reviewed the licensee's corrective action system and component health database for previously identified conditions adverse to quality to assess the licensee's ability to identify and correct problems.

Complete System Walkdown

The inspectors conducted a detailed review of the alignment and condition of the Unit 2 component cooling water system. The inspector reviewed the Updated Final Safety Analysis Report (UFSAR), associated attachments of Operating Procedure OP/2/A/6400/005, Component Cooling Water (KC) System, Revision 052, and the system flow diagram (drawing number MCFD-2573 series) in determining correct system lineup. The inspectors reviewed pending design and equipment issues to verify that the identified deficiencies did not significantly impact the system's functions. Items included in this review were: (1) the operator workaround list; (2) the temporary modification list; (3) outstanding maintenance work requests/work orders (WOs); and (4) operator turnover sheets. The following related system Problem Investigation Process (PIP)s were reviewed to assure that the licensee had properly characterized and prioritized equipment problems in the corrective action program:

<u>PIP Number</u>	<u>Issue</u>
M-02-00400	KC surge tank relief (2 KC-800) lifted above nameplate setpoint
M-02-03463	Operator burden requires periodic equalization of Unit 2 KC surge tank level

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Area Inspections

a. Inspection Scope

To assess the adequacy of the fire protection program implementation, the inspectors toured the following 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:

- Units 1 and 2 ETA essential switchgear rooms and air handling unit rooms (2 areas)
- Cable spreading room
- Unit 2 spent fuel pool area
- Units 1 and 2 EDG building exteriors (2 areas)
- KC heat exchanger area (auxiliary building elevation 750)
- Unit 2 EDG rooms

For the Units 1 and 2 ETA essential switchgear rooms and air handling unit rooms, the inspectors also reviewed the licensee's compensatory measures when all four channels of the Units 1 and 2 Reactor Protection System were discovered to be routed together

through the respective Unit's ETA Switchgear Room and did not meet the separation criteria of 10CFR50, Appendix R (see 4OA3.3 for additional details). The inspector reviewed the compensatory measures for consistency with the requirements of Selected Licensee Commitment 16.9.5, Fire Rated Assemblies, for inoperable fire rated assemblies.

The inspectors also reviewed the licensee's corrective action system for previously identified conditions adverse to quality to assess the licensee's ability to identify and correct problems. This included PIP M-03-02754 which documented an inspector identified issue concerning combustible materials found in an area that was under the protection of a continuous fire watch (air handling unit room adjacent to 2 ETA switchgear room).

b. Findings

No findings of significance were identified.

.2 Fire Drill Observations

a. Inspection Scope

On April 23, 2003, the inspectors monitored an unannounced quarterly shift fire drill in the 6.9 kv switchgear area of the Unit 2 turbine building. The purpose of the inspection was to monitor the fire brigade's use of protective equipment and fire fighting equipment, to verify that fire fighting pre-plan procedures and appropriate fire fighting techniques were used, and to verify that the directions of the fire brigade leader were thorough, clear, and effective. The inspectors also reviewed final critique evaluations to ensure they were critical and identified appropriate areas for licensee follow-up.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On June 4, 2003, the inspectors observed a licensed operator requalification annual dynamic simulator examination, and the subsequent instructor evaluation and grading of the crew. The inspection focused on high-risk operator actions, emergency plan implementation, and lessons learned from previous plant experiences. The simulator examination evaluated operator response to and use of appropriate emergency procedures to mitigate a reactor coolant leak with subsequent loss of secondary heat removal, a steam line break outside containment, an anticipated transient without scram, and a steam generator tube rupture. Additionally, operator response to various system failures and use of abnormal procedures were evaluated. The inspectors assessed whether appropriate feedback was provided to the licensed operators.

The inspectors also reviewed PIP M-03-02512 to assess the licensee's ability to identify and correct problems. The issue involved the inadvertent removal of a critical task from the observed examination scenario.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in performing routine maintenance activities. This review included an assessment of the licensee's practices pertaining to the identification, scoping, and handling of degraded equipment conditions, as well as common cause failure evaluations. For each selected item, the inspectors performed a detailed review of the problem history and surrounding circumstances, evaluated the extent of condition reviews as required, and reviewed the generic implications of the equipment and/or work practice problem. For those systems, structures, and components (SSCs) scoped in the maintenance rule per 10 CFR 50.65, the inspectors verified that reliability and unavailability were properly monitored and that 10 CFR 50.65 (a)(1) and (a)(2) classifications were justified in light of the reviewed degraded equipment condition. The inspectors conducted this inspection for the following two PIPs:

<u>PIP Number</u>	<u>Title/Description.</u>
M-03-01970	Both trains of hydrogen mitigation rendered inoperable when the power cable to the A train was mistakenly cut with the B train in the process of being repaired
M-03-01489	Pipe trench running from Unit 2 refueling water storage tank (FWST) to the auxiliary building found full of water

b. Findings

Introduction: A Green finding was identified and dispositioned as an NCV for a failure to follow maintenance procedures for the Unit 1 Hydrogen Mitigation System.

Description:

On May 2, 2003, maintenance workers were in the process of performing Work Order (WO) 98588868 which implemented a modification (MGMM 13951) to replace power supply cables to the Unit 1 B train of hydrogen igniters (i.e., Hydrogen Mitigation System). At 0115, workers mistakenly cut the cables supplying power to the redundant (A train) of hydrogen igniters located in the ice condenser of Unit 1. TS LCO 3.6.9, Hydrogen Mitigation System, requires 34 of 35 igniters of a train to be functional for a train of the system to be considered operable. Therefore, the A train of the system was rendered inoperable because the error by the maintenance workers removed the power

to 6 igniters. Due to the modification work in progress, the B train of the hydrogen igniter was inoperable and non-functional at the time. Operators appropriately entered TS LCO 3.0.3 because this condition, two inoperable trains of the Hydrogen Mitigation System, was prohibited by TS. Unit 1 began reducing power at 0215 in preparation for the required shutdown.

The licensee expedited repairs to the A train of the system, performed post maintenance testing, and exited TS LCO 3.0.3 at 0741 on May 2, 2003. In anticipation of a TS required unit shutdown, power had been reduced to approximately 45 percent RTP by the time the A train was declared operable.

Analysis:

Due to a human performance error, a maintenance worker failed to follow maintenance instructions and incorrectly cut the power cables to the A Train of hydrogen igniters located in the ice condenser portion of containment. This finding is more than minor because it resulted in a failure of the Hydrogen Mitigation System pressure control function due to the redundant train of the system previously being removed from service due to maintenance. This function is necessary to reduce the potential for breach of primary containment due to a hydrogen-oxygen reaction in post-accident environments.

An analysis under the SDP was performed by the regional Senior Reactor Analyst assuming a loss of the containment pressure control function for 6.5 hours. This finding was of very low safety significance due to the short time interval that the train was inoperable and the availability of igniters in adjacent compartments.

Enforcement:

TS 5.4.1.a requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33 requires procedures for performing safety-related maintenance. Work Order (WO) 98588868 contained procedures for performing maintenance on the Unit 1 B train of the Hydrogen Mitigation System. Contrary to WO 98588868, on May 2, 2003, maintenance workers cut the power cables to the A train of hydrogen igniters located in the ice condenser instead of the B train cables, thus rendering the A train of the Hydrogen Mitigation System inoperable. This resulted in the plant being in a condition prohibited by TS since the B train of the system was in the process of being modified and was inoperable at the time. Because the finding is of very low safety significance (Green) and is captured in the licensee's corrective action program as PIP M-03-01970, it is being treated as a self-revealing NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. Accordingly, it is being identified as NCV 05000369/2003003-001, Failure to Follow Maintenance Procedure for Hydrogen Mitigation System.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's control of plant risk and configuration, due to emergent or planned work activities, as related to 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. The inspectors also reviewed associated WOs and PIPs to verify the adequacy of planned and implemented corrective actions.

<u>PIP Number/ WO/Procedure</u>	<u>Title/Description</u>
98583701/98583703	Unit 1 downpower for main feedpump solenoid valve replacement (planned)
M-03-01725	Unit 1 annunciator power supply failure resulting in loss of annunciators on panels 1AD-3, 1AD-6, 1AD-7 (Reactor Coolant System, Chemical and Volume Control System, and Main Steam System Annunciators) (emergent).
WO 98585337	Unit 1 A and B Offsite Power Busline Transfer Trip Communication System failure and subsequent troubleshooting (emergent)
M-03-01879	Compensatory measures to reduce risk with Unit 1 B EDG and A Offsite Power Busline Communication System out-of-service (planned)
M-02-02290	Failure of the Unit 2 B EDG voltage regulatory relay (K-1) following replacement resulting in excess field current and extended EDG unavailability (emergent)
WO 98585799	Pump and valve maintenance on Unit 1 Train B KC and Residual Heat Removal (ND) Systems (planned)

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. 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>Reference</u>	<u>Title/Description</u>
M-03-01969	Unit 1 downpower to 45 percent RTP as a result of commencing a shutdown in accordance with TS LCO 3.0.3 when both trains of the Hydrogen Mitigation System were rendered inoperable on May 2, 2003
Complex Evolution	Unit 1 planned downpower to 40 percent RTP to perform main feed pump maintenance on April 18, and subsequent power ascension to 100% on April 20
M-03-02312	Unit 2 operators enter AP/2/A/5500/010, Reactor Coolant Leakage Within Capacity of Both NV Pumps, due to letdown relief valve (2NV-6) leaking

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. 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-03-00834	Nuclear Service Water (RN) System vacuum breaker (1RN-280) installed incorrectly and non-functional
M-03-01748	Unit 1 A EDG roofing modification incorrectly installed (past operability)
M-03-01711	A Train Control Room Area Ventilation Chiller (YC) condenser divider plate found shifted out of normal position
M-03-00990	KC relief valves (1/2KC-281) not sized for two phase flow
M-03-01055	Unit 2 A and B Motor-Driven Auxiliary Feedwater (CA) Pump motor start curve/time delay relay discrepancies due to curve re-analysis

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors evaluated the operator workaround described in Unit 1 Work Around (WA) 03-03 due to possible problems with the Unit 1 B auxiliary feed water pump flow isolation valve to the D steam generator (1CA42B) opening with the presence of differential pressure. The workaround established alternate methods to throttle auxiliary feed water flow during loss of instrument air or vital bus events. 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 affect on the operator's ability to implement abnormal or emergency procedures; and (3) if operator workaround problems were captured in the licensee's corrective action program. The inspectors reviewed the potential abnormal plant configurations and conditions to assess if the conditions could increase the likelihood of an initiating event or affect multiple mitigating systems and that implemented and planned licensee actions were appropriate to address the issue.

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 or accident. Aggregate impacts of the identified workarounds on each individual operator watch station were also reviewed.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT)

a. Inspection Scope

The inspectors reviewed PMT instructions and/or observed testing activities for the equipment listed 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. The inspectors also reviewed PIPs to verify the adequacy of planned and implemented corrective actions.

PIP or WO Number

Title/Description

WO 98593277

Repair Unit 1 upper containment airlock door interlocks

WO 98396626	Repair power cable to Unit 1 A train hydrogen ignitor system
M-03-01613	RN suction isolation valve (0RN-007A) from standby nuclear service water pond would not stroke closed from Units 1 or 2 control boards
WO 98600171	Repair Unit 2 B train EDG relay (K-1) associated with generator field circuit
WO 98602081	Repair Unit 1 over-power delta T Channel A erratic indication
M-03-02514	Repair RN supply isolation valve (1RN-166A) to the Unit 1 A CA pump motor cooler

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

.1 Routine Surveillance Testing

a. 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, 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</u>	<u>Title/Description</u>
PT/1/A/4250/004A	Turbine Valve Movement Test, Rev. 044
PT/1/A/4208/006	Leak Test for 1NS-161 and 1NS-163 (1A and 1B Containment Spray (NS) discharge check valves), Rev. 006
PT/2/A/4252/001B	Unit 2 B Motor-Driven Auxiliary Feedwater (CA) Pump Performance Test, Rev. 001B
PT/2/A/4600/001	Rod Cluster Control Assembly (RCCA) Movement Test, Rev. 026
PT/1/A/4150/001B	Reactor Coolant Leakage Calculation, Rev. 047

b. Findings

No findings of significance were identified.

.2 Inservice Surveillance Testing

a. Inspection Scope

The inspectors reviewed the results of Periodic Test PT/2/A/4209/801C, Standby Makeup Pump Flow Periodic Test, Rev. 032. 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 assessed whether corrective actions were taken as applicable.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP1 Exercise Evaluation

a. Inspection Scope

The inspectors reviewed the scope, objectives, and scenario for the biennial, full-participation 2003 emergency response exercise to verify that they were designed to suitably test major elements of the licensee's emergency plan in accordance with 10 CFR 50, Appendix E, Section IV.F.2.f requirements. During the period of May 12-15, 2003, the inspectors observed and evaluated the licensee's performance in the exercise, as well as selected activities related to the licensee's conduct and self-assessment of the exercise. On May 13, 2003, the inspectors observed the conduct of the exercise to ensure that employees of the licensee were familiar with their specific emergency response duties in accordance with 10 CFR 50, Appendix E, Section IV.F.1.(a). Licensee activities observed during the exercise included those occurring in the control room simulator (CRS), technical support center (TSC), operational support center (OSC), and emergency operations facility (EOF). The inspectors evaluation focused on the risk-significant activities of event classification, notification of governmental authorities, onsite protective actions, offsite protective action recommendations, and accident mitigation. The inspectors also evaluated command and control, the transfer of emergency responsibilities between facilities, communications, adherence to procedures, and the overall implementation of the emergency plan. The inspectors attended the post-exercise critique to evaluate the licensee's self-assessment process, as well as the presentation of critique results to plant management.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector reviewed changes to the Radiological Emergency Plan (REP) as contained in Revision 02-2, against the requirements of 10 CFR 50.54(q) to determine whether any of the changes decreased REP effectiveness.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed the licensee's emergency preparedness drill conducted on May 12, 2003. 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 monitored operator responses to the drill scenario and compared their actions to applicable Abnormal and Emergency response procedures. During the drill the inspectors assessed the adequacy of event classification and notification activities. The licensee's drill critique was also reviewed. The inspectors assessed the licensee's evaluation of 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

.1 Reactor Safety PI Verification

a. Inspection Scope

The inspectors reviewed data for the following three Reactor Safety PIs for Units 1 and 2 for the period of April 2002 through March 2003, to verify the accuracy of the PIs reported during that period. PI definition and guidance contained in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Indicator Guideline, Revision 2, were used while assessing the accuracy in reported data.

<u>Cornerstone</u>	<u>Performance Indicator</u>
Mitigating Systems	Safety System Unavailability-Auxiliary Feedwater System
Mitigating Systems	Safety System Unavailability-Emergency AC Power System
Barrier Integrity	Reactor Coolant System Leakage

To verify the PI data, the inspectors reviewed control room logs, Licensee Event Reports, TS Action Item Log entries, and maintenance rule data for the aforementioned time frame.

The inspectors also reviewed the licensee's corrective action system to assess the licensee's ability to identify and correct problems. This included PIP M-03-02733 which documented an inspector identified issue concerning unavailability when testing auxiliary feedwater pump suction pressure switches not included in performance indicator unavailability.

b. Findings

No findings of significance were identified.

.2 Emergency Preparedness PI Verification

a. Inspection Scope

The inspectors reviewed licensee records for the following PIs to determine whether the submitted PI values through the first quarter of 2003 were calculated in accordance with the guidance contained in Section 2.4 (Emergency Preparedness Cornerstone) of NEI 99-02, "Regulatory Assessment Performance Indicator Guideline, Revision 2."

- Emergency Response Organization (ERO) Drill/Exercise Performance
- ERO Drill Participation
- Alert and Notification System Reliability

The inspectors assessed the accuracy of the PI for ERO drill and exercise performance (DEP) over the past eight quarters through review of a sample of drill and event records. The inspector reviewed training records to assess the accuracy of the PI for ERO drill participation during the previous eight quarters for personnel assigned to key positions in the ERO. The inspector assessed the accuracy of the PI for the alert and notification system reliability through review of a sample of the licensee's records of the weekly low-growth and silent tests and quarterly full-cycle tests.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors selected PIPs for the annual sample review and performed in-depth reviews of these PIPs to determine whether conditions adverse to quality were addressed in a manner that was commensurate with the safety significance of the issue. The inspectors performed an in-depth review of the licensee's corrective actions associated with two Unit 1 EDG building roof fires (which occurred in April 2003 and June 2003) to assess the adequacy and timeliness of the corrective actions. The inspectors reviewed the actions taken in the PIPs selected to determine if the licensee had adequately addressed the following attributes:

- Complete, accurate, and timely identification of the problem
- Evaluation and disposition of operability and reportability issues
- Consideration of previous failures, extent of condition, generic or common cause implications
- Prioritization and resolution of the issue commensurate with the safety significance
- Identification of the root cause and contributing causes of the problem
- Identification and implementation of corrective actions commensurate with the safety significance of the issue

The following issues and associated corrective actions were reviewed:

- PIP M-02-4071, Unit 2 hydrogen dryer fire and unit shutdown
- PIP M-03-0543, Unit 1 B motor-driven CA pump discharge isolation to D steam generator (1CA42B) valve stem failure during testing
- PIP M-03-1748, Fire on roof of EDG 1A and PIP M-03-2611, Fire on roof of EDG 1A, a recurring problem

b. Findings

Introduction: A Green non-cited violation (NCV) was identified for inadequate corrective actions involving two fires that occurred on the Unit 1 EDG building roof when the EDG 1A was operated on two separate occasions subsequent to the installation of the new roofing materials per minor modification MGMM-13726.

Description: On April 15, 2003, following an EDG surveillance test, the licensee observed a smoldering fire on the Unit 1 EDG building roof directly above the EDG 1A exhaust. The licensee initiated PIP M-03-1748 to address this issue. The licensee had installed new roofing materials on the Units 1 and 2 EDG buildings in January 2003 per minor modification MGMM-13726. The licensee inspected the EDG 1A roof immediately after the fire and initially concluded that the fire occurred in the vicinity of the EDG 1A exhaust support 1-MCA-VN-H8 and the roof penetrations over the exhaust area. The fire was believed by the licensee to have been caused by the covers over the penetrations trapping the heat conducted from the EDG 1A exhaust line via the hangers which ignited the excess tar around the penetrations and the wood nailers. The

licensee's initial corrective actions involved removal of excessive tar and nailers in the immediate area of the hangers and removal of the covers. The licensee implemented building roof fire watches during EDG runs for both units. Work request (WR) 98275888 was implemented for EDG 1A on April 16, 2003, which removed the roofing materials from around the exhaust support and the penetrations above the exhaust area for EDG 1A. The licensee also initiated a root cause evaluation of the EDG 1A roof fire. The root cause evaluation report was due June 14, 2003. The building roof fire watches during EDG runs were stopped after surveillance runs on all four EDGs were completed with no adverse observations.

Prior to issuance of the root cause report (and its proposed corrective actions), another fire occurred on the roof of EDG 1A above the exhaust area following a surveillance test on June 11, 2003. The licensee initiated PIP M-03-2611 to address this second fire on the roof of EDG 1A. The inspectors concluded that the licensee's corrective actions specified in PIP M-03-1748 were not adequate to prevent reoccurrence of this second fire on the EDG 1A roof. The root cause evaluation, which was initiated after the first fire but was not completed prior to the second roof fire, concluded that the cause was a gap created by the settlement of the sloped missile barrier protecting the EDG exhaust. The report stated that when the EDG building was re-roofed in January 2003, this gap was covered with considerably thicker insulation causing sufficient heat to build up from the EDG exhaust line which resulted in high temperatures coming in contact with and igniting the new roof material. The corrective actions to prevent recurrence proposed in the root cause evaluation report included the following:

- Remove all roofing material from the EDG exhaust structure.
- Fill the entire gap with an appropriate fiber insulating material.
- Install flashing over the gap.
- Install flashing along the turbine building where it adjoins the EDG exhaust structure.
- Seal the EDG exhaust structure with an appropriate concrete sealer.

Analysis: The inspectors determined that this finding is greater than minor because it was associated with protection against one of the external factors (fire) attribute and affected the objective of the mitigating systems cornerstone to ensure the availability, reliability and capability of systems that respond to initiating events. In addition, this finding could have resulted in an unnecessary challenge to plant operators during response to initiating events requiring the EDGs for mitigation (i.e., loss of offsite power events). The additional challenge to operators could have resulted in reduced availability, reliability, and capability of the EDGs during these events. This finding was determined to be of very low safety significance because neither fire caused the EDG 1A to be inoperable.

Enforcement: Criterion XVI of 10 CFR 50, Appendix B, requires, in part, that the cause of significant conditions adverse to quality be identified and corrective actions taken to prevent reoccurrence. Inherent in this requirement is that the corrective actions are adequate and timely.

Contrary to the above, the licensee did not take adequate nor timely corrective actions to prevent a second fire from occurring on the roof of EDG 1A. The first fire occurred following EDG 1A operation for surveillance testing on April 15, 2003. Corrective

actions were completed on April 16, 2003, to address immediate fire concerns and to minimize fire reoccurrence issues. Prior to completion of the root cause and additional corrective actions, the posting of a fire watch during EDG operation was discontinued. The inspectors concluded that the immediate corrective actions were inadequate to prevent a second fire from occurring (following EDG 1A operation for surveillance testing) on June 11, 2003. This finding is identified as NCV 05000369/2003003-002, Corrective Actions Not Adequate to Prevent Second Fire From Occurring on the Roof of EDG 1A.

4OA3 Event Followup

- .1 Unit 1 A EDG Building Roof Fires: On April 15 and June 11, the licensee responded to reported fires on the Unit 1 EDG building roof following surveillance runs of the Unit 1 A EDG. The inspectors responded to the events and observed that the fires were relatively small in nature. The fires were the result of recently modified roofing materials smoldering/catching fire as a result of heating by the EDG exhaust line. For additional details see section 4OA2.2. The events were determined to be of very low safety significance because the fires did not affect the operability of the EDG. Therefore, the events did not warrant additional NRC response.
- .2 Unit 1 Entry into TS LCO 3.0.3: On May 2, 2003, operators entered TS LCO 3.0.3 and commenced a plant shutdown due to both trains of the Hydrogen Mitigation System being inoperable. This event was the result of a maintenance worker incorrectly cutting the power cables to the A Train hydrogen igniter, located in the ice condenser, while the B Train of the system was inoperable due to maintenance. The A Train was restored to an operable status prior to completing the shutdown (see Section 1R12 and 1R14 for additional details). The event was determined to be of very low safety significance due to the short time interval that the two trains were inoperable. Therefore, the event did not warrant additional NRC response.
- .3 Unit 1 and 2 Reactor Protection System Cable Routing: The licensee discovered that all four channels of the Units 1 and 2 Reactor Protection System were routed together through the respective Unit's ETA Switchgear Room and did not meet the separation criteria of 10CFR50, Appendix R. The licensee promptly established appropriate compensatory measures (continuous fire watch) for the apparent adverse condition. The inspectors toured the applicable fire areas and reviewed the licensee's compensatory measures (see 1R05 for additional details). The licensee made a 10CFR50.72 report as an unanalyzed condition significantly degrading plant safety. Because the cable routing was identified by NRC inspectors during a recent Triennial Fire Protection Inspection (see NRC Inspection Report 50-369, 370/03-07), and further follow-up of the issue would occur as a result of that inspection, no additional NRC response was warranted.
- .4 (Closed) Licensee Event Report (LER) 50-369/03-01: Failure of Refueling Water Storage Tank level instrumentation during cold weather due to sensing line heat trace and insulation deficiencies. NRC reviews of this event were previously documented in Inspection Report 50-369, 370/03-02. During the review, a violation of regulatory requirements was identified and documented as NCV 50-369/03-02-01, Failure to Follow Maintenance Procedure for FWST Level Instrument Freeze Protection System. No new information was identified during review of the LER. This LER is closed.

- .5 (Closed) Unresolved Item (URI) 50-369/03-02-04, Root Cause Determination for 1CA42 stem failure requiring Notice of Enforcement Discretion (NOED): This URI was identified to review the root cause of the stem failure to determine if Enforcement Actions were warranted for the identified condition. The inspectors reviewed the licensee's root cause and interviewed cognizant system engineers. The licensee determined that the cause for the stem failure was due to an overload condition due to failure of the limit and torque control functions of the actuator. The licensee found that the actuator controls' over-travel guide bar assembly (vendor supplied with the valve and actuator) had been improperly assembled and was a pre-existing condition prior to the maintenance performed on February 4, 2003. This, in combination with heating and distorting of an unannealed striker plate in a loaded condition, resulted in the over-travel guide bar binding which caused the actuator open limit function to fail. Torque protection failed due to the distorted striker plate losing engagement with the over-travel guide cam.

The heating of the striker plate was the result of a vendor approved procedure to correct part deficiencies (unannealed actuator add-on pack switch mechanisms) which were the subject of a 10 CFR Part 21 Notice. The unannealed striker plate deficiency was not the subject of any previous notices from the actuator's vendor. Based on work history review, the pre-existing condition of the over-travel guide bar assembly occurred prior to receipt of the valve/valve actuator assembly by the licensee. Additionally, the licensee performed receipt inspections and bench testing of the actuator which did not reveal any abnormalities with the improperly assembled over-travel guide bar assembly. Although there was an error in the valve weak link analysis provided by the valve vendor, the incorrectly set torque switch, utilized as a backup to protect the valve and operator, had no impact on the stem failure. This was because the above identified causes resulted in the valve operator's torque switch being bypassed during the valve's opening stroke. The inspector determined that none of the contributing causes for the stem failure were directly attributed to the licensee's performance. The inspector noted that there was an opportunity that the licensee could have detected the problem with the switch mechanism, when an intermediate valve position was indicated after the valve was stroked closed following the maintenance. However, the inspector judged that given the licensee's past experience with Rotork actuators, this indication alone should not have indicated a problem with the actuator that would have resulted in catastrophic failure of the valve/operator stem. This URI is closed

- .6 (Closed) Licensee Event Report (LER) 50-369/03-02: Operation Prohibited by Technical Specification 3.6.3 and 3.7.5 due to an Inoperable Auxiliary Feedwater System Valve for Greater than 72 Hours. Unresolved Item (URI) 50-369/03-02-04, Root Cause Determination for 1CA42 stem failure requiring Notice of Enforcement Discretion (NOED) was opened to review the causes of the valve stem failure. The inspectors determined that no Enforcement Actions against the licensee were warranted and the URI was closed as discussed in Section 4OA3.5. No new information was identified during review of the LER. This LER is closed.

40A5 Other

.1 Review of Independent Spent Fuel Storage Installation (ISFSI) Cask Loading

a. Inspection Scope

The inspectors reviewed a variety of activities associated with ISFSI cask 9 and 10 loading conducted throughout the inspection period. The inspectors reviewed cask loading procedures, reviewed pre-job briefing plans, walked portions of cask transport path (before and after), and observed planned contingencies that were in place for work activities in progress. The inspectors also reviewed the establishment of routine monitoring for the casks and periodically monitored the alarm status after cask loading was complete.

b. Findings

No findings of significance were identified.

.2 Licensed Operator Requalification

(Closed) URI 50-369/370/02-03-01: ND Auxiliary Spray Flow Requirement During Single NS Pump Operation and Suction Switchover from FWST to Recirculation on the Reactor Building Sump. This unresolved item (URI) identified a discrepancy that existed in the FSAR between a transient analysis and the system design of the Containment Spray System (NS). Emergency Operating Procedure "Transfer to Cold Leg Recirc", EP/1/A/5000/ES-1.3, could be impacted, if it were determined that (ND) auxiliary spray flow was required during single NS pump operation to mitigate the consequences of the peak containment pressure transient as outlined in Chapter 6 of the FSAR. Based on review of the licensee's UFSAR Change Summary Package No. 03-021 and Problem Investigation Process reports M-02-04726 and M-99-05166, the inspector concluded that, EP/1/A/5000/ES-1.3, provides adequate direction to ensure ND is providing the required auxiliary spray flow when shifting NS suction from the FWST to the Reactor building sump. The licensee has submitted a change to the UFSAR to provide clarification to the Peak Containment Pressure Transient input assumptions.

40A6 Meetings

Exit Meeting

The inspectors presented the inspection results to Mr. D. Jamil, Site Vice President, McGuire Nuclear Station, at the conclusion of the inspection on June 26, 2003. 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.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

Baily, D., Fire Protection/Civil Engineering
Bradshaw, S., Superintendent, Plant Operations
Bramblett, J., Chemistry Manager
Brandes, H., Consulting Engineer, General Office Fire Protection Program
Brenton, D., Shift Operations Manager
Bryant, J., Licensing Engineer
Caldwell, D., Inservice Inspection
Dolan, B., Manager, Safety Assurance
Evans, W., Security Manager
Geer, T., Manager, Mechanical and Civil Engineering (MCE)
Grass, F., Inservice Inspection
Harrall, T., Station Manager, McGuire Nuclear Station
Herrick, D., Civil Engineering Supervisor, MCE
Houser, D., Reactor Electrical Systems (RES) - Freeze Protection Coordinator
Jamil, D., Site Vice President, McGuire Nuclear Station
Loucks, L., Radiation Protection Manager
Moore, T., System Engineer
Murray, K., Emergency Preparedness Supervisor
Nesbitt, B., Civil Engineer
Oldham, J., Fire Protection Engineer, MCE-Civil
Patrick, M., Superintendent, Maintenance
Peele, J., Manager, Engineering
Robson, M., ISFSI Project Manager
Simms, N., Licensing Specialist
Sloan, H., RP Shift/Effluent Controls Supervisor
Stone, R., RES - Instrumentation & Controls
Thomas, J., Manager, Regulatory Compliance
Thomas, K., Manager, RES Engineering
Travis, B., Superintendent, Work Control
Williams, D., RES Supervisor

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000369/2003003-001	NCV	Failure to Follow Maintenance Procedure for Hydrogen Mitigation System (Section 1R12)
----------------------	-----	---

05000369/2003003-002 NCV Corrective actions not adequate to prevent second fire from occurring on the roof of EDG 1A (Section 4OA2.2)

Closed

50-369/03-01 LER Failure of Refueling Water Storage Tank level instrumentation during cold weather due to sensing line heat trace and insulation deficiencies (Section 4OA3.4)

50-369/03-02-04 URI Root Cause Determination for 1CA42 stem failure requiring Notice of Enforcement Discretion (NOED) (Section 4OA3.5)

50-369/03-02 LER Operation Prohibited by Technical Specification 3.6.3 and 3.7.5 due to an Inoperable Auxiliary Feedwater System Valve for Greater than 72 Hours (Section 4OA3.6)

50-369/370/02-03-01 URI ND Auxiliary Spray Flow Requirement during single NS pump operation and suction swapover from FWST to Recirculation on the Reactor Building Sump. (Section 4OA5.2)

Discussed

None

LIST OF DOCUMENTS REVIEWED

(Section 4OA1.2)

Radiological Emergency Plan, Revision 02-2

(Section 4OA2.2)

Work Requests (WR)

WR 98275888, Remove Flashing on 1A DG Exhaust, dated 4/15/03

WR 98275889, Remove Flashing and Flammable Material 1B DG Exhaust, dated 4/15/03

WR 98275890, Remove Flashing and Flammable Material 2A DG Exhaust, dated 4/15/03

WR 98275891, Remove Flashing and Flammable Material 2B DG Exhaust, dated 4/15/03

Problem Identification Process (PIP) Reports Reviewed

PIP M-03-1748, Fire on roof of EDG 1A

PIP M-03-2611, Fire on roof of EDG 1A, this is a recurring problem

Other Documents

Minor Modification MGMM-13726, Reroofing Project - Standby Shutdown Facility and Unit ½
 Diesel Generator Building Areas
 (Section 4OA5.2)

UFSAR Change Summary Package No. 03-021
 Problem Investigation Process Reports M-02-04726 and M-99-05166

LIST OF ACRONYMS

AP	-	Abnormal Procedure
ASME	-	American Society of Mechanical Engineers
CA	-	Auxiliary Feedwater
CFR	-	Code of Federal Regulations
EDG	-	Emergency Diesel Generator
FWST	-	Fueling Water Storage Tank
IMC		Inspection Manual Chapter
IR	-	Inspection Report
ISFSI	-	Independent Spent Fuel Storage Installation
KC	-	Component Cooling Water
LER	-	Licensee Event Report
LCO	-	Limiting Condition of Operation
MGMM		Modification Group Minor Modification
NCV	-	Non-Cited Violation
ND	-	Residual Heat Removal
NEI	-	Nuclear Energy Institute
NOED	-	Notice of Enforcement Discretion
NS	-	Containment Spray
NV	-	Chemical and Volume Control
PAR	-	Protective Action Recommendation
PI	-	Performance Indicator
PIP	-	Problem Investigation Process Report
PMT	-	Post-Maintenance Testing
PT	-	Periodic Test
RCCA	-	Rod Cluster Control Assembly
RN	-	Nuclear Service Water
RTP	-	Rated Thermal Power
SDP	-	Significance Determination Process
SSC	-	Structures, Systems, Components
TS	-	Technical Specifications
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
WA	-	Work Around
WO	-	Work Order
YC	-	Chilled Water