



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

January 12, 2004

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  
05000369/2003005 AND 05000370/2003005**

Dear Mr. Peterson:

On December 13, 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 December 18, 2003, 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 NRC identified finding of very low safety significance (Green). The finding was determined to be a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you deny this non-cited violation, 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, 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

NRC's document 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  
License Nos. NPF-9, NPF-17

Enclosure: NRC Integrated Inspection Report 05000369/2003005 and 05000370/2003005,  
w/Attachment - Supplemental Information

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NAME	RCarroll	JBrady	SWalker	MMorgan	SSchaeffer	SVias	DJones
DATE	1/12/2004	1/12/2004	1/12/2004	1/12/2004	1/12/2004	1/12/2004	1/12/2004
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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-369, 50-370

License Nos: NPF-9, NPF-17

Report Nos: 05000369/2003005 and 05000370/2003005

Licensee: Duke Energy Corporation

Facility: McGuire Nuclear Station, Units 1 and 2

Location: 12700 Hagers Ferry Road  
Huntersville, NC 28078

Dates: September 14 - December 13, 2003

Inspectors: J. Brady, Senior Resident Inspector  
S. Walker, Resident Inspector  
M. Morgan, Senior Resident Inspector - North Anna (Sections 1R12, 1R15, 1R19, and 1R20)  
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D. Jones, Resident Inspector - Robinson (Sections 1R20 and 1R22)  
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P. Fillion, Reactor Inspector (Section 4OA5.1)

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

Enclosure

## SUMMARY OF FINDINGS

IR05000369/2003-005, IR05000370/2003-005; 09/14/2003 - 12/13/2003; McGuire Nuclear Station, Units 1 and 2; Maintenance Risk Assessment and Emergent Work Evaluation

The report covered a three month period of inspection by resident inspectors and announced inspections by four regional engineering inspectors and two senior project engineers. One Green non-cited violation (NCV) was 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: Mitigating Systems

- Green. A non-cited violation (NCV) was identified by the inspectors for failure to perform an adequate risk assessment as required by 10 CFR 50.65(a)(4) when the 1B motor-driven auxiliary feedwater pump containment isolation valve for the 1D steam generator (1CA42B) was closed to perform maintenance on October 14, 2003 (Section 1R13).

This finding was considered to be more than minor because the inadequate risk assessment resulted in the assignment of an incorrect risk action level (color) for this maintenance activity. This finding was considered to be of very low safety significance because had the error not occurred the only additional action required would have been management awareness of the additional risk associated with the activity.

### B. Licensee-Identified Violations

None.

## REPORT DETAILS

### Summary of Plant Status:

Unit 1 operated at approximately 100 percent rated thermal power (RTP) during the inspection period.

Unit 2 began the inspection period shutdown in a refueling outage. Unit 2 was taken critical on October 5, went on-line October 6, and reached 100 percent power on October 11. The unit remained at approximately 100 percent RTP for the rest of the period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors reviewed the licensee's implementation of adverse weather preparation in regard to forecasted adverse weather associated with hurricane Isabel from September 17 to 18, 2003. The inspectors verified the licensee implemented proper pre-established measures for forecasted high wind conditions. The inspectors performed walkdowns of the outside plant areas and roofs of accessible safety-related structures. Temporary outage structures were verified to be either tied down or in process of being removed. The inspectors also reviewed the licensee's outage activities to assess whether key activities associated with components utilized during loss of offsite power events, such as the emergency diesel generators (EDGs), were being monitored to maximize their availability during the adverse weather conditions.

When a tornado warning was predicted for the site on November 19, 2003, the inspectors reviewed actions taken by the licensee in accordance with procedure RP/0/A/5700/006, Natural Disasters, prior to the onset of that weather, to ensure that the adverse weather conditions would neither initiate a plant event nor prevent any system, structure, or component (SSC) from performing its design function.

After the licensee completed preparations for seasonal low temperature, the inspectors walked down the auxiliary feedwater (CA) system and the fueling water storage tank (FWST). This equipment was selected because their safety related functions could be affected by adverse weather (freezing conditions). The inspectors observed plant conditions and evaluated those conditions using criteria documented in procedure IP/0/B/3250/059, Preventive Maintenance and Operational Check of Freeze Protection.

The inspectors also reviewed the following Problem Investigation Process (PIPs) documents associated with this area to verify that the licensee identified and implemented appropriate corrective actions.

PIPs

- M-02-05786, NRC Audit of Freeze Protection Found Discrepancies in Monthly and Annual Heat Trace Procedures
- M-03-00352, FWST Level Channel Failed Due to Freezing
- M-03-00491, Operator Workarounds Due to FWST Level Channel Freezing
- M-03-01580, FW System Requires "A(1)" Maintenance Status

b. Findings

No findings of significance were identified.

1R04 Equipment Alignmenta. Inspection ScopePartial System Walkdowns

During this inspection period, the inspectors performed the following three partial system walkdowns, when, as applicable, the indicated SSCs were out of service for maintenance and testing:

- Unit 2 Spent Fuel Pool Cooling with the core fully unloaded in the spent fuel pool
- Unit 1A Diesel Generator with 1B Diesel Generator out of service on October 14
- Unit 1 train A Residual Heat Removal with train B out of service on November 12

To evaluate the operability of the selected trains or systems under these conditions, the inspectors verified correct valve and power alignments by comparing observed positions of valves, switches, and electrical power breakers to the procedures and drawings listed in the Attachment to this report.

Complete System Walkdown

The inspectors conducted a detailed review of the alignment and condition of the Residual Heat Removal (ND) system. To determine the proper system alignment, the inspectors reviewed the procedures, drawings, and Updated Final Safety Analysis Report (UFSAR) sections listed in the Attachment to this report. In addition, significant events data in the industry was reviewed to ascertain any similarities to McGuire SSCs. The inspectors walked down the system, to verify that the existing alignment of the system was correct. Items reviewed during the walkdown included the following:

- Valves are correctly positioned and do not exhibit leakage that would impact the function(s) of any given valve.
- Electrical power is available as required.
- Major system components are correctly labeled, lubricated, cooled, ventilated, etc.
- Hangers and supports are correctly installed and functional.
- Essential support systems are operational.
- Ancillary equipment or debris does not interfere with system performance.

- Tagging clearances are appropriate.
- Valves are locked as required by the licensee's locked valve program.

The inspectors reviewed the documents listed in the Attachment to this report, to verify that the ability of the system to perform its function(s) would not be affected by outstanding design issues, temporary modifications, operator workarounds, adverse conditions, and other system-related issues. In addition the inspectors also reviewed the associated PIPs listed in the attachment to this report to verify that the licensee identified and implemented appropriate corrective actions.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

For the six areas identified below , the inspectors reviewed the licensee's control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures, to verify that those items were consistent with UFSAR Section 9.5.1, Fire Protection System, and Design Basis Specification for Fire Protection, MCS-1465.00-00-0008. The inspectors walked down accessible portions of each area and reviewed results from related surveillance tests, as well as reviewed the associated pre-fire plan strategy, to verify that conditions in these areas were consistent with descriptions of the areas in the Design Basis Specification. Documents reviewed during this inspection are listed in the Attachment to this report.

The inspected areas included:

- Portions of the Unit 2 containment structure during No Mode work activities (fire area containment)
- Unit 2 safety-related switchgear rooms (fire area 18 )
- Main control room (fire area 24)
- Unit 2 motor-driven CA pump room (fire area 3)
- Unit 2 turbine-driven CA pump room (fire area 3A)
- 120 volt vital AC instrument and electrical area (fire area 13)

b. Findings

No findings of significance were identified.

## 1R06 Flood Protection Measures

### a. Inspection Scope

#### External Flooding

The inspectors assessed the licensee's flooding mitigation plan and equipment maintenance program to determine if they were risk informed and consistent with design requirements. This review entailed: (1) potential flooding affects from probable maximum flooding on the Auxiliary Building (AB); (2) potential flooding affects of cable trenches, cable pits, and manholes; (3) potential failure of the Auxiliary Feedwater Storage Tanks (CAST) and flooding of the Turbine Building, Diesel Generator Area, and Yard. The inspectors reviewed the operator actions credited in the analysis to verify that the desired results could be achieved using the plant procedure listed in the Attachment to this report.

In addition, the inspectors walked down accessible manholes or reviewed digital photographs taken during licensee inspections of manholes that contain safety-related cables that are subject to flooding. This was to verify that cables and associated support equipment described in UFSAR Sections 2.4.10, Flooding Protection Requirements, and 8.3.1.2.37, Underground Raceway Design, were not damaged by submergence and would perform their intended function.

#### Internal Flooding

The inspectors walked down the cable spreading rooms for both units and reviewed operating experience to verify safe shutdown equipment in lower elevations would not be affected by potential leaks from cracks in the floor. In addition, the inspectors assessed the licensee's mitigating actions for a service water (RN) line break in the CA pump room to verify that the area configuration, features, and equipment functions were consistent with the descriptions and assumptions used in UFSAR section 3.6.A.6, Flooding Analysis, and in the supporting basis documents listed in the Attachment to this report. Maintenance and testing records were examined to ensure necessary instrumentation and equipment was available and reliable and within Technical Specifications (TS) requirements where applicable. The inspectors reviewed the operator actions credited in the analysis, to verify that the desired results could be achieved using the plant procedure listed in the Attachment.

### b. Findings

No findings of significance were identified.

## 1R07 Heat Sink Performance

### a. Inspection Scope

#### Biennial Inspection

For the three RN cooled heat exchangers identified below, the inspectors reviewed the documents listed in the Attachment to this report to verify that testing, inspection/maintenance, or monitoring of biotic fouling controls were adequate to ensure proper heat transfer. The inspectors reviewed the heat exchanger test and inspection records to verify that testing and inspection methods were as described in the licensee's response to Generic Letter 89-13, Service Water System Problems Affecting Safety Related Equipment. The inspectors verified that test/inspection results were trended, that degrading trends were identified in the corrective action program, and that corrective actions were taken to restore acceptable performance when trends were identified. The inspectors reviewed the design documents listed in the Attachment to this report to verify that the actual heat exchanger condition related to tube plugging was within the bounds of the design documents. The inspectors determined whether the assumed design temperatures, flow rates, and heat transfer factors were being verified through testing and inspection, and whether current performance met the design.

- Unit 2 component cooling water heat exchangers (RN on tube side)
- Unit 2 diesel generator engine cooling water heat exchangers (RN on tube side)
- Unit 2 containment spray heat exchangers (RN on shell side)

The inspectors reviewed the performance of the ultimate heat sink and sub-components by reviewing their availability. The inspectors' review of the ultimate heat sink involved review of service water pond dam inspection records and performance of a walkdown, review of main dam inspection records, and assessment of pump and valve performance with the licensee system and component engineers to verify that the heat sink and components were available and accessible to perform their heat sink function. The inspectors reviewed PIPs for the last two years associated with RN to determine whether any specific trends existed that were not being acted on by the licensee. For the PIPs listed in the Attachment to this report, the inspector reviewed corrective actions to determine if they were adequate and to determine if the problems had recurred.

### b. Findings

No findings of significance were identified.

## 1R08 Inservice Inspection Activities

### .1 Inservice Inspection (ISI)

#### a. Inspection Scope

The inspectors observed in-process Unit 2 ISI work activities and reviewed selected ISI records. The observations and records were compared to the TS and ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition, no Addenda, to verify compliance. In

addition, nondestructive examination (NDE) procedures for the below listed ISI examination activities were reviewed. The licensee did not conduct examination of steam generator U-tubes during the current outage. Examination results with recordable indications and pressure boundary welding activities were not available for review. Qualification and certification records for examiners, and equipment for selected examination activities were reviewed. In addition, a sample of ISI issues in the licensee's corrective action program were reviewed for adequacy. The following Unit 2 ISI activities were reviewed:

- Liquid Penetrant (PT) exams of weld numbers 2ND2FW16-21 and 2ND2F-367 on the 12 inch diameter residual heat removal piping located in the elevation 716 auxiliary building pipe chase.
- Ultrasonic Examination (UT) of weld numbers 2ND2FW16-21 and 2ND2FW16-22 on the 12-inch diameter residual heat removal piping located in the elevation 716 auxiliary building pipe chase. Witnessed calibration of equipment for examination of dissimilar metal welds.
- Radiographic films (RT) for weld numbers 2RHR-2A-2-3 & 2RHR-2A-3-4.
- Work record for repair/replacement of three pipe supports.
- Results of visual inspections performed on 11 pipe supports.

b. Findings

No findings of significance were identified.

.2 Containment Vessel Inspection

a. Inspection Scope

The inspectors examined interior and exterior sections of the steel containment vessel (SCV) and reviewed selected records. The observations and records were compared to the TS, ASME Boiler and Pressure Vessel Code, Article IWE of Section XI, 1992 Edition and 1992 Addenda, as modified by 10 CFR 50.55a(b)(2)(vi).

The inspectors reviewed the licensee's ISI procedures for containment inspection to verify the procedures complied with the above listed requirements and specified acceptance criteria. The inspectors examined the accessible interior surfaces of the SCV in the pipe chase area (elevation 725) and at elevation 752 between azimuths 105 to 122 degrees in the seal table area, and the exterior surfaces of the SCV between elevations 725 and 735 between azimuths 349 to 180 degrees. The inspectors also reviewed records documenting visual inspection of the SCV and moisture barriers to verify that the ISI activities were conducted in accordance with program requirements and the acceptance criteria specified in the licensee's procedures. The inspectors also reviewed records documenting results of UT measurements to determine thickness of the SCV in February, 1999 and during the September 2003 outage to satisfy applicable requirements of the TS and ASME Section XI.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On October 22, the inspectors observed licensed-operators during requalification simulator training for shift C, to verify that operator performance was consistent with expected operator performance, as described in Exercise Guide OP-MC-SRT-26 and 27. This training tested the operators' ability to perform abnormal and emergency procedures dealing with load rejection, rod control malfunctions, reactor trip, safety injection, grid disturbances, loss of electrical power, and safety injection termination. 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 verify that the licensee identified deficiencies and discrepancies that occurred during the simulator training.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the four degraded SSC/function performance problems or conditions listed below, to verify the licensee's appropriate handling of these performance problems or conditions in accordance with 10CFR50, Appendix B, Criterion XVI, Corrective Action, and 10CFR50.65, Maintenance Rule.

- Erratic steam generator level control/feedwater control
- Maintenance on main steam supply to auxiliary equipment valve actuator 2SA-49 actuator resulted in additional damage to mechanical yoke stop and instrument tubing (PIP M-03-4726)
- Repetitive failure of standby shutdown facility (SSF) steam generator 1C level indication
- Lightning induced damage/loss of SSF battery charger SDSP-2

The inspectors focused on the following:

- Appropriate work practices
- Identifying and addressing common cause failures
- Scoping in accordance with 10 CFR 50.65(b)
- Characterizing reliability issues (performance)
- Charging equipment unavailability (performance)

- Trending key parameters (condition monitoring)
- 10 CFR 50.65(a)(1) or (a)(2) classification and reclassification, and
- Appropriateness of performance criteria for SSCs/functions classified (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified (a)(1).

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 six 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 also verified that any increase in risk was promptly assessed, and that appropriate risk management actions were promptly implemented. The inspectors also reviewed associated PIP M-03-5178, Unrecognized yellow risk condition entered due to valve 1KC-394A going closed, to verify that the licensee identified and implemented appropriate corrective actions:

- Emergent work activities associated with Work Order (WO) 98620247, failure of containment spray (NS) valve 1NS12B limit switch (add on pack set up)
- Emergent work activities on October 6, which involved: RN water system alignment changes to reduce 1B reactor coolant (NC) pump stator temperature and 2A component cooling (KC) heat exchanger service water side differential pressure increase; a wrong unit human error for mis-positioning of a Unit 1 service water valve; and the effects on 1A diesel generator operability from the special service water alignment for the KC heat exchanger.
- Scheduled work activities on Unit 1 for October 14 involving maintenance on the 1B diesel generator and maintenance on the auxiliary feedwater containment isolation valve for the 1D steam generator (1CA42B)
- Scheduled work activities on Unit 1 for the week of October 20, including Craighead off-site power line switchyard work and emergent work on the 1A NC pump thermal barrier component cooling water outlet isolation valve (1KC-394).
- Scheduled work activities for November 13, which included 2B CA pump testing and emergent work for a super flush of the side of the A train control room ventilation chiller. The super flush made the Unit 1 RN system train A inoperable, but available, and had interactions with Unit 2 that caused the licensee to delay the Unit 2 auxiliary feedwater testing.

- Scheduled work activities for November 19 which included work on the Unit 1 fuel handling building train B exhaust fan motor, 1A CA pump slave start test, 1A charging pump oil gauge replacement and calibration, and 7300 protection cabinet 2 testing. An emergent tornado warning resulted in risk management actions being taken to delay some of the planned work.

b. Findings

Introduction: A Green non-cited violation (NCV) was identified for failure to perform an adequate risk assessment when the 1B motor-driven auxiliary feedwater pump containment isolation valve for the 1D steam generator (1CA42B) was closed to perform maintenance.

Description: The inspectors discovered, on October 14, that the licensee failed to adequately evaluate the risk of isolating the auxiliary feedwater supply to the 1D steam generator from the 1B motor-driven auxiliary feedwater pump. The valve was closed and power removed on October 14, at 4:23 a.m., and was declared operable after maintenance at 5:42 a.m., on October 15. The risk assessment assumed that the flow path to the 1D steam generator through valve 1CA42B was functional for the entire period of maintenance. Consequently, the risk assessment underestimated the risk and resulted in a green code for this activity instead of a yellow code.

Analysis: Operator logs indicated that during the time valve 1CA42B was unavailable, the 1B emergency diesel generator was also unavailable for planned maintenance on October 14 from 4:15 a.m. until 7:01 p.m. It was returned to a functional status at 4:24 p.m. The 1B EDG activity was coded as yellow. Consequently, the coding of 1CA42B as yellow would have added a second yellow until the EDG became available, and would have been the only yellow until the valve was returned to functional. This issue was considered to be more than minor in the mitigating system cornerstone because the inadequate risk assessment resulted in the identification of an incorrect risk action level (color). This issue was considered to be of very low safety significance because had the error not occurred the only additional action required would have been management awareness of the additional risk associated with the activity.

Enforcement: 10 CFR 50.65(a)(4) requires that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, on October 14, the licensee failed to properly assess the increase in risk from isolating the auxiliary feedwater supply to the 1D steam generator from the 1B motor-driven auxiliary feedwater pump in that the licensee's risk assessment assumed that the function was available when it was not. Consequently, the risk assessment was inaccurate. The failure to have an adequate risk assessment as required by 10 CFR 50.65(a)(4) is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy and is identified as NCV 05000369/2003005-01: Inadequate Risk Assessment For 1CA42B Out-of-service. This issue is in the licensee's corrective action program as PIP M-03-5115.

1R14 Personnel Performance During Nonroutine Plant Evolutionsa. Inspection Scope

During the non-routine evolutions associated with Unit 2 plant startup from refueling outage, the inspectors observed plant instruments and operator performance to verify that operator performance was in accordance with procedure OP/2/A/6100/003, Controlling Procedure for Unit Operations, and related training.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluationsa. Inspection Scope

The inspectors reviewed the five operability determinations associated with the PIPs listed below. The inspectors assessed the accuracy of the evaluations, the use and control of any necessary compensatory measures, and compliance with the TS. The inspectors verified that the operability determinations were made as specified by Nuclear System Directive (NSD) 203, Operability. The inspectors compared the arguments made in the determination to the requirements in TS, the UFSAR, and associated design-basis documents, to verify that operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred.

- M-03-2668 Evaluate settlement of the 1A EDG exhaust missile barrier
- M-03-4260 Unit 2 in mast sipping failed to identify suspect fuel defect
- M-03-2861 Unanalyzed thermal transient on Unit 2 pressurizer power operated relief valve (PORV) piping and components
- M-03-5405 Low magnitude pressure surge occurred when valve 2RN-162B was closed during service water flush of supply lines to the auxiliary feedwater system (also PIP M-01-01573, previous similar occurrence)
- M-03-5055 Unit 2 pressurizer PORV piping temperatures lower than assumed in previous operability evaluation

b. Findings

No findings of significance were identified.

1R16 Operator Work-Aroundsa. Inspection Scope

The inspectors reviewed the cumulative effects of the operator work-arounds listed in the attachment to this report, to verify that those effects would not increase an initiating event frequency, affect multiple mitigating systems, or affect the ability of operators to respond in a correct and timely manner to plant transients and accidents.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testinga. Inspection Scope

For the post-maintenance tests listed below, the inspectors witnessed the test and/or reviewed the test data, to verify that test results adequately demonstrated restoration of the affected safety function(s) described in the UFSAR and TS. The tests included the following:

- PT/2/A/4350/002A, Diesel Generator 2A Operability Test (outage maintenance)
- PT/2/A/4350/002B, Diesel Generator 2B Operability Test (outage maintenance)
- PT/2/A/4401/013, KC to NC pump Flow Balance Test (repair of various KC valves)
- PT/2/A/4403/005A, RN Train 2A Head Curve Verification (repair of various RN components and 2A pump bearing repair)
- OP/2/A/6200/009, Adjustment of Accumulator Pressures (reseating of C cold leg accumulator check valve 2NI-81)
- PT/2/A/4204/005B, ND Train B Valve Stroke Timing - Shutdown (replacement of 2ND-15B actuator)

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activitiesa. Inspection Scope

The inspectors evaluated licensee outage activities to verify that the licensee considered risk in revising outage schedules, adhered to administrative risk reduction methodologies they developed to control plant configuration, adhered to operating license and TS requirements that maintained defense-in-depth, and developed mitigation strategies for losses of the key safety functions identified below:

- Decay heat removal
- Inventory control

- Power availability
- Reactivity control
- Containment

The inspectors observed the items or activities described below, to verify that the licensee maintained defense-in-depth commensurate with the outage risk control plan for key safety functions and applicable TS when taking equipment out of service. The inspectors reviewed the licensee's responses to emergent work and unexpected conditions to verify that resulting configuration changes were controlled in accordance with the outage risk control plan, and to verify that control room operators were kept cognizant of plant configuration.

- Clearance Activities
- Reactor Coolant System (RCS) Instrumentation
- Electrical Power
- Decay Heat Removal (DHR)
- Spent Fuel Pool Cooling
- Inventory Control
- Reactivity Control
- Containment Closure

The inspectors also observed fuel handling operations (insertion) and other ongoing activities including Control Rod Latching, to verify that those operations and activities were being performed in accordance with TS and approved procedures. Additionally, the inspectors observed refueling activities to verify that the location of the fuel assemblies was tracked, including new fuel, from core offload through core reload.

Prior to mode changes and on a sampling basis, the inspectors reviewed system lineups and/or control board indications to verify that TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant configurations. Also, the inspectors periodically reviewed RCS boundary leakage data, and observed the setting of containment integrity, to verify that the RCS and containment boundaries were in place and had integrity when necessary. Prior to reactor startup, the inspectors walked down containment to verify that debris has not been left which could affect performance of the containment sumps. The inspectors reviewed reactor startup and unit synchronization to the grid to verify procedure compliance and that systems performed as designed. The inspectors reviewed reactor physics testing results to verify that core operating limit parameters were consistent with the design.

Periodically, the inspectors reviewed the items that had been entered into the licensee's corrective action program, to verify that the licensee had identified problems related to outage activities at an appropriate threshold and had entered them into the corrective action program. For the significant problems documented in the corrective action program and listed on the Attachment to this report, the inspectors reviewed the results of the licensee's investigations to verify that the licensee had determined the root cause

and implemented appropriate corrective actions, as required by 10CFR50, Appendix B, Criterion XVI, Corrective Action.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the surveillance tests identified below, the inspectors witnessed testing and/or reviewed the test data, to verify that the systems, structures, and components involved in these tests satisfied the requirements described in the Technical Specifications, the UFSAR, and applicable licensee procedures, and that the tests demonstrated that the SSCs were capable of performing their intended safety functions.

- PT/2/A/4350/004A, 2A D/G [Diesel Generator] Periodic and Load Sequencer Test
- PT/2/A/4200/009 A, Engineered Safety Features Actuation Periodic Test Train A, on September 26
- PT/2/A/4200/009 B, Engineered Safety Features Actuation Periodic Test Train B, on September 27
- SM/0/A/8510/006, Ice Condenser Intermediate Deck Doors Inspection and Corrective Maintenance
- PT/0/A/4200/032, Periodic Inspection of Ice Condenser Lower Inlet Doors
- PT/2/A/4403/001A, 2A RN Pump Performance Test\*
- PT/2/A/4252/001A, 2A CA Pump Performance Test\*
- PT/2/A/4200/001 N, VP Valve Leak Rate Test\*\*

\* This procedure included inservice testing requirements.

\*\* This procedure included testing of a large containment isolation valve.

The inspectors reviewed associated PIP M-03-2880, Cylinder 1 on Unit 2 A EDG exhibited low exhaust temperature for one minute during 24 hour run, to verify that the licensee identified and implemented appropriate corrective actions.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications described in the McGuire Temporary Modifications (MGTM) listed below, to verify that the modifications did not affect the safety functions of important safety systems, and to verify that the modifications satisfied the requirements of 10CFR50, Appendix B, Criterion III, Design Control.

- MGTM-0302, Leak repair pipe cap for 2NI-465, unit 2 NV to 2B NC cold leg high point vent valve
- MGTM-0306, Bypass FWST trench sump pump high level cutoff switch until new switch arrives.

The inspectors also reviewed tag outs open on December 10, 2003, to verify that tag outs were not being used to implement temporary modifications.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification

a. Inspection Scope

For the performance indicators (PIs) listed below, the inspectors sampled licensee PI data for the period from July 2002 through September 2003. To verify the accuracy of the PI data reported for both units 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. 2.

Mitigating Systems Cornerstone

- Safety System Unavailability, High Pressure Safety Injection

The inspectors reviewed Licensee Event Reports, records of inoperable equipment, and Maintenance Rule records, to verify that the licensee had adequately accounted for unavailability hours that the subject systems had experienced during the previous four quarters. The inspectors also reviewed the number of hours those systems were required to be available and the licensee's basis for identifying unavailability hours. In addition, the inspectors interviewed licensee personnel associated with the PI data collection, evaluation, and distribution.

Integrity Cornerstone

- Reactor Coolant System Specific Activity

The inspectors observed licensee sampling and analysis of reactor coolant system samples, and compared the licensee-reported performance indicator data with records developed by the licensee while analyzing previous samples. The inspectors also reviewed the following PIPs associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- M-03-05536, 3 Primary Chemistry Samples Analyzed With Incorrect Sample Times, dated 11/12/03
- M-03-05686, Chemistry HPRC Procedure Benchmarking Project, dated 11/12/03

b. Findings

No findings of significance were identified

4OA2 Problem Identification and Resolution

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 a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing hard copies of each condition report, attending daily screening meetings, and accessing the licensee's computerized database.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 50-369, 370/2003007001: Fire Suppression System for Dedicated Shutdown Areas Not in Accordance with 10 CFR 50, Appendix R, Section III.G.3

This URI was opened pending evaluation of whether a backfit was warranted to require that the existing partial suppression capability be expanded to whole area suppression. Though the URI writeup describes the partial suppression system in Fire Area 4, the report alludes to other III.G.3 areas with similar partial suppression.

The inspector used the significance determination process to determine the change in risk that would result from expanding the existing suppression system from partial coverage to area wide coverage. This analysis indicated no significant difference in risk between the normal suppression and degraded suppression cases. Hence, the inspector concluded that backfitting to provide area wide suppression was not warranted. This analysis considered the worst case of post-fire shutdown with only the standby shutdown system available. Both the transient worksheet and the loss of nuclear service water worksheets were evaluated. Insights gained from this analysis, which focused on Fire Area 4, led to the conclusion that the same result would be obtained for any auxiliary building III.G.3 area at McGuire. This is primarily due to the small difference in initiating event likelihood between the normal suppression and degraded suppression cases and the relatively low likelihood values. There were only three other III.G.3 areas. Two were the cable spreading rooms which had misty fog type suppression systems. The other was the control room, which is a generic exception to the requirement to have a fixed suppression system.

.2 Reactor Pressure Vessel Lower Head Penetration Nozzle Inspection

a. Inspection Scope (TI 2515/152)

The inspectors observed activities associated with the inspection of the Unit 2 reactor vessel lower head penetrations in response to NRC Bulletin 2003-02. The guidelines for the inspection are provided in NRC temporary instruction (TI) procedure 2515/152, "Reactor Pressure Vessel (RPV) Lower Head Penetration Nozzle Inspection" (NRC Bulletin 2003-02).

The inspection included review of nondestructive examination (NDE) procedures, assessment of NDE personnel training and qualification, and observation and assessment of Remote Visual (VT) examinations. Discussions were also held with contractor representatives and other licensee personnel. The inspectors reviewed results of the licensee's 100% Bare Metal Visual (BMV) and VT examination. The inspectors also performed a visual inspection of the lower head to verify items on the video tape prior to licensee cleaning of the lower head. The activities and documents listed below were examined to verify licensee compliance with regulatory requirements and gather information to help the NRC staff identify possible further regulatory positions and generic communications.

Specifically, the inspectors reviewed and observed:

- MP/0/A/7150/165, "Rx Vessel Bottom Head Bare Metal Inspection," Rev 0
- MP/0/A/7700/080, "Inspection, Evaluation and Cleanup of Boric Acid on Plant Materials."
- QAL-15, "Inservice Inspection (ISI) Visual Exam, VT-2, Pressure Test," Rev 20.
- PIP M-03-04004 U2 Rx Vessel Bottom Head Bare Metal Inspection Results
- PIP M-03-04096 Count Room Analysis of Smear Samples
- Video results of VT-2 exam of U2 Rx Bottom Head Inspection

b. Findings

TI 2515/152 Reporting Requirements:

1.1 Was the examination performed by qualified and knowledgeable personnel?

The Bare Metal Visual (BMV) examination of the reactor vessel (RV) lower head was conducted by certified visual inspectors to QAL-15, "Inservice Inspection (ISI) Visual Exam, VT-2, Pressure Test." The qualification documentation for the Level II & Level III VT-2 personnel performing the inspection was verified. The inspectors also reviewed the inspection standards, acceptance criteria, calibration requirements of the camera and lighting, the resolution and sensitivity requirements for the inspection equipment. The inspectors found that the licensee's inspection personnel were very knowledgeable with the requirements in all of these areas.

1.2 Was the examination performed in accordance with demonstrated procedures?

The inspectors reviewed the applicable inspection procedures and verified they had been reviewed and approved through the licensee's procedure review process.

The Bare Metal Visual (BMV) examination was performed in accordance with licensee procedure number MP/0/A/7150/165, "Rx Vessel Bottom Head Bare Metal Inspection."

- 1.3 Was the examination able to identify, disposition, and resolve deficiencies?

The inspectors reviewed the procedures controlling the 100% Bare Metal VT-2 examination techniques and determined that they provided adequate guidance to ensure that they would be able to identify, disposition and resolve relevant deficiencies in the RV lower head penetration materials.

- 1.4 Was the examination capable of identifying pressure boundary leakage and/or RPV lower head corrosion as described in BL 2003-02?

Based upon review of the results for the BMV examination, procedures, qualifications, appropriate lighting, and sensitivity requirements, the inspectors determined that the licensee was capable of identifying and dispositioning pressure boundary leakage and boric acid corrosion, if present.

- 2.0 What was the condition of the reactor vessel lower head (debris, insulation, dirt, boron from other sources, physical layout, viewing obstructions)?

Prior to the RPV lower head inspection all the insulation was removed, and the reactor vessel bottom head was entirely accessible for the BMV inspection. Minor boron deposits and metal corrosion were identified on the bottom reactor vessel and incore guide tubes. In all cases there were visible leak tracks running down the side of the vessel that originated from previous cavity seal and sandbox cover seal leaks. Each of the 58 penetrations was videoed twice, one pass from each side. The combination of the two passes provided a complete 360 degree view of each penetration. No significant boron buildup at the annular areas around the bottom mounted instrumentation (BMI) penetrations was found that would indicate a leakage. The inspectors did not see any "popcorn" type boric acid crystals surrounding the penetrations. There was no wastage, corrosion or cracks that needed repair. The inspection results were documented in PIP M-03-04004, U2 Rx Vessel Bottom Head Bare Metal Inspection Results, 09/07/2003. The inspectors reviewed the video of the bottom head inspection to verify the licensee's inspection results, and held discussions with the appropriate engineering and examination staff.

- 3.0 Could small boron deposits, as described in the bulletin, be identified and characterized?

With the available lighting on the remote visual equipment and the clarity of the picture, the inspectors were able to verify that the boric acid present on the bottom head would not mask any indications of penetration leakage. Boron deposits, as described in the bulletin, could have been readily identified and characterized.

- 4.0 What materiel deficiencies (associated with the concerns identified in the bulletin) were identified that required repair?

There was no wastage, corrosion or cracks that needed repair. The licensee was planning to conduct an additional BMV examination upon completion of hydro-cleaning the reactor vessel bottom head. This will provide the licensee with appropriate baseline documentation for future inspections.

- 5.0 What, if any, impediments to effective examinations were identified.

There were no significant items that could impede effective examinations. The licensee was able to inspect 360 degrees around each of the 58 lower head penetration nozzles.

- 6.0 Did the licensee perform appropriate follow-up examinations for indications of boric acid leaks from pressure-retaining components above the RPV lower head?

The Licensee was aware of cavity seal leaks from previous outages. The licensee plans to hydro-clean the bottom vessel head in order to establish a baseline visual inspection record for any future BMV examinations.

The licensee obtained residue samples at various locations on the reactor bottom vessel head, and performed an isotopic analysis. The results verified the source of the deposits to be from past cavity seal leaks greater than 18 months old. These results are described in PIP M-03-04096, Count Room Analysis of Smear Samples.

#### 4OA6 Meetings, Including Exit

On December 18, 2003, the resident inspectors presented the inspection results to Mr. G. Peterson and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

D. Black, Security Manager  
S. Bradshaw, Superintendent, Plant Operations  
J. Bramblett, Chemistry Manager  
S. Brown, Manager, Engineering  
K. Crane, Technical Specialist  
B. Dolan, Manager, Safety Assurance  
K. Evans, Manager, Mechanical and Civil Engineering (MCE)  
T. Harrall, Station Manager, McGuire Nuclear Station  
B. Johanson, SSF System Engineer  
R. Kirk, Plant Systems Engineer - PI  
L. Loucks, Radiation Protection Manager  
R. Parker, Superintendent, Maintenance  
G. Peterson, Site Vice President, McGuire Nuclear Station  
P. Smith, Maintenance Rule Engineer  
J. Thomas, Manager, Regulatory Compliance  
K. Thomas, Manager, RES Engineering  
B. Travis, Superintendent, Work Control  
R. Branch, QA/QTeam Leader  
J. Bryant, Regulatory Compliance  
D. Caldwell, Inservice Inspection  
F. Grass, Inservice Inspection

#### NRC personnel

R. Haag, Chief, Reactor Projects Branch 1

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

#### Opened and Closed

50-369/03-05-01	NCV	Failure to perform an adequate risk assessment for removing from service the auxiliary feedwater isolation valve to the 1D steam generator (Section 1R12)
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#### Closed

50-369, 370/03-07-01	URI	Fire Suppression System for Dedicated Shutdown Areas Not in Accordance with 10 CFR 50, Appendix R, Section III.G.3 (Section 4OA5)
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#### Discussed

None

## LIST OF DOCUMENTS REVIEWED

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

#### Procedures:

IP/0/B/3250/059, Preventive Maintenance and Operational Check of Freeze Protection, Rev. 15  
 IP/1/B/3050/013C, FWST Area Temperature Loop Calibration, Rev. 4  
 IP/0/B/3250/059A, Monthly Check of Freeze Protection, Rev. 14,15

#### Work Orders:

98585977, Freeze Protection Heat Trace Inspection, dated 8/29/03  
 98618219, U2 High Temp Normal Heat Trace Control Board Replacement, dated 11/12/03  
 98289914, U2 Re-Terminate T/C Input Wiring for HT Control, dated 11/19/03  
 98617629, U1 High Temp Normal Heat Trace Control Board Replacement, dated 11/12/03  
 98289648, U2 Heat Trace Panel Channel 2 Alarm dated 9/13/03  
 98606092, Redesign FWST Heat Trace System U2 (Work Order Report), dated 9/4/03  
 98585977, Inspect Heat Trace, (Work Order Report), dated 10/30/03

#### PIPs Generated During This Inspection

M-03-05700, Determine If SSF Duct Heaters Needed for Freeze Protection and PM'd  
 M-03-05696, Area Heaters for U1 FWST Instrument Room Not Listed in IP/0/B/3250/095

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

#### Partial System Walkdown

Spent Fuel Cooling System Drawing MCFD 1570-01.01

Diesel Generator Engine Flow Diagrams: MCFD-1609-03, Fuel Oil System;  
 MCFD-1609-01, Cooling Water System; MCFD-1609-04, Starting Air System;  
 MCFD-1609-02, Lubricating Oil System

Residual Heat Removal Flow Diagram: MCFD-2561-01.00

#### Complete System Walkdown

Procedure OP/2/A/6200/004, Residual Heat Removal , Revision 071  
 Training OP-MC-PS-ND, "Residual Heat Removal (ND) Lesson Plan", Revision 29  
 Design Basis Specification -MCS-1561.ND-00-0001, "ND System", Revision 8  
 Drawing MCFD-2561-01.00, "Flow Diagram of ND System", Revision10  
 UFSAR section 6.3, "Emergency Core Cooling System"  
 UFSAR section 5.5.7, " Residual Heat Removal "

WR 98623147 2NDPS5040: Top Left T-Valve Has Leak  
 WR 98624377 2NDTE7500: Reinstall Upper Thermocouple  
 WR 98618960 2NDTE7500: Check Upper Bearing T/C  
 WR 98618403 2ND-19A: Replace Add-On Pack of Actuator

PIP M-03-04545, Miniflow Recirc via 2ND-68A has decreased from 667 to 587 gpm  
 PIP M-03-02170, 2NDPS 5040 Locking Screw for Low Switch Found Stripped  
 PIP M-01-04677, 1/2ND-14,29, & 34 Present Special System Vulnerabilities  
 PIP M-03-01236, Operating Experience Evaluation of IN 2003-03, Part 21 Inadequately Staked  
 Capscrew Renders Residual Heat Removal Pump Inoperable

IN-2003-03, Part 21 - Inadequately Staked Capscrew Renders Residual Heat Removal Pump  
 Inoperable

2003T2, ND - Residual Heat Removal and Low Head Safety Injection Health Report  
 2003T2, Air Operated Valves Health Report

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

#### Procedures:

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, R4, Design Basis Specification for Fire Protection

Drawings: MC-1384-07-17-01, MC-1384-07-13-01, MC-1384-07-15-01, MC-1384-07-15-01

### **Section 1R06: (Flood Protection Measures)**

#### UFSAR Sections

2.4.10, "Flooding Protection Requirements".  
 3.6A.6, "Flooding Analysis".

#### Calculations:

MCC-1223.42-00-0037, Evaluation of the Use of Non-Safety Water Sources for the Auxiliary  
 Feedwater System, Sec. 10.8, Rev. 6  
 MCC-1206.47-69-1001, Auxiliary Building Flooding Analysis, Sec.9.2-9.2.1, Rev. 11

#### Procedures:

AP/0/A/5500/44, Plant Flooding, Rev. 3  
 IP/0/A/3215/004, Magnetrol Liquid Level Control Switch Calibration, Rev. 15

#### Other Documents:

PIP M-02-04591, Steel Plate Trench Cover at Unit 2 FWST Not Bolted Down  
 PIP M-02-04582, Flood Curbing Around Exterior Auxiliary Building Doors  
 PIP M-02-04569, FWST Sump System Calibration and Labeling  
 PIP M-02-04578, SSF Control and Annunciator for WZ Sump Pumps  
 PIP M-02-04592, WZ C Sump HI Setpoint Set at 6.5 Instead of 7.0 Feet  
 PIP M-02-03265, Evaluate Applicability of Columbia Station Water Spill Event Report  
 PIP M-03-02564, Water Filling in Cable Trench on U2 TB SE Side in Gravel  
 WO 98549870, Magnetrol Liquid Level Control Switch Calibration 5000, dated 4/1/03  
 WO 98253960, Magnetrol Liquid Level Control Switch Calibration 5000, dated 4/8/00

WO 98549871, Magnetrol Liquid Level Control Switch Calibration 5010, dated 4/1/03  
 WO 98253961, Magnetrol Liquid Level Control Switch Calibration 5010, dated 4/8/00  
 WO 98253962, Magnetrol Liquid Level Control Switch Calibration 5020, dated 4/3/00  
 WO 98547819, Magnetrol Liquid Level Control Switch Calibration 5020, dated 4/4/03  
 WO 98253963, Magnetrol Liquid Level Control Switch Calibration 5030, dated 4/3/00  
 WO 98547820, Magnetrol Liquid Level Control Switch Calibration 5020, dated 4/4/03  
 WO 98253964, Magnetrol Liquid Level Control Switch Calibration 5040, dated 4/5/00  
 WO 98476920, Rad Monitor EMF-31 U1 Flow Calibration, dated 4/23/02  
 WO 98562946, Rad Monitor EMF-31 U1 Flow Calibration, dated 3/24/03  
 WO 98498788, Rad Monitor EMF-31 U2 Flow Calibration, dated 10/9/02  
 WO 98551649, Rad Monitor EMF-31 U2 Flow Calibration, dated 4/23/02  
 MN32104U, System Description for WP & WU Systems, dated 12/19/85

### PIPs Generated During Inspection

PIP M-03-05352, Incorrect Tolerance for WZ Sump Level Switch LS0500

### **1R07: Heat Sink Performance**

#### Procedures:

MP/0/A/7700/013, Component Cooling System Heat Exchanger Corrective Maintenance:  
 performed 9/12/2203 for 2B KC, 9/17-19/2003 for 2A KC  
 MP/0/A/7650/087, Documenting Heat Exchanger Tube Plugs In Safety Related Heat  
 Exchanger: performed 9/19/2003 for 2A KC  
 MP/0/A/7650/101, Diesel Generator Cooling Water (KD) Heat Exchanger Corrective  
 Maintenance: performed 9/17/2003 for 2A KD, 9/12-13/2003 for 2B KD  
 OP/2/A/6400/006, Enclosure 4.9, KC Heat Exchanger Flush and Realignment: performed  
 11/02/2003 for 2B KC heat exchanger high velocity flush, performed 11/10/2003 for 2A KC  
 heat exchanger high velocity flush and super flush

#### Calculations:

MCC-123.24-00-0072, RN/KD Heat Exchanger Tube Plugging Analysis  
 MCC-123.24-00-0075, RN/KC Heat Exchanger Tube Plugging Analysis  
 MCC-123.24-00-0076, RN/NS Heat Exchanger Tube Plugging Analysis

#### Drawings:

SNSWP intake structure sketch (C-4 & C-5)  
 Main Dam intake structure sketch (Figure 1-9)

PIPs:

M-01-4406, M-01-5099, M-02-3497, M-02-4182, M-03-1762, M-03-2112, M-03-2678, M-03-4962, M-03-5253, M-03-5434

Other documents:

Duke Power Generic Letter 89-13 response dated 9/30/1996  
 Licensee's service water heat exchanger spread sheet/data base  
 Licensee's service water flow balance data base from 1992 until present  
 Work Order 98091368: Inspection of LLI, SNSP intake and discharge, main intake and discharge (last performed 6/2-3/99, due in 2004) .  
 Work Orders for inspection of containment spray heat exchangers: 96052306 (1A); 96052317 (1B); 97007785 (2A); 97007793 (2B)  
 2003 Annual Inspection of SNSW Dam and WWCB Dikes, performed February 3, 2003  
 NRC Dam Safety Audit transmitted March 24, 1999 for FERC inspection conducted October 14, 1998  
 Service Water Profile Data report dated November 5, 2003  
 Digital pictures of the RN tube side inspections of Unit 2 KC and 2KD heat exchangers during 2EOC15  
 RN-Nuclear Service Water Health Report for report period 2003T2  
 UFSAR section 9.2.2, Nuclear Service Water System and Ultimate Heat Sink

**Section 1R08:Inservice Inspection Activities**Procedures

Procedure QAL-13, Inservice Inspection (ISI) Visual Examination, VT-1 and VT-1C, Rev. 18, dated 8/15/02, and Field Change FC F31, dated 9/11/02

Procedure QAL-14, Inservice Inspection (ISI) Visual Examination, VT-3 and VT-3C, Rev. 24, dated 8/15/02, and Field Change FC F32, dated 9/11/02

Procedure NDE-600, Ultrasonic Examination of Similar Metal Welds in Ferric and Austenitic Piping, Rev. 15, dated 9/2/03

Procedure NDE-35 Liquid Penetrant Examination, Rev 19, dated 1/31/02, Field Changes FC 02-30, dated 11/21/02 and FC 03-19, dated 7/7/03

Procedure PDI-UT-10, PDI Generic Procedure for the Ultrasonic Examination of Dissimilar Metal Piping Welds, Rev. A 12/20/2002, approval date 1/28/03

Drawings

Drawing numbers MC-ISIC-1042-002 & -003, Reactor Building Unit 1, Steel Containment Vessel, Inside Surfaces, ISI Areas, Sheet 1, Rev. 2, & Sheet 2, Rev. 1

Drawing Number MC-ISIC-2042-004 & -005, Reactor Building Unit 1, Steel Containment Vessel, Outside Surfaces, ISI Areas, Sheet 1, Rev. 0 and Sheet 2, Rev. 1

Drawing Number MC-ISIC-1042-006, Reactor Building Unit 1, Steel Containment Vessel, Dome Plan & Elevation, Rev. 0

Drawing Number MC-ISIC-1042-015, Reactor Building Unit 1, Steel Containment Vessel, Penetration Details, Rev. 2

Drawing Number MC-ISIC-1042-016, Reactor Building Unit 1, Steel Containment Vessel, Outside Surfaces, Augmented Examination Areas, Details, Sheet 1, Rev. 0

Drawing Number MC-ISIC-1042-017, Reactor Building Unit 1, Steel Containment Vessel, Outside Surfaces, Augmented Examination Areas, Details, Sheet 2, Rev. 2

Drawing Number MC-ISIC-1042-018, Reactor Building Unit 1, Steel Containment Vessel, Outside Surfaces, Augmented Examination Areas, Details, Sheets 3, Rev. 2

Drawing Number MC-ISIC-1042-019, Reactor Building Unit 1, Steel Containment Vessel, Outside Surfaces, Augmented Examination Areas, Details, Sheet 4, Rev. 3

Other Documents:

Problem Investigation Process (PIP) PIP M-03-02452, Failure to Include Head to Flange Welds on the Excess Letdown Heat Exchanger in the Unit 1 and Unit 2 Second Inservice Inspection Plan

PIP M-03-04270, Identification of Indication during UT Exam of Weld Number 2NI2FW24-6

Liquid penetrant examination reports for weld numbers 2ND2FW16-22, and -367 dated 9/18/03

Ultrasonic calibration report numbers CAL-03-160, 162 and -163, for 3/17/03

Ultrasonic examination reports for weld numbers 2ND2FW16-22, -22, and -367, dated 9/19/03

Repair of Hanger # 2MCY-FW-5048

Replacement of Mechanical Snubber on Hanger 2-MCA-S-RN-533-01-S

Replacement of Mechanical Snubber on Hanger 2-MCR-NC-4285

Records for Visual inspection of Unit 2 Containment Moisture Barriers completed on 9/8/03, 9/9/03, and 9/11/03

Visual Inspection Reports for pipe support numbers 2-MCA-KC-3324, 2-MCA-CA-H141, 2-MCA-CA-H145, 2-MCA-ND-6127, -6130, -6220, -6280, and -5502, 2-MCA-SV-H53, 2-MCA-SV-H55, and 2-MCA-SA-5086

## **Section 1R12: Maintenance Effectiveness**

### Feedwater Control

Screened 357 PIPs related to the feedwater system and reviewed 40 that dealt with aspects of feedwater/steam generator level control

Discussed system history (including 40 related PIPs) with the system engineer

S/G Level Control Improvement plan dated 10/28/2002

CF-Feedwater Health Report for period 2003T1'

CF system maintenance rule scoping document

Preventive maintenance work order tasks on CF Reg valves: 92027512, 85055329, 98384459, 8505526, 9852483, 898418540

Preventive maintenance work order tasks on CF Reg valves: 85055531, 90056974

SSF Health Report 2003T2

Engineering Directives Manual EDM-210, Engineering Responsibilities for the Maintenance Rule, Revision 16

AP/1/A/5500/024, Loss of Plant Control Due to Fire or Sabotage, Revision 21

SLC 16.9.7, Standby Shutdown System

### SSF steam generator 1C level indication

PIPs M-02-01969 (Unit 2), M-02-06075 (Unit 1), and M-03-00762 (Unit 1) - SSF standby makeup pump flow indication (NVP6420) deficiencies/failures

PIPs M-02-04211 (Unit 1), M-02-04299 (Unit 1), and M-02-05261 (Unit 1) - SSF 1C steam generator wide range level indication (1CFP6100) deficiencies/failures

Modification MGMM13978 and associated Work Order 98565527, Replacement of Foxboro flow transmitter 1NVFT6420 with Rosemount Model 1153HB4RCN0037

Modification MGMM13604 and associated Work Order 98538684, Replacement of Foxboro level transmitter 1CFLT6100 with Rosemount Model 1153DB5RC

Modification MGMM14396 (scheduled 1EOC17), Replacement of Foxboro level transmitters 1CFLT6080, 1CFLT6090, and 1CFLT6110 with Rosemount Model 1153DB5RC

Modification MGMM14397 (scheduled 2EOC16), Replacement of Foxboro level transmitters 2CFLT 6100, 2CFLT6080, 2CFLT6090, and 2CFLT6110 with Rosemount Model 1153DB5RC, and Replacement of Foxboro flow transmitter 2NVFT6420 with Rosemount Model 1153HB4RCN0037

7-Year Work Order History for 1CFLP6080, 1CFLP6090, 1CFLP6100, 1CFLP6110, 1NVLP6420, 2CFLP6080, 2CFLP6090, 2CFLP6100, 2CFLP6110, 2NVLP6420, and 1LGPT5090 (Unit 1 main generator seal oil pump d/p)

### SSF battery charger SDSP-2

7-Year Work Order History for SSF chargers SDSP-1, SDSP-2 and SDSS  
PIP M-03-03042 (SDSP-2; lightning trip - control board damage)

PIP M-02-02461 (SDSP-1; lightning trip - no damage)  
 PIP M-03-00733 (SDSP-1; trip following deep discharge battery test - no damage)  
 PIP M-99-03656 (SDSP-2; trip following deep discharge battery test - no damage)  
 PIP M-98-01003 (SDSS; trip following deep discharge battery test - control board damage)  
 IEE Transactions on Energy Conversions, Volume 5, No. 1, March 1990 (Analytical Technical of  
 Lightning Surges Induced on Grounding Mesh of PWR Nuclear Power Plant)  
 IEE Transactions on Energy Conversions, Volume 9, No. 3, September 1994 (A Review of  
 Lightning-Related Operating Events at Nuclear Power Plants)  
 Drawing MC-1716-02.03, Connection Diagram - SSF Control Panel, Revision 37  
 Drawing MC-1705-03.01, One and Three Line Diagram - SSF 250/125VDC Auxiliary Power  
 System, Revision 24  
 Drawing MC-1778-01.01, Connection Diagram - SSF Diesel Generator, Revision 12

### **Section 1R16: Operator Work-Arounds**

#### Work-arounds reviewed for cumulative affect

98-03, EFA zones  
 99-01, S/G chart recorder ink problems  
 99-12, excessive leakage of 1RL-18 causes improper LT oil temperature  
 01-01, S/G level control at low power levels  
 03-01, frequency changes to grid cause reactor power to exceed 100%  
 03-02, 1NV-124 in manual control due to erratic control in auto  
 03-03, 1CA-42B may have a problem reopening against d/P and will not be cycled to control CA  
 flow to 1D S/G during a loss of VI or vital bus events  
 03-04, Ongoing problems with both the U-1 and U-2 FWST level heat tracing systems have  
 resulted in numerous malfunctions, alarms and eventually resulting in all 3 U-1 FWST level  
 channels freezing and failing high  
 03-05, Due to tripping problems associated with the A train VC/YC chiller during startup,  
 Engineering Guidance # 03-16 was generated providing compensatory actions locally at the  
 chiller by a designated maintenance technician to prevent chiller from tripping.  
 03-06, control room operators must take turbine to manual to perform governor valve  
 movement portion of PT/1(2)/A/4250/004A (turbine valve movement test), to prevent other  
 governor valves from swinging drastically (20%)

### **Section 1R20: Refueling and Outage Activities**

#### Procedures and Reports

MCEI-0400-41, "McGuire 2 Cycle 16 Final Core Map", Rev. 11  
 PT/0/A/4150/033, "Core Verification", Rev. 15  
 PT/0/A/4150/033, "Total Core Reloading", Rev. 43  
 MP/2/A/7150/073, "Rod Cluster Control Assembly Heavy Drive Rod Unlatching and Latching",  
 Rev. 14  
 OP/2/A/6100/003, Controlling Procedure For Unit Operation  
 PT/0/A/4150/021, Post Refueling Controlling procedure for Criticality, Zero Power Physics, &  
 Power Escalation Testing  
 PT/0/A/4150/028, Criticality Following a Change in Core Nuclear Characteristics  
 PT/0/A/4150/013, Boron Endpoint, Dynamic Rod Worth and Isothermal Temperature  
 Coefficient Measurement  
 MCEI-0400-47, Unit 2 Cycle 16 Core Operating Limits Report

PIP M-03-4868, ND discharge cross-connect valve 2ND-15 actuator failure and acceptability of Mode 4 entry with valve functional but inoperable.

PIP M-03-4911, Unit 2 reactivity computer loss of configuration control resulting in the need to return to Mode 3, reconfigure, and restart the reactor.

### **Section 40A5.2 Other Activities (TI 2515/152)**

#### Procedures

MP/0/A/7150/165, "Rx Vessel Bottom Head Bare Metal Inspection," Rev. 0

MP/0/A/7700/080, "Inspection, Evaluation and Cleanup of Boric Acid on Plant Materials."

QAL-15, "Inservice Inspection (ISI) Visual Exam, VT-2, Pressure Test," Rev 20, 7/22/02.

#### Other Documents

PIP M-03-04004 U2 Rx Vessel Bottom Head Bare Metal Inspection Results, 09/07/2003

PIP M-03-04096 Count Room Analysis of Smear Samples, 09/10/2003

### **LIST OF ACRONYMS**

ASME	-	American Society of Mechanical Engineers
CA	-	Auxiliary Feedwater
CF	-	Feedwater
CFR	-	Code of Federal Regulations
DHR	-	Decay Heat Removal
EDG	-	Emergency Diesel Generator
EOC	-	End-Of-Cycle
EP	-	Emergency Procedure
EPRI	-	Electric Power Research Institute
FWST	-	Fueling Water Storage Tank
GPM	-	Gallons Per Minute
ICM	-	Interim Compensatory Measures
IR	-	Inspection Report
ISI	-	Inservice Inspection
KC	-	Component Cooling Water
LER	-	Licensee Event Report
LCO	-	Limiting Condition of Operation
MGTM	-	Temporary Modifications
NCV	-	Non-Cited Violation
ND	-	Residual Heat Removal
NDE	-	Non-Destructive Examination
NEI	-	Nuclear Energy Institute
NS	-	Containment Spray
NSD	-	Nuclear Site Directive
NV	-	Chemical and Volume Control
PI	-	Performance Indicator
PIP	-	Problem Investigation Process Report
PORV	-	Power Operated Relief Valve
PT	-	Liquid Penetrant
PWR	-	Pressurized Water Reactor

QC	-	Quality Control
RN	-	Nuclear Service Water
SCV	-	Steel Containment Vessel
SDP	-	Significance Determination Process
SSC	-	Structures, Systems, Components
SSF	-	Standby Shutdown Facility
TI	-	Temporary Instruction
TS	-	Technical Specifications
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
UT	-	Ultrasonic Testing
WA	-	Work Around
WO	-	Work Order
YC	-	Ventilation Chiller