



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

April 23, 2009

Mr. Bruce H. Hamilton  
Vice President  
Duke Power Company, LLC  
d/b/a Duke Energy Carolinas, LLC  
McGuire Nuclear Station  
12700 Hagers Ferry Road  
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000369/2009002, 05000370/2009002, AND 07200038/2009001

Dear Mr. Hamilton:

On March 31, 2009, 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 April 8, 2009, with you 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.

This report documents one finding of very low safety significance (Green) which was determined to be a violation of NRC requirements and one finding categorized as a Severity Level IV violation under traditional enforcement. However, because of the very low safety significance and categorization at Severity Level IV, and because they were entered into your corrective action program, the NRC is treating these NRC-identified findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, to the 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.

Additionally, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the McGuire facility. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

DEC

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at [www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html) (the Public Electronic Reading Room).

Sincerely,

***/RA/***

Jonathan H. Bartley, Chief,  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos.: 50-369, 50-370, 72-038  
License Nos.: NPF-9, NPF-17

Enclosure: NRC Integrated Inspection Report 05000369/2009002, 05000370/2009002 and  
07200038/2009001 w/Attachment - Supplemental Information

cc w/encl: (See page 3)

DEC

2

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**/RA/**

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cc w/encl: (See page 3)

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Letter to Bruce H. Hamilton from Jonathan H. Bartley dated April 23, 2009

SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT  
05000369/2009002, 05000370/2009002, AND 07200038/2009001

Distribution w/encl:

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**U.S. NUCLEAR REGULATORY COMMISSION  
REGION II**

Docket Nos: 50-369, 50-370, 72-038

License Nos: NPF-9, NPF-17

Report Nos: 05000369/2009002, 05000370/2009002, and  
07200038/2009001

Licensee: Duke Power Company, LLC

Facility: McGuire Nuclear Station, Units 1 and 2

Location: 12700 Hagers Ferry Road  
Huntersville, NC 28078

Dates: January 1, 2009 through March 31, 2009

Inspectors: J. Brady, Senior Resident Inspector  
R. Eul, Resident Inspector  
S. Walker, Senior Reactor Inspector (4OA5.4)

Approved by: Jonathan H. Bartley, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR05000369/2009002, IR05000370/2009002, IR07200038/2009001; 1/1/2009 - 3/31/2009; McGuire Nuclear Station, Units 1 and 2; Licensed Operator Requalification, Other.

The report covered a three month period of inspection by two resident inspectors and one regional senior reactor inspector. One Green and one Severity Level IV non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). The cross cutting aspects were determined using IMC 0305. Findings for which the SDP does not apply may be Green or be assigned a severity level (SL) 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 (ROP), Revision 4, dated December 2006. The alpha-numeric reference to cross-cutting aspects are described in IMC 0305, "Reactor Oversight Process."

### Cornerstone: Mitigating Systems

- Green: The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for the failure to promptly correct a condition adverse to quality associated with the sharing of the nuclear service water system between units in abnormal operating procedures (APs). Specifically, the licensee had neither developed a safety analysis to demonstrate the safety of this activity nor revised the procedural steps that allowed sharing.

This finding is more than minor because it affected the availability, reliability, and capability of the Nuclear Service Water (RN) system (ultimate heat sink) and was related to the design control and procedure quality attributes of the Mitigating Systems cornerstone. In addition, this finding could be reasonably viewed as a precursor to a significant event (i.e., loss of RN on both units). The issue was determined to be of very low safety significance in IMC 0609 SDP Phase 1 screening based on the fact that it did not represent an actual loss of system safety function nor a loss of a single train of RN for greater than its Technical Specification allowed outage time, because the subject procedural steps of the APs had never been used. This finding has a cross-cutting aspect of corrective action in the area of Problem Identification and Resolution [P.1.d], because the licensee failed to take appropriate corrective action in a timely manner. The licensee plans to revise the procedure, complete a calculation to support the donating of one train of nuclear service water to the other unit when two trains are available from the donor unit, and perform an associated 10 CFR 50.59 review. (Section 1R11)

- SLIV: The inspectors identified a non-cited violation of 10 CFR 50.34(b)(2) for failing to include in the Updated Final Safety Analysis Report (UFSAR) a description and analysis of the separate accelerated sequencer function that loads the safety-related equipment onto the safety-related emergency A.C. power system buses using different criteria than the committed sequencer function described in the UFSAR.

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This issue is greater than minor because the failure to have a description of the accelerated sequencer function in the UFSAR had a material impact on licensed activities, in that any modifications to safety-related systems, such as the modification that removed the seal-in function from the control room chiller digital control system, would need to consider the interaction with the accelerated sequencer (in addition to the separate committed load sequencer) to ensure that risk significant equipment, as modified, would function as analyzed. This issue was treated as traditional enforcement, because it had the potential for impacting the NRC's ability to perform its regulatory function. It was characterized as a Severity Level IV violation, because the occurrence of the control room chiller failing to start (after being dropped by the accelerated load sequencer) when required by the committed load sequencer function during testing, had very low safety significance. This issue has a cross-cutting aspect of appropriate corrective action in the area of problem identification and resolution [P.1.(d)]. This aspect was chosen because the licensee recognized, as documented in a January 12, 2007 letter to the NRC, that there were content problems with the UFSAR and was in the process of trying to correct it. However, the inspectors could not find any completed interim corrective action documented in the licensee's corrective action program that would alert/caution UFSAR users that compensatory actions were needed in order to perform adequate evaluations such as for operability, reportability, or 10 CFR 50.59. The licensee intends to add the accelerated sequence function to the UFSAR and install seal-in functions for the affected load blocks in the accelerated sequence. (Section 4OA5.4)

## Report Details

### Summary of Plant Status:

Unit 1 began the inspection period at approximately 100 percent rated thermal power and remained there for the rest of the period.

Unit 2 began the inspection period at approximately 100 percent rated thermal power and remained there for the rest of the period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

#### 1R01 Adverse Weather Protection

##### .1 Severe Weather Condition (Actual)

###### a. Inspection Scope

On January 16, 2008, cold weather (freezing) was experienced on site. The inspectors reviewed the plant response to the conditions. The inspectors toured the plant site to assess the readiness of risk significant systems and verify that procedures PT/0/B/4700/038, Verification of Freeze Protection Equipment and Systems and PT/0/B/4700/070, On Demand Freeze Protection Verification Checklists, were implemented properly. The inspectors interviewed Operations, Maintenance and Engineering personnel regarding preparations and inspections performed prior to the arrival of the severe weather, adequacy of the operations procedures, and additional actions to be taken following the period of adverse weather. The documents reviewed during the inspection are listed in the Attachment to this report.

###### b. Findings

No findings of significance were identified.

##### .2 Flood Protection Measures - External

###### a. Inspection Scope

The inspectors walked down the outside portions of the plant which are susceptible to flooding from external sources, to determine whether the area configuration, features, and equipment functions were consistent with the descriptions and assumptions used in Updated Final Safety Analysis Report (UFSAR) Section 2.4.10, Flood Protection Requirements, and in the supporting basis documents listed in the Attachment to this report. In addition, the inspectors assessed whether emergency flooding procedures would achieve the desired actions and evaluated the implementation of preparation procedures. The documents reviewed during the inspection are listed in the Attachment to this report.

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b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed a partial walkdown of the four systems listed below to assess the operability of redundant or diverse trains and components when safety equipment was inoperable. The inspectors focused on discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, walked down control systems components, and determined whether selected breakers, valves, and support equipment were in the correct position to support system operation. The documents reviewed during this inspection are listed in the Attachment to this report.

- Unit 1, A train emergency diesel generator (EDG) when 1B EDG was out of service for maintenance on January 27, 2009
- Unit 2, B train safety injection (NI) system with 2A train out of service for maintenance on February 3, 2009
- Unit 2, A train EDG when 2B EDG was out of service for maintenance on February 17, 2009
- Unit 1, B train EDG when 1A EDG was out of service for maintenance on March 10, 2009

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors conducted a detailed review of the vital 125-volt DC system. To determine the correct system alignment, the inspectors reviewed the procedures, drawings, and the UFSAR. Items reviewed during the inspection included: (1) valves were correctly positioned, did not exhibit leakage, and were locked as required; (2) electrical power was available; (3) system components were correctly labeled, cooled, lubricated, ventilated, etc.; (4) hanger and supports were correctly installed and functional; (5) essential system support systems were functional; (6) system performance was not hindered by debris; and (7) tagging clearances were appropriate. To determine the effect of outstanding design issues on the operability of the systems the inspectors reviewed the operator workaround list, the temporary modification list, system health reports, and other outstanding items tracked by the engineering

department. In addition, the inspectors reviewed outstanding maintenance work requests/work orders and deficiencies that could affect the ability of the system to perform its function. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Fire Protection Walkdowns

a. Inspection Scope

The inspectors walked down accessible portions of the five plant areas listed below to determine if they were consistent with the UFSAR and the fire protection program for defense in depth features. The features assessed included the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire fighting equipment, and passive fire features such as fire barriers. The inspectors also reviewed the licensee's compensatory measures for fire deficiencies to determine if they were commensurate with the significance of the deficiency. The inspectors reviewed the fire plans for the areas selected to determine if they were consistent with the fire protection program and presented an adequate fire fighting strategy. The documents reviewed during this inspection are listed in the Attachment to this report.

- Unit 1 cable spreading room on 750 elevation (Fire Area 19)
- Unit 2 cable spreading room on 750 elevation (Fire Area 20)
- Unit 1 ETA switchgear room on 750 elevation (Fire Area 17)
- Unit 2 ETA switchgear room on 750 elevation (Fire Area 18)
- Main Control Room (Fire Area 24)

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification

a. Inspection Scope

On January 29, 2009, the inspectors observed operators in the plant's simulator during licensed operator requalification training to determine the effectiveness of licensed operator requalification training required by 10CFR55.59 and the adequacy of operator performance. The inspectors focused on clarity and formality of communication, use of procedures, alarm response, control board manipulations, group dynamics, and supervisory oversight. The inspectors observed the post-exercise critique to determine

whether the licensee identified deficiencies and discrepancies that occurred during the simulator training. The inspectors observed the shift crew's response to the scenario listed below. The documents reviewed during this inspection are listed in the Attachment to this report.

- Dropped Control Rod
- Loss of 4160V Bus
- Faulted Steam Generator
- Anticipated Transient without Scram with Safety Injection

The inspectors also reviewed Problem Investigation Process report (PIP) M-07-6207 to determine whether the licensee identified and implemented appropriate corrective actions to a previously identified operator training issue.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for the failure to promptly correct a condition adverse to quality associated with the sharing of the nuclear service water (RN) system between units in abnormal operating procedures (APs). Specifically, the licensee had neither developed a safety analysis to demonstrate the safety of this activity nor revised the procedural steps that allowed sharing.

Description: On February 18, 2009, the inspectors found that the licensee had not completed any corrective action to correct previously identified NCV 05000369,370/2008002-01. This NCV concerned the failure to establish and maintain adequate APs for the loss of RN (AP/1/A/5500/20, AP/2/A/5500/20) associated with the sharing of RN between units. This issue was identified in PIP M-07-6207 on December 5, 2007. Associated Inspection Report 05000369,370/2008002, identified that the licensee's UFSAR was submitted in accordance with Regulatory Guide 1.70, which indicates that the UFSAR shall include a failure analysis to demonstrate any safety implications related to sharing of the service water system (Section 9.2.1). In addition, the licensee's UFSAR section 3.1 commits to 10 CFR 50, Appendix A, General Design Criterion 5, which indicates that systems shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety function, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the other unit. The licensee did not have a safety analysis that showed that the procedural guidance to share the RN discharge safety trains between units would not significantly impair the operable RN system's ability to perform its safety function. As of February 18, 2009, the licensee had neither performed a safety analysis to demonstrate that sharing the RN discharge safety trains between units, per the AP, would not significantly impair the operable RN system's ability to perform its safety function, nor had revised the procedural steps that allowed sharing. The licensee plans to revise the procedure, complete a calculation to support the donation of one train of RN to the other unit when two trains are available from the donor unit, and perform an associated 10 CFR 50.59 review.

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Analysis: This finding is more than minor because it affected the availability, reliability, and capability of the RN system (ultimate heat sink), and was related to the design control and procedure quality attributes of the Mitigating Systems cornerstone. In addition, this finding could be reasonably viewed as a precursor to a significant event (i.e., loss of RN on both units). The issue was determined to be of very low safety significance (Green) in IMC 0609 SDP Phase 1 screening based on the fact that it did not represent an actual loss of system safety function nor a loss of a single train of RN for greater than its Technical Specification (TS) allowed outage time, because the subject procedural steps of the APs had never been used. This finding has a cross-cutting aspect of corrective action in the area of Problem Identification and Resolution (P.1.d), because the licensee failed to take appropriate corrective action in a timely manner.

Enforcement: 10CFR50, Appendix B, Criterion XVI, Corrective Action, requires that measures be established to assure that conditions adverse to quality such as deficiencies, deviations and nonconformances are promptly identified and corrected. Contrary to the above, from December 5, 2007, to February 18, 2009, the licensee failed to promptly correct a condition adverse to quality identified in PIP M-07-6207, and NCV 05000369,370/ 2008002-01, by failing to establish and maintain APs /1(2)/A/5500/20, Loss of RN, associated with the sharing of RN between units. More specifically, the licensee had neither performed a safety analysis to demonstrate that sharing the RN discharge safety trains between units, per the APs, would not significantly impair the operable RN system's ability to perform its safety function, nor had revised the procedural steps that allowed sharing. Although this violation involved untimely corrective action, it was dispositioned as an NCV in accordance with Section VI.A.1 of the Enforcement Policy because the reason for the violation, corrective actions to be taken, corrective actions that will be taken to avoid further violations, and date when full compliance will be achieved, were specifically documented by the licensee in PIP M-09-1381. This violation is identified as NCV 05000369,370/2009002-01, Failure to Correct a Condition Adverse to Quality associated with Abnormal Procedures for Loss of Nuclear Service Water.

## 1R12 Maintenance Effectiveness

### a. Inspection Scope

The inspectors reviewed the two samples listed below for items such as: (1) appropriate work practices; (2) identifying and addressing common cause failures; (3) adequacy of corrective actions; (4) scoping in accordance with 10 CFR 50.65(b) of the maintenance rule; (5) characterizing reliability issues against performance criteria; (6) trending key parameters for condition monitoring; (7) charging unavailability for performance; (8) classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and (9) appropriateness of performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2); and/or (10) appropriateness and adequacy of goals and corrective actions for SSCs/functions classified as (a)(1). For each item selected, the inspectors performed a detailed review of the problem history and surrounding circumstances, evaluated the extent of condition reviews as required, and reviewed the

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generic implications of the equipment and/or work practice problem. The documents reviewed during this inspection are listed in the Attachment to this report.

- Unit 1 and 2 component cooling water heat exchanger flow control valves
- Unit 1 and 2 hydrogen igniters

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 risk assessments and the risk management actions used to manage risk for the plant configurations associated with the five activities listed below. The inspectors assessed whether the licensee performed adequate risk assessments, and implemented appropriate risk management actions when required by 10CFR50.65(a)(4). For emergent work, the inspectors verified that any increase in risk was promptly assessed, that appropriate risk management actions were promptly implemented, and that work activities did not place the plant in unacceptable configurations.

- Emergent Yellow due to winter storm warning on January 19 that resulted in schedule changes
- Emergent work for week of February 9, including a repair of a 1B train hydrogen igniter, a 2C steam generator steam pressure channel 2 failure that required card replacement, and a standby shutdown facility diesel fuel oil day tank level switch malfunction (changed Unit 2 risk from green to yellow)
- Emergent work for February 18, when 2B EDG work was extended due to emergent problems which caused schedule rearrangement
- Emergent work for February 23, when an inadvertent start of the turbine-driven auxiliary feedwater caused schedule rearrangement
- Emergent work for March 27, replacing Unit 1 main feedwater pump control room operating stations due to inadvertent switching of pump control from auto to manual

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

For the seven PIPs documenting operability evaluations listed below, the inspectors evaluated the technical adequacy of the evaluations to determine whether TS operability was properly justified and the subject component or system remained available such that

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no unrecognized increase in risk occurred. The inspectors reviewed any compensatory measures taken for degraded SSCs to determine whether the measures were in-place and adequately compensated for the degradation such that operability was justified. For the degraded SSCs, or those credited as part of compensatory measures, the inspectors reviewed the UFSAR to determine whether the measures resulted in changes to the licensing basis functions, as described in the UFSAR, and whether a license amendment was required per 10CFR 50.59. Other documents reviewed during this inspection are listed in the Attachment to this report.

- M-08-7225, 1A Steam Generator Collector Bars have been found to be mis-positioned relative to the original design.
- M-09-0404, Vital battery charger EVCA output amps was observed to be swinging by plus/minus 5 amps
- M-09-0063, Accelerated sequencer function interaction with committed load sequencer function
- M-09-0073, Failure Modes Evaluation and Analysis on diesel generator load sequencer accelerated sequence circuitry
- M-09-0492, Electrical box 1ATB184 is not properly sealed.
- M-09-0538, Resistance reading for DC dielectric absorption test for 1A diesel generator were not recorded in maintenance procedure
- M-09-0569, Steps to crimp and inspect intermediate ferrule for the triax connector on power range N-41 are marked as non-applicable (N/A).

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

For the six maintenance tests listed below, the inspectors determined the safety functions described in the UFSAR and Technical Specification (TS) that were affected by the maintenance activity. The inspectors witnessed the post-maintenance listed and/or reviewed the test data to determine whether the test results adequately demonstrated restoration of the affected safety function(s). Other documents reviewed during this inspection are listed in the Attachment to this report.

- PT/1/A/4350/002B, Diesel Generator 1B Operability Test, after several planned maintenance tasks completed on January 27, 2009
- PT/2/A/4403/002A RN Train A Valve Stroke Timing – Quarterly, after planned maintenance on 2A NI Motor and Bearing Oil Coolers completed on February 3, 2009
- IP/0/A/3066/002N, Rotork Actuator Lubrication and Inspection, for valve cycling after planned maintenance was completed on 1ND-19A [suction valve to 1A Residual Heat Removal (ND) Pump from FWST] on February 9, 2009

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- PT/2/A/4350/002B, Diesel Generator 2B Operability Test, after replacement of fuel oil transfer line piping on February 18, 2009
- WO 01833506 and 01845872 for retesting 1KC-81B and 1KC-53B component cooling water valves after preventive maintenance was performed on February 24, 2009
- PT/1/A/4350/002A, Diesel Generator 1A Operability Test, after several planned maintenance tasks completed on March 11, 2009

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the seven surveillance test activities identified below, the inspectors witnessed testing and/or reviewed the test data, to determine if the SSCs involved in these tests satisfied the requirements described in the TSs, the UFSAR, and applicable licensee procedures, and that the tests demonstrated that the SSCs were capable of performing their intended safety functions. Other documents reviewed during this inspection are listed in the Attachment to this report.

Surveillance Tests

- PT/2/A/4350/002B, 2B Diesel Generator Operability Test
- IP/2/A/3207/007B, NIS Power Range N42 Detector Current Calibration
- PT/2/A/4350/023A, Hydrogen Mitigation Igniter Current Verification, Train A.
- PT/1/A/4350/002A, 1A Diesel Generator Operability Test
- PT/1,2/A/4150/001B, Reactor Coolant System Leakage Calculation

In-Service Tests

- PT/1/A/4204/002B, ND Train B Valve Stroke Timing – Quarterly
- PT/1/A/4204/001B, 1B ND Pump Performance Test

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

Resident inspectors evaluated the conduct of a routine licensee emergency drill on February 11, 2009, to identify any weaknesses and deficiencies in classification, notification, dose assessment and protective action recommendation development activities in accordance with 10CFR50, Appendix E. The inspectors observed emergency response operations in the simulated control room to determine whether

event classification and notifications were done in accordance with Emergency Plan Implementing Procedure RP/0/A/5700/000, "Classification of Emergency." The inspectors also attended the licensee critique of the drill to compare any inspector-observed weakness with those identified by the licensee in order to verify whether the licensee was properly identifying failures.

b. Findings

No findings of significance were identified.

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee data to confirm the accuracy of reported performance indicator (PI) data for the indicators during the four quarters of 2008. To determine the accuracy of the PI data reported during that period, the inspectors compared the licensee's basis in reporting each data element to the PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Indicator Guideline, Rev. 5.

Barrier Integrity Cornerstone

- Reactor Coolant System Specific Activity, Units 1 and 2

The inspectors compared the licensee-reported performance indicator data with records developed by the licensee while analyzing previous samples. The inspectors observed a chemistry technician take and analyze a Reactor Coolant System sample.

- Reactor Coolant System Leak Rate Performance Indicator, Units 1 and 2

The inspectors reviewed surveillance test records of measured reactor coolant system identified leakage and compared these calculations with TS limiting values. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed screening of items entered into the licensee's corrective action program. This was accomplished by reviewing copies of

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condition reports, attending some daily screening meetings, and accessing the licensee's computerized database.

## .2 Selected Issue Follow-Up Inspection

### a. Inspection Scope

The inspectors selected PIP M-08-6927 for detailed review. This PIP concerned required quality control inspections that were not completed during maintenance on October 11, 2008, related to nuclear service water containment isolation valve 1RN-253A. The inspectors reviewed this PIP to determine whether the licensee identified the full extent of the issue, performed an appropriate evaluation, and specified and prioritized appropriate corrective actions. In addition to PIP M-08-6927, the inspectors also evaluated similarly focused PIPs against the requirements of the licensee's corrective action program and implementing procedures, and 10 CFR 50, Appendix B. These documents are listed in the Attachment to this report.

### b. Findings

No findings of significance were identified. The inspectors determined that the licensee adequately evaluated the issue and took appropriate correct actions. The inspectors determined that the failure to complete the quality control inspections was a violation of Duke Work Process Manual 700 and Technical Specification 5.4.1. However, it was determined to be minor because the correct safety-grade parts were issued to support the maintenance on valve 1RN-253A, proper hardware was installed and torqued to the correct value, and all procedure steps were verified (peer checked) by qualified technicians. In addition, after the work was performed, valve 1RN-253A successfully completed a functional verification test, a valve stroke timing test and a leak rate test. Therefore, the failure to complete the quality control inspections constituted a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy.

## 40A3 Event Follow-up

### a. Inspection Scope

The inspectors reviewed the licensee's actions associated with the two Unit 1 events listed below. The inspectors observed plant parameters for mitigating systems, evaluated performance of systems and operators, and confirmed proper classification and reporting of the event.

- On February 20, 2009, at approximately 2:10 p.m., the 1D reactor coolant pump (RCP) seal injection took a step drop from about 7.5 gpm to about 4 gpm. The licensee used procedures AP-12, Loss of Letdown, Charging or Seal Injection, and AP-8, Malfunction of RCP, to respond to the decrease in seal injection. The licensee evaluated the parameter increases and developed a plan to open and flush the manual flow control valve to the 1D RCP seal injection. As a result, seal flow was returned to normal at approximately 11:00 p.m.

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- On February 23, 2009, at 4:06 a.m., an automatic start of the Unit 1 turbine-driven auxiliary feedwater pump occurred while placing a tagout for planned maintenance. The tagout removed power to the two steam admission valve solenoids, which caused the valves to open. The upstream steam isolation valves were not yet tagged shut. Operators responded to the turbine driven auxiliary feedwater pump start by reducing main generator output. Power was reduced to about 87 percent. The licensee made a 10CFR50.72 notification (#44869). On February 26, 2009, the licensee retracted the notification based on the fact that the actuation was not a valid Engineered Safeguards Feature signal.

b. Findings

No findings of significance were identified.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.2 World Association of Nuclear Operators (WANO) Report Review

The inspectors reviewed the field notes and final report issued by WANO for the peer review that was conducted at the McGuire facility during December 2008. The inspectors did not note any safety issues in the WANO Peer Review report that either warranted further NRC follow-up or that had not already been addressed by the NRC.

.3 Independent Spent Fuel Storage Installation (IP 60855.1)

a. Inspection Scope

The inspectors reviewed the Unit 1 documentation package for the casks listed below that were created using procedure XSM-006, Workplace Procedure for Selecting Spent Fuel for Use of NAC-UMS System at McGuire, and Regulatory Guide 3.54, Spent Fuel

Heat Generation, to verify that the selected fuel assemblies and burnable poison inserts met the requirements for insertion in dry cask storage.

- NAC-UMS TSC-MNZ-021 (Document Control NO MCEI 0400-174)
- NAC-UMS TSC-MNZ-022 (Document Control NO MCEI 0400-175)
- NAC-UMS TSC-MNZ-024 (Document Control NO MCEI 0400-176)
- NAC-UMS TSC-MNZ-023 (Document Control NO MCEI 0400-177)

The inspectors reviewed the cask loading verification video tapes for each of the above casks to verify that the alpha-numeric identification numbers stamped on the loaded fuel assemblies and burnable poison assemblies matched the identification numbers used in the documentation package, as required by procedure OP/0/A/6550/028, NAC UMS Fuel Assembly Loading/Unloading Procedure. The inspectors also reviewed the documentation package to determine whether the selected fuel assemblies met the TS and NAC-UMS FSAR requirements for dry storage. The casks were loaded on January 19, February 2, February 16, and March 2, 2009, respectively. The inspectors reviewed selected licensee activities as specified in procedure MP/0/A/7650/212, Loading Spent Fuel Assemblies into NAC-UMS Casks, to verify that activities were being accomplished in accordance with procedural requirements. The documents reviewed during this inspection are listed in the Attachment to this report. The inspectors reviewed the documentation for the most recent crane inspections for the 125 ton spent fuel building main crane to determine whether the inspections were current and had been adequately completed.

b. Findings

No findings of significance were identified.

.4 (Closed) Unresolved Item (URI) 05000369,370/2008005-02, Accelerated Sequencer not Described in the UFSAR

Introduction: The inspectors identified a SL IV NCV of 10CFR 50.34(b)(2) for failing to include in the UFSAR a description and analysis of the separate accelerated sequencer function that loads the safety-related equipment onto the safety-related emergency A.C. power system buses using different criteria than the committed sequencer function described in the UFSAR.

Description: While reviewing Unit 1, Train A, engineering safeguard features test deficiency data on October 22, 2008, the inspectors identified that the accelerated sequencer function was not described in the UFSAR. The licensee's UFSAR commits to Regulatory Guide (RG) 1.70, Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants, Revision 1 and 3, for the format and content of the UFSAR. RG 1.70, Revision 1, Section 8.3.1.1 states that, "those portions of the onsite A.C. power system that are not related to safety need only be described in sufficient detail to permit an understanding of their interactions with the safety-related portions. The description of the safety-related portion should include: ... (8) automatic loading and stripping of buses." The inspectors' review concluded that the accelerated sequencer function can

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sequentially load safety equipment (partitioned into load groups) onto the safety buses (ETA and ETB) from the safety-related emergency A.C. power system during design basis accidents described in UFSAR Chapter 15. This accelerated sequencer function will automatically energize the next safety load group, after 2 seconds, if the emergency A.C. bus voltage and diesel engine speed recover to values of approximately 92.5% and 97%, respectively. If after energizing certain safety load groups, either the bus voltage or diesel speed permissive is no longer met, the accelerated sequencer function may drop out the start signal, as it did for one test deficiency associated with the failure of the control room chiller to start in the time described in the UFSAR. The licensee performed an operability evaluation under PIP M-09-0063 and concluded that all load blocks except load blocks 2 and 10 had seal-in relays in the sequencer that do not allow the start signal to drop out. This review determined that the only load off of load blocks 2 and 10 that would be affected by the current configuration was the control room chiller. The inspectors' review of this operability evaluation concluded that the reason that no other loads were affected was that all loads on load blocks 2 and 10, other than the chiller, had separate seal-in functions at the downstream loads. Prior to a modification that upgraded the chiller controller, the chiller had a separate seal-in feature as well. The licensee generated PIPs M-08-6767, M-09-0063, and M-09-0373 to address this issue. The licensee intends to add the accelerated sequence function to the UFSAR and install seal-in functions in the sequencer for load block 2 and 10 in the accelerated sequence.

Analysis: This issue is important because the accelerated sequencer function interfaces with the safety-related emergency A.C. power system and with the safety-related equipment for which the A.C. power system provides power. Because the accelerated sequencer function interfaces with safety-related equipment used to mitigate UFSAR chapter 15 initiating events, and had the common cause potential to affect multiple mitigating systems and components, this issue had the potential to affect risk. The issue is greater than minor because the failure to have a description of the accelerated sequencer function in the UFSAR had a material impact on licensed activities, in that any modifications to safety-related systems, such as the aforementioned upgrade to the control room chiller digital control system, would need to consider the interaction with the accelerated sequencer to ensure that high risk significant equipment, as modified, would function as analyzed. This issue was treated as traditional enforcement, because it had the potential for impacting the NRC's ability to perform its regulatory function. It was characterized as a Severity Level IV violation, because the occurrence of the control room chiller failing to start (after being dropped by the accelerated load sequencer) when required by the committed load sequencer function during testing, had very low safety significance. This issue has a cross-cutting aspect of appropriate corrective action in the area of problem identification and resolution [P.1.(d)]. This aspect was chosen because the licensee recognized, as documented in a January 12, 2007, letter to the NRC, that there were content problems with the UFSAR and was in the process of trying to correct it. The inspectors reviewed PIP M-08-4383, which included a high level apparent cause (completed on October 16, 2008) on UFSAR content problems based on NCV 05000369,370/2008003-01. One of the apparent causes identified by the licensee was that corrective actions to prevent recurrence were not adequate. Specifically, the apparent cause documents numerous cases of previous PIP corrective actions that could have addressed the UFSAR content problems that were deleted. In addition, the apparent cause identified that corrective actions for a 2006 PIP (M-06-3620) to make

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programmatic changes to address the UFSAR content issue and conduct training on the change still had not been completed. Additionally, it identified that “interim corrective action was considered that would have covered the time between the procedure revision and the completion of the training; however, it was decided not to distribute the interim guidance and wait for training to be completed.” Independently, the inspectors also could not find any interim corrective action documented in the licensee’s corrective action program that would alert/caution UFSAR users that compensatory actions were needed in order to perform adequate evaluations such as for operability, reportability, or 10 CFR 50.59.

Enforcement: 10 CFR 50.34(b)(2) requires that the Final Safety Analysis Report (FSAR) include information on the description and analysis of structures, systems, and components, to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to safety evaluations. McGuire UFSAR Chapter 1 commits to adopting RG 1.70, Rev. 1 and 3, to implement the content requirement of 10 CFR 50.34(b)(2) for the FSAR. RG 1.70 Rev. 1, section 8.3.1.1 requires that the onsite A.C. power system be described with emphasis on those portions of the systems that are safety-related. Those portions of the onsite A.C. power system that are not related to safety need only be described in sufficient detail to permit an understanding of their interactions with the safety-related portions. The description of the safety-related portion should include: ... (8) automatic loading and stripping of buses. Contrary to the above, McGuire UFSAR section 8.3.1, Onsite AC Power Systems, describes the onsite AC power systems, including the load sequencer and the load block loading times, but has never described the separate accelerated sequencer function that loads the safety-related equipment onto the safety-related emergency A.C. power system buses using different criteria. This issue is in the licensee’s corrective action program as PIPs M-08-6767, M-09-0063, and M-09-0373. The failure to have an adequate FSAR for the accelerated load sequencer function as required by 10 CFR 50.34(b)(2) is characterized as a SL IV violation under traditional enforcement and is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 0500369,370/2009002-02, Failure to Adequately Describe the Load Sequencer Function in the FSAR.

.5 (Closed) Temporary Instruction (TI) 2515/176, EDG TS Surveillance Requirements Regarding Endurance and Margin Testing

Inspection activities for TI 2515/176 were previously completed and documented in Inspection Report 05000369,370/2008004, and this TI is considered closed at McGuire Nuclear Station; however, TI 2515/176 will not expire until August 31, 2009. The information gathered while completing this temporary instruction was forwarded to the Office of Nuclear Reactor Regulation for review and evaluation.

40A6 Meetings, Including Exit

On April 8, 2009, the resident inspectors presented the inspection results to Mr. B. Hamilton and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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## **SUPPLEMENTAL INFORMATION**

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened and Closed**

05000369,370/2009002-01	NCV	Failure to Correct a Condition Adverse to Quality Associated with Abnormal Procedures for Loss of Nuclear Service Water (Section 1R11)
05000369,370/2009002-02	NCV	Failure to Adequately Describe the Load Sequencer Function in the FSAR (Section 4OA5.4)

#### **Closed**

05000369,370/2008005-02	URI	Accelerated Sequencer not Described in the UFSAR (Section 4OA5.4)
2515/176	TI	EDG TS Surveillance Requirements Regarding Endurance and Margin Testing (Section 4OA5.5)

### **KEY POINTS OF CONTACT**

#### **Licensee**

Ashe, K., Manager, Regulatory Compliance  
Black, D., Security Manager  
Bradshaw, S., Training Manager  
Brewer, D., Manager, Safety Assurance  
Capps, S., Manager, Engineering  
Crane, K., Regulatory Compliance  
Hamilton, B. Site Vice President, McGuire Nuclear Station  
Hicks, J., Superintendent, Maintenance  
Mooneyhan, S., Radiation Protection Manager  
Nolin, J., Manager, Mechanical and Civil Engineering  
Parker, R., Superintendent, Work Control  
Repko, R., Station Manager, McGuire Nuclear Station  
Scott, W., Chemistry Manager  
Simril, T., Superintendent, Plant Operations  
Snider, S., Manager, Reactor and Electrical Systems Engineering

#### **NRC personnel**

J. Thompson, Project Manager, NRR  
R. Carroll, Senior Project Engineer, RII

## DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

PT/0/B/4700/038, Verification of Freeze Protection Equipment and Systems  
PT/0/B/4700/070, On Demand Freeze Protection Verification Checklist  
UFSAR Sections 2.4 and 3.4  
MCS-1465.00-00-0012, Design Basis Specification for Flooding From External Sources, Rev 1

### **Section 1R04: Equipment Alignment**

#### Partial System Walkdown

Emergency Diesel Generator 1A:

Drawing MCFD-1609-04.00, Flow Diagram of the Diesel Generator Starting Air System  
Drawing MCFD-1609-03.00, Flow Diagram of the Diesel Generator Engine 1A Fuel Oil System  
Drawing MCFD-1609-02.00, Flow Diagram of the Diesel Generator Engine Lube Oil System  
Drawing MCFD-1609-01.00, Flow Diagram of the Diesel Generator Engine Cooling Water System  
Safety Injection (NI) 2B:

Drawing MCFD-2562-01.00 Flow Diagram of Safety Injection System  
Drawing MCFD-2562-02.00 Flow Diagram of Safety Injection System  
Drawing MCFD-2562-03.00 Flow Diagram of Safety Injection System

Emergency Diesel Generator 2A:

Drawing MCFD-2609-04.00, Flow Diagram of the Diesel Generator Starting Air System  
Drawing MCFD-2609-03.00, Flow Diagram of the Diesel Generator Engine 2A Fuel Oil System  
Drawing MCFD-2609-02.00, Flow Diagram of the Diesel Generator Engine Lube Oil System  
Drawing MCFD-2609-01.00, Flow Diagram of the Diesel Generator Engine Cooling Water System

Emergency Diesel Generator 1B:

Drawing MCFD-1609-04.00, Flow Diagram of the Diesel Generator Starting Air System  
Drawing MCFD-1609-03.01, Flow Diagram of the Diesel Generator Engine 1B Fuel Oil System  
Drawing MCFD-1609-02.01, Flow Diagram of the Diesel Generator Engine Lube Oil System  
Drawing MCFD-1609-01.01, Flow Diagram of the Diesel Generator Engine Cooling Water System

#### Detailed System Walkdown:

LER 2007-01

PIP M-06-1907, M-06-5905, M-07-5588, M-08-2689, M-08-2694

UFSAR Chapters 7 and 8

MCS-105.18-EPL-0001 Rev. 8, Design Basis Specification for 125-Volt DC

MCC 1381.05-00-0230, Voltage Drop on 125-Volt DC Vital I&C Power System

System health report for 125-Volt DC system

### **Section 1R05: Fire Protection**

McGuire Nuclear Station IPEEE Submittal Report dated June 1, 1994

McGuire Nuclear Station Supplemental IPEEE Fire Analysis Report dated August 1, 1996

MCS-1465.00-00-0008, R9, Design Basis Specification for Fire Protection

McGuire fire protection pre-plan diagrams for inspected areas

PIPs initiated from this inspection: M-09-1783 & 1851, MCR fire strategy deficiency; M-09-1616, cable spreading room fire strategy deficiency

**Section 1R11: Licensed Operator Requalification**

McGuire Simulator Exercise Guide SRT-080  
 AP/1/A/5500/014, Rod Control Malfunction  
 AP/1/A/5500/007, Loss of Electrical Power  
 AP/1/A/5500/001, Steam Leak  
 AP/1(2)/5500/20, Loss of RN  
 EP/1/A/5000/E-0, Reactor Trip or Safety Injection  
 EP/1/A/5000/FR-S1, Response to Nuclear Power Generation/ATWS  
 EP/1/A/5000/E-2, Faulted Steam Generator  
 PIP M-07-0816

**Section 1R12: Maintenance Effectiveness**

PIP M-09-0770

**Section 1R15: Operability Evaluations**

BWC calculations MCC1201.37-00-0082 and MCC 1201.37-00-0029  
 IP/0/A/2005/001, Diesel Generator Inspection and Ground Wall Repair  
 IP/0/A/3007/020A, NIS Crimp-on Triax Connector Maintenance

**Section 1R19: Post-Maintenance Testing**

PIP initiated from this inspection: M-09-1278

**Section 1R22: Surveillance Testing**

PT/1/A/4150/001B, Reactor Coolant System Leakage Calculation for 3/11/09  
 PT/2/A/4150/001B, Reactor Coolant System Leakage Calculation for 3/11/09  
 PIPs reviewed: M-99-3926, M-04-3317, M-05-779  
 TS 3.4.13 and bases  
 SLC 16.9.7 and bases  
 PIPs initiated from this inspection: M-09-1307

**Section 4OA1: Performance Indicator Verification**

Autolog entries for 2008 that record identified leakage values.  
 Chemistry primary sample dose equivalent Iodine records for 2008  
 PIPs initiated from this inspection: M-09-1060

**Section 4OA2: Identification and Resolution of Problems**

Work Process Manual (WPM) 700, Execute the Work Process  
 PIP M-06-0345  
 PIP M-06-2095  
 PIP M-06-4477

PIP M-06-4760  
 PIP M-07-4003  
 PIP M-07-5094  
 PIP M-08-6927  
 PIP M-08-6992

### **Section 40A5.3: Independent Spent Fuel Storage Installation**

MCEI 0400-174, McGuire Nuclear Station, Cask MNZ-021, Load 1-11(31)  
 MCEI 0400-175, McGuire Nuclear Station, Cask MNZ-022, Load 1-12(32)  
 MCEI 0400-176, McGuire Nuclear Station, Cask MNZ-024, Load 1-13(33)  
 MCEI 0400-177, McGuire Nuclear Station, Cask MNZ-023, Load 1-14(34)  
 NAC-UMS Technical Specifications  
 NAC-UMS FSAR  
 Procedure OP/0/A/6550/028, NAC UMS Assembly Loading/Unloading Procedure  
 Work Order 01807038 01, Spent Fuel Pool Crane Annual Inspection  
 Work Order 01842115 01, Spent Fuel Pool Crane Quarterly Inspection  
 IP/0/B/3262/001, Overhead Cranes and Hoists Electrical Inspection and Maintenance  
 MP/0/A/7700/096, Quarterly/Annual Inspection and Servicing Of Overhead and Gantry Cranes  
 UFSAR 18.2.7

### **LIST OF ACRONYMS**

EDG	-	Emergency Diesel Generator
FSAR	-	Final Safety Analysis Report
NCV	-	Non-Cited Violation
ND	-	Residual Heat Removal
NI	-	Safety Injection
PI	-	Performance Indicator
PIP	-	Problem Investigation Process report
RCP	-	Reactor Coolant Pump
RG	-	Regulatory Guide
RN	-	Nuclear Service Water
SDP	-	Significance Determination Process
SSC	-	Structures, Systems and Components
TI	-	Temporary Instruction
TS	-	Technical Specifications
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
WANO	-	World Association of Nuclear Operators