



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

July 26, 2010

Mr. Regis T. Repko
Vice President
Duke Energy Carolinas, LLC
McGuire Nuclear Station
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION
REPORT 05000369/2010003 AND 05000370/2010003

Dear Mr. Repko:

On June 30, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on July 6, 2010, with you and other members of your staff.

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

This report documents two findings of very low safety significance (Green) which were determined to involve violations of NRC requirements. Additionally, two licensee-identified violations which were determined to be of very low significance are listed in this report. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, 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 McGuire. In addition, if you disagree with the cross-cutting aspect assigned to 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, RII, and the NRC Senior Resident Inspector at McGuire.

DEC

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In accordance with 10 CFR 2.390 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 Website at 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
License Nos. NPF-9, NPF-17

Enclosure: NRC Integrated Inspection Report 05000369/2010003 and 05000370/2010003
w/Attachment - Supplemental Information

cc w/encl: (See page 3)

DEC

2

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Letter to Regis T. Repko from Jonathan H. Bartley dated July 26, 2010

SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT
05000369/2010003 AND 05000370/2010003

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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: 05000369/2010003, 05000370/2010003

Licensee: Duke Energy Carolinas, LLC

Facility: McGuire Nuclear Station, Units 1 and 2

Location: Huntersville, NC 28078

Dates: April 1, 2010, through June 30, 2010

Inspectors: J. Brady, Senior Resident Inspector
J. Heath, Resident Inspector
J. Beavers, EP Inspector (Section 1EP6)
B. Caballero, Senior Operations Engineer (Section 1R11)
J. Dodson, Senior Project Engineer (Section 1EP6)
C. Dykes, Health Physicist (Section 2)
R. Fanner, Reactor Inspector (Section 1R18)
R. Hamilton, Senior Health Physicist (Section 2)
W. Loo, Senior Health Physicist (Section 2)
L. Miller, Senior EP Inspector (Section 1EP6)
E. Stamm, Project Engineer

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

Enclosure

SUMMARY OF FINDINGS

IR05000369/2010003, IR05000370/2010003; 4/1/2010 – 6/30/2010; McGuire Nuclear Station, Maintenance Risk Assessment, Radiological Hazard Assessment and Exposure Controls

The report covered a three month period of inspection by two resident inspectors and nine region based inspectors. Two Green findings which were determined to be NCVs and two licensee identified violations were found. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspects were determined using IMC 0310, "Components Within the Cross-Cutting Areas." 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."

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation (NCV) of 10 CFR 50.65(a)(4) for an inadequate risk assessment prior to performing maintenance troubleshooting activities on the 120VAC Vital Instrument & Control (I&C) Power System. The troubleshooting activities resulted in the unavailability of one channel of the 120VAC Vital I&C Power system which had not been adequately considered in the risk assessment. Specifically, before aligning the AC vital bus and cross-tying the DC vital busses, the licensee did not adequately evaluate the increase in risk of losing 120VAC vital bus 1EKVB. The licensee entered this issue into their corrective action program as PIP M-10-03700 and plans to re-evaluate the deterministic electronic risk assessment tool against the actual PRA risk for the loss of a single vital 120VAC bus.

The finding is more than minor because it was similar to example 7(f) of IMC 0612, Appendix E, in that it involved the failure to perform an adequate risk assessment prior to performing troubleshooting activities on a safety related system where the outcome of the risk assessment would have resulted in an increase in the licensee's risk management category (from Green to Red), and therefore would have required additional risk management actions. The inspectors determined it to be of very low risk significance (Green) because the Risk Deficit during the timeframe that the 120VAC Vital I&C bus was removed from service was calculated by the licensee to be less than $1.0E-6$. This finding is associated with the cross-cutting aspect of appropriate planning of work activities in the work control component of the Human Performance cross-cutting area [H.3(a)] in that the licensee did not adequately incorporate risk insights prior to performing troubleshooting activities. (Section 1R13)

Cornerstone: Occupational Radiation Safety

- Green. A self-revealing NCV of TS 5.7.1 was identified for the failure of the licensee to barricade, conspicuously post, and adequately control access to a high radiation area (HRA). Specifically, on September 17, 2009, a crane flagman on a Radiation Work Permit (RWP) that did not allow access to a HRA, inadvertently entered an unposted but guarded transient HRA and recorded an electronic dosimeter (ED) dose rate alarm at 128 mrem/hr. The worker was unable to hear the alarm due to wearing a headset and not wearing an

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auxiliary alarm device as specified in station procedures for HRA entries. The worker had been briefed to not enter the area when an irradiated instrument was on the floor and that the guard would prevent his entering the area. The guard was not positioned to prevent entry into the area and did not detect the flagman entering the area until he had already passed the source. The licensee entered this issue into their corrective action program as PIP M-10-05506.

The finding is greater than minor because it is associated with the cornerstone attribute of exposure control and affected the Occupational Radiation Safety Cornerstone objective of ensuring the adequate protection of the worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation because it resulted in unplanned or unintended radiation dose. The finding was determined to be of very low safety significance (Green) because it was not an ALARA finding or overexposure, did not have a substantial potential for overexposure, and did not compromise the ability to assess dose. The cause of the finding was directly related to the cross-cutting aspect of radiological safety in the work control component of the Human Performance area because the licensee did not adequately control the areas as a HRA. [H.3(a)] (Section 2RS1).

Two violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken by the licensee have been entered into their corrective action program. These violations and the licensee's corrective action program tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period in a refueling outage. Unit 1 went critical on April 17 and was synchronized to the grid on April 19. Unit 1 reached 100 percent Rated Thermal Power (RTP) on April 23. On June 10, power was reduced to 48 percent RTP due to dropped shutdown bank rod N-7. On June 12, the unit was manually tripped due to a second dropped rod, shutdown bank rod J-13. The unit restarted on June 14, and achieved 100 percent RTP on June 16. The unit remained there for the rest of the period.

Unit 2 began the inspection period at approximately 100 percent RTP. On June 6, power was reduced to 54 percent RTP for repair of 2A main feed pump. Power was returned to 100 percent RTP on June 7. The unit remained there for the rest of the period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

Flood Protection Measures - External: The inspectors reviewed the UFSAR and related flood analyses to determine which plant areas are susceptible to flooding from external sources. The inspectors walked down the internal and external portions of the Auxiliary Building to assess the condition of the safety-related Groundwater Collection System that drains the area under the building and associated groundwater level instruments and pumps to determine whether the flood mitigation features were adequate to provide the appropriate flood mitigation. The inspectors reviewed the selected preventive maintenance/test requirements for the level instruments to determine whether the testing met the Selected Licensee Commitment requirements. For those areas where operator actions were credited, the inspectors evaluated whether the actions could be conducted and would produce the desired mitigation results. Documents reviewed are listed in the Attachment.

Summer Readiness of Offsite & Alternate AC Power Systems: The inspectors evaluated plant features, procedures for operation, and continued availability of offsite and alternate AC power systems to determine whether they were appropriate for the circumstances. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator and the plant to determine whether the appropriate information is exchanged when issues arise that could impact the offsite power system. Documents reviewed are listed in the Attachment.

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b. Findings

No findings were identified.

1R04 Equipment Alignmenta. Inspection Scope

Partial Walkdowns: The inspectors performed a partial walkdown of the following seven systems 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. Documents reviewed are listed in the Attachment.

- 1B Diesel Generator with 1A Diesel Generator unavailable on April 1
- 1B Residual Heat Removal as the Technical Specification (TS) required train during core reload on April 1
- 1B Safety Injection Boration Injection flow path available during Mode 6 on April 2
- 1B Nuclear Service Water train with 1A Nuclear Service water train out of service on May 4
- 2A Safety Injection with 2B Safety Injection out of service for planned maintenance on May 12
- Unit 1 Vital Instrumentation and Control system following loss of DC/AC inverter 1EVIB on May 17
- 2A Diesel Generator during planned ORANGE risk condition for 2B Nuclear Service Water Pump out of service on June 8

b. Findings

No findings were identified.

1R05 Fire Protectiona. Inspection Scope

Fire Protection Walkdowns: The inspectors walked down accessible portions of the following six plant areas to determine if they were consistent with the Updated Final Safety Analysis Report (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, firefighting 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. Documents reviewed are listed in the Attachment.

- Unit 1 Annulus (Fire Area RB1)
- 750' Unit 1 Cable spreading room (Fire Area 19)
- 750' Unit 2 Cable spreading room (Fire Area 20)
- 767' Unit 1 rod drive motor generator set room (Fire Area 22)
- 767' Unit 2 rod drive motor generator set room (Fire Area 23)
- 733' Unit 1 and Unit 2 Vital Battery Room (Fire Area 13)

b. Findings

No findings were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors selected the 1A Component Cooling heat exchanger based on its risk significance and reviewed the inspection results to determine if the heat exchanger was available to perform its intended functions as described in the UFSAR. The inspectors evaluated if the frequency of inspection was sufficient to detect degradation prior to loss of heat removal capabilities below design requirements; that the inspection results were appropriately categorized against pre-established engineering acceptance criteria including the impact of tubes plugged on the heat exchanger performance; and that the licensee had developed adequate acceptance criteria for bio-fouling controls. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program

a. Inspection Scope

Regualification Activities Review by Resident Staff: On April 27, 2010, the inspectors observed the Licensed Operator Just-in-Time-Training for the Ovation Distributed Control System Transient Test Simulator Exercise in the plant's simulator during licensed operator regualification training to determine the effectiveness of licensed operator regualification training required by 10 CFR 55.59, 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 also observed the shift crew's response to the scenario.

Biennial Review by Regional Specialist: The inspectors reviewed the facility operating history and associated documents in preparation for this inspection. During the week of June 7, 2010, the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the facility licensee in implementing requalification requirements identified in 10 CFR Part 55, "Operators' Licenses." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The inspectors also evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations using ANSI/ANS-3.5-1985, "American National Standard for Nuclear Power Plant Simulators for use in Operator Training and Examination." The inspectors observed six crews during the performance of the operating tests. Documentation reviewed included written examinations, Job Performance Measures, simulator scenarios, licensee procedures, on-shift records, simulator modification request records, simulator performance test records, operator feedback records, licensed operator qualification records, remediation plans, watchstanding records, and medical records. The records were inspected using the criteria listed in Inspection Procedure 71111.11. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the two activities listed below for items such as: (1) appropriate work practices; (2) identifying and addressing common cause failures; (3) scoping in accordance with 10 CFR 50.65(b) of the Maintenance Rule; (4) characterizing reliability issues for performance; (5) charging unavailability for performance; (6) balancing reliability and unavailability; (7) trending key parameters for condition monitoring; (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 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 generic implications of the equipment and/or work practice problem. Documents reviewed are listed in the Attachment.

- M-10-3655, EVDB-3E tripped open causing a loss to 1EKVB power panel board
- M-10-2703, 2B nuclear service water discharge header developed a leak when an orifice flange plug corroded away and blew out

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b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

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 eight activities listed below. The inspectors assessed whether the licensee performed adequate risk assessments, and implemented appropriate risk management actions when required by 10 CFR 50.65(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. Documents reviewed are listed in the Attachment.

- An emergent change to Unit 1 shutdown risk for reduction of number of boration flow paths that occurred on April 3
- An emergent change to Unit 1 shutdown risk due to Engineered Safety Feature testing which separated a safety bus from off-site power on April 6
- An emergent change to Unit 1 shutdown risk due to a tornado watch on April 8
- An emergent change to Unit 2 risk assessment due to a Standby Shutdown Facility diesel failure to start on April 9
- An emergent change to Unit 1 risk assessment due to loss of 1EVIB Vital Inverter with Vital Battery EVCB out of service for planned maintenance on April 20
- An emergent change to Unit 1 risk assessment due to the unplanned loss of 1EVIB Vital Inverter on May 17 and the planned troubleshooting of the problem on May 17 and 18
- A planned ORANGE risk condition for 2A Nuclear Service Water system out of service for planned maintenance activities on May 25
- A planned ORANGE risk condition for 2A Nuclear Service Water system out of service for planned maintenance activities on June 8

b. Findings

Introduction: An NRC-identified Green NCV of 10 CFR 50.65(a)(4) was identified for an inadequate risk assessment prior to performing troubleshooting activities. The troubleshooting activities resulted in the unavailability of one channel of the 120VAC Vital I&C Power system.

Description: On May 17, Unit 1 experienced a loss of the Channel II 120VAC Vital I&C Power (1EKVB) when the supply breaker (EVDB-3E) to inverter 1EVIB tripped open unexpectedly. The event occurred shortly after cross-tying 125VDC vital busses EVDB and EVDD. The 120VAC vital bus was restored within the two hour TS Limiting Condition for Operation by aligning it to its alternate regulated AC power supply (1KRP).

The inverter was declared inoperable and the licensee entered a 24-hr TS Limiting Condition for Operation at approximately 0600 for one safety-related inverter inoperable.

The licensee implemented a troubleshooting plan that included replacement of the DC input breaker and testing on the 1EVIB inverter. The licensee assessed this risk condition using their electronic risk assessment tool (deterministic) as Green. On May 18, following the breaker replacement and inverter testing, the 120VAC vital bus was realigned to its safety-related source, inverter 1EVIB. The inverter remained inoperable because the licensee had not determined the cause of the inverter input breaker trip. As part of the troubleshooting plan, the licensee cross-tied the 125VDC vital busses EVDB and EVDD to recreate the conditions under which the input breaker tripped. Approximately 30 minutes after cross-tying the two DC busses, the inverter input breaker tripped and dropped power to vital bus 1EKVB.

The inspectors reviewed the licensee's risk assessment for the troubleshooting activities and determined it had not adequately considered the potential loss of the 120VAC vital bus after placing the AC vital bus back onto its inverter and cross-tying the DC busses. The licensee's risk assessment incorrectly assumed that Operations personnel staged at the inverter would have sufficient time, based on indications available, to open the cross-tie breaker prior to breaker EVDB-3E tripping. The licensee initiated PIP M-10-3700 after questions by the NRC resident inspectors revealed an unexpected Red risk condition with the bus out of service after the second trip.

Analysis: The inspectors determined that the licensee's failure to perform an adequate risk assessment prior to performing troubleshooting activities on the 120VAC Vital I&C Power System was a performance deficiency in the mitigating systems cornerstone. Specifically, before aligning the AC vital bus and cross-tying the DC vital busses, the licensee did not adequately evaluate the increase in risk of losing vital bus 1EKVB. The performance deficiency is more than minor because it was similar to example 7(f) of IMC 0612, Appendix E, in that it involved the failure to perform an adequate risk assessment prior to performing troubleshooting activities on a safety related system where the outcome of the risk assessment would have resulted in an increase in the licensee's risk management category (from Green to Red), and therefore would have required additional risk management actions. The inspectors evaluated the finding using IMC 0609, Appendix K, Maintenance Risk Assessment and Risk Management Significance Determination Process, and determined it to be of very low risk significance (Green) because the Risk Deficit during the timeframe that the 120VAC Vital I&C bus was removed from service was calculated by the licensee to be less than 1.0E-6. This finding is associated with the cross-cutting aspect of "appropriate planning of work activities" in the Work Control component of the Human Performance cross-cutting area [H.3(a)]. Specifically, the licensee did not adequately incorporate risk insights in that they failed to incorporate the increased probability of tripping the inverter breaker based on previous operating experience.

Enforcement: 10 CFR 50.65(a)(4), Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, states in part that the licensee shall assess and manage the increase in risk that may result from proposed maintenance activities. Contrary to the above, on May 18, the licensee failed to adequately assess the increase

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in risk from the planned maintenance troubleshooting activities associated with the 1EVIB inverter DC supply breaker trip. The licensee's risk assessment did not factor in the potential for the DC supply breaker EVDB-3E to trip after recreating the original alignment, which lead to an increase in risk from Green to Red. Because this violation was of very low safety significance (Green) and has been entered into the licensee's corrective action program as PIP M-10-03700, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy: NCV 05000369/2010003-01, Inadequate Risk Assessment associated with 1EVIB Troubleshooting Activities.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the five technical evaluations listed below to determine whether Technical Specification operability was properly justified and the subject component or system remained available such that 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. 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 10 CFR 50.59. Documents reviewed are listed in the Attachment.

- M-10-2695, 1A nuclear service water strainer over pressurization during A Engineered Safety Feature testing
- M-10-2797, Excessive leakage to Unit 1 volume control tank due to the discharge relief for the positive displacement charging pump leaking
- M-08-3371, Operability evaluation update due to need for additional information on RN strainer backwash hard debris
- M-10-2070, 1EDGB Battery requires replacement in 1EOC21
- M-10-2444, 1EDGA Battery requires replacement

b. Findings

No findings were identified.

1R18 Plant Modifications

a. Inspection Scope

The inspectors reviewed permanent plant modification EC 78241 / MD1002242, Upgrade 7300 Process Control System with Ovation DCS Modification and the associated 10 CFR 50.59 review to determine whether the modifications satisfied the requirements of 10 CFR 50, Appendix B, and compared each against the UFSAR and TS to determine whether the operability or availability of SSCs were affected by completion of the modification. The inspectors reviewed the modification to ensure that

it was installed in accordance with the modification documents and reviewed post-installation testing to verify that the actual impact on permanent systems was adequately verified by the tests. In addition, the inspectors determined whether the appropriate procedures, design documents, and licensing documents were updated to reflect the installation of the modification. Documents reviewed are listed in the Attachment.

b. Findings

No findings 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 TS that were affected by the maintenance activity. The inspectors witnessed the post-maintenance tests listed and/or reviewed the test data to determine whether the test results adequately demonstrated restoration of the affected safety function(s). Documents reviewed are listed in the Attachment.

- PT/1/A/4208/021B, 1B Containment Spray Pump test (various pump and valve planned outage maintenance)
- PT/1/A/4600/001, Unit 1 rod control cluster assembly Movement test (after Reactor head reinstallation)
- PT/1/A/4252/001, #1 TD Auxiliary Feedwater Pump Performance Test (linkage adjustments to the governor)
- PT/1/A/4209/001C, Standby Makeup Pump Flow Periodic Test (after oil change and drive belt inspection)
- PT/2/A/4209/001C, Standby Makeup Pump Flow Periodic Test (after oil change and belt change)
- 1A Auxiliary Feed Pump Control 1ETA-11 Timing Relay Bench Testing following relay calibration

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

Unit 1 began a refueling outage on March 13, 2010. During this inspection period, the inspectors observed portions of the following activities during this outage. Documents reviewed are listed in the Attachment.

- Reviewed the licensee's responses to emergent work and unexpected conditions, to determine if configuration changes were controlled in accordance with the outage risk control plan.
- Observed outage activities to determine if the licensee maintained defense-in-depth commensurate with the outage risk control plan for the key safety functions and applicable TS.
- Assessed outage activities that were conducted during short time-to-boil periods.
- Observed fuel handling operations (insertion) and other ongoing activities, to determine if those operations and activities were being performed in accordance with technical specifications and licensee procedures.
- Prior to mode changes, the inspectors reviewed selected system lineups and/or control board indications to determine if TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites for mode changes were met prior to changing modes or plant configurations.
- Reviewed reactor coolant system boundary leakage data, and observed the setting of containment integrity, to determine whether the reactor coolant system and containment boundaries were in place and had integrity when necessary.
- Conducted a containment walk-down prior to reactor startup to determine whether containment cleanliness supported Emergency Core Cooling System sump operability, observed Reactor Coolant System heat-up and reviewed mode change check lists to determine whether TS requirements were being met, observed reactor criticality to determine whether procedural requirements were followed and whether the estimated critical position was consistent with actual, and reviewed reactor physics testing to determine whether core operating parameters were consistent with core design.
- Reviewed the items that had been entered into the licensee's corrective action program, to determine if 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, the inspectors reviewed the results of the licensee's investigations, to determine whether the licensee had determined the root cause and implemented appropriate corrective actions.

b. Findings

No findings were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the nine surveillance tests 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 Technical Specifications, the Updated Final Safety Analysis Report, and applicable licensee procedures, and that the tests demonstrated that the SSCs were capable of performing their intended safety functions. Documents reviewed are listed in the Attachment.

Surveillance Tests

- PT/1/A/4200/009A, Engineered Safety Features Actuation Periodic Test Train A
- PT/1/A/4200/009B, Engineered Safety Features Actuation Periodic Test Train B
- 1A Auxiliary Feed Pump Control 1ETA-11 Timing Relay Bench Testing (5 yr test)
- PT/0/A/4200/057, Train B Service Water Nuclear Water Pond Header Flush
- PT/1/A/4350/002A, Diesel Generator 1A Operability Test

In-Service Tests

- PT/1/A/4252/007, Auxiliary Feedwater System Turbine Driven Train Performance Test
- PT/1/A/4209/001C, Standby Makeup Pump Flow Periodic Test

Containment Isolation Valve Testing

- PT/1/A/4255/003C, Main Steam Valve Timing at Full Temperature and Pressure

Ice Condenser Systems Testing

- PT/0/A/4200/018, Ice Bed Analysis

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluationa. Inspection Scope

The inspectors evaluated the conduct of a graded exercise re-demonstration drill on May 11, 2010, to identify any weaknesses or deficiencies in classification, notification, dose assessment and protective action recommendation development activities in accordance with 10 CFR 50, Appendix E. The inspectors also attended the licensee critique of the drill to compare any inspector observations with those identified by the licensee in order to determine if the licensee was properly identifying failures. The inspectors reviewed the licensee's performance indicator determinations for this drill to determine if they were in conformance with the criteria contained in Nuclear Energy Institute 99-02.

b. Findings

No findings were identified.

2. RADIATION SAFETY (RS)

Cornerstones: Occupational Radiation Safety (ORS) and Public Radiation Safety (PS)

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

Hazard Assessment and Instructions to workers: During facility tours, the inspectors directly observed labeling of radioactive material and postings for radiation areas, high radiation areas (HRAs), and airborne radioactivity areas established within the radiologically controlled area (RCA). The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys for selected RCA areas. The inspectors reviewed survey records for several plant areas including surveys for alpha emitters, hot particles, airborne radioactivity, gamma surveys with a range of dose rate gradients, and pre-job surveys for upcoming tasks. The inspectors also discussed changes to plant operations that could contribute to changing radiological conditions since the last inspection. For selected outage jobs, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements and current radiological conditions to workers.

Hazard Control and Work Practices: The inspectors evaluated access barrier effectiveness for selected Unit 1 and Unit 2 Locked High Radiation Area (LHRA) and Very High Radiation Area (VHRA) locations. Changes to procedural guidance for LHRA and VHRA controls were discussed with Radiation Protection (RP) supervisors. Controls and their implementation for storage of irradiated material within the spent fuel pool were reviewed and discussed in detail. Established radiological controls (including airborne controls) were evaluated for selected tasks including work in auxiliary building HRAs, and radwaste processing and storage. In addition, licensee controls for areas where dose rates could change significantly as a result of plant shutdown and refueling operations were reviewed and discussed.

Occupational workers' adherence to selected RWPs and RP technician proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Electronic dosimeter (ED) alarm set points and worker stay times were evaluated against area radiation survey results for pressurizer code safety removal and steam generator eddy current testing. ED alarm logs were reviewed and worker response to dose and dose rate alarms during selected work activities was evaluated. For HRA tasks involving significant dose rate gradients, e.g., filter maintenance activities, the inspectors evaluated the use and placement of whole body and extremity dosimetry to monitor worker exposure.

Control of Radioactive Material: The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors reviewed the last two calibration records for selected release point survey instruments and discussed equipment sensitivity, alarm setpoints, and release program guidance with licensee staff.

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The inspectors compared recent 10 CFR Part 61 results for the Dry Active Waste (DAW) radioactive waste (radwaste) stream with radionuclides used in calibration sources to evaluate the appropriateness and accuracy of release survey instrumentation. The inspectors also reviewed records of leak tests on selected sealed sources and discussed nationally tracked source transactions with licensee staff.

Problem Identification and Resolution: Problem Investigation Process reports (PIPs) associated with radiological hazard assessment and control were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure Nuclear Safety Directive (NSD) 208, Problem Investigation Process (PIP), Rev. 31. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results.

RP activities were evaluated against the requirements of UFSAR Section 12; TS Sections 5.4 and 5.7; 10 CFR Parts 19 and 20; and approved licensee procedures. Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, Control of Radioactively Contaminated Material. Documents reviewed are listed in the Attachment.

The inspectors completed all specified line-items detailed in Inspection Procedure (IP) 71124.01 (sample size of 1).

b. Findings

Introduction: A Green self-revealing NCV of TS 5.7.1 was identified for the failure of the licensee to barricade, conspicuously post, and adequately control access to a HRA.

Description: On September 17, 2009, a crane flagman supporting Unit 2 N41 and N35 excore detector replacement received an unexpected dose rate alarm with a maximum dose rate of 128 mrem/hr. The flagman had entered a guarded HRA caused by the N41 excore detector canister being placed on the containment upper operating deck. The flagman was not authorized for a HRA entry and was not logged in on a HRA RWP task; therefore, he was not wearing the required ED auxiliary alarm device as required by station procedures for entry into a HRA. The flagman had been briefed that the N41 canister work was scheduled to occur later in the shift, he was not on a HRA RWP task, and he was not to enter the HRA nor to go near the N41 canister when it was on the deck and that a HRA guard would be there to prevent access. When the canister was raised to the operating deck and placed on the floor the flagman and others in the area were told of the dose rates and told to stay back as far as possible from the canister. The flagman changed location to get a better vantage point for another lift and moved along the handrail until the HRA guard realized that he was in the HRA and that he had already passed the canister. The HRA guard had been communicating with another work group outside the immediate HRA when the flagman entered the HRA. The HRA guard checked the flagman's dose on his ED and it indicated 5 mrem. The flagman was wearing a headset and had not heard the ED dose rate which had cleared by the time the guard had checked his dosimetry. The fact that an ED dose rate alarm had occurred was discovered upon exiting the RCA.

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Analysis: The failure to correctly control a HRA is a performance deficiency. The finding is greater than minor because it is associated with the cornerstone attribute of exposure control and affected the cornerstone objective of ensuring the adequate protection of the worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation because it resulted in unplanned or unintended radiation dose. Because the finding involved the potential for workers to receive significant, unplanned, unintended doses as a result of conditions contrary to TS requirements, the inspector used the ORS SDP described in Manual Chapter 0609, Appendix C, to analyze the significance of the finding. The inspectors determined that the finding was of very low significance because: (1) it was not an ALARA finding, (2) it was not an overexposure, (3) it did not have a substantial potential for overexposure, and (4) it did not compromise the ability to assess dose. The cause of the finding was directly related to the cross-cutting aspect of radiological safety in the work control component of the Human Performance area [H.3 (a)] because the licensee did not adequately control the area as a HRA.

Enforcement: TS 5.7.1 requires, in part, that each HRA in which the intensity of radiation is greater than 100 mrem/hr but less than 1,000 mrem/hr at 30 cm from the radiation source or from any surface which the radiation penetrates, shall be barricaded and conspicuously posted as a HRA and entrance thereto shall be controlled by requiring issuance of a RWP. Contrary to the above, on September 17, 2009, the licensee failed to barricade, conspicuously post, and adequately control access to a HRA. The finding was documented in the licensee's corrective action program as PIP M-09-5506. Because this violation was of very low safety significance and was entered into the licensee's corrective action program, it is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000369,370/2010003-02, Failure to barricade, conspicuously post, and adequately control access to a HRA.

2RS2 As Low As Reasonably Achievable (ALARA)

a. Inspection Scope

ALARA Program Status: The inspectors reviewed and discussed plant exposure history and current trends including the site's three-year rolling average (TYRA) collective exposure history for calendar year (CY) 2007 through CY 2009. Current and proposed activities to manage site collective exposure and trends regarding collective exposure were evaluated through review of previous TYRA collective exposure data and review of the licensee's 5-year ALARA program implementing plan. Current ALARA program guidance and recent changes, as applicable, regarding estimating and tracking exposure were discussed and evaluated.

Radiological Work Planning: The inspectors reviewed planned work activities and their collective exposure estimates for the current Unit 1 End of Cycle (EOC) 20 refueling outage (RFO). Work activities, exposure estimates and mitigation activities were reviewed for the following high collective exposure tasks: reactor head disassembly and re-assembly; Unit 2 containment scaffold installation and removal; and coatings, painting and all associated work in Unit 2 containment. For the selected tasks, the inspectors reviewed dose mitigation actions and established dose goals. During the inspection, use

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of remote technologies including teledosimetry and remote visual monitoring were verified as specified in RWP or procedural guidance. Current collective dose data for selected tasks were compared with established estimates and, where applicable, changes to established estimates were discussed with responsible licensee ALARA planning representatives. The inspectors reviewed previous post-job reviews conducted for the Unit 2 EOC 18 RFO and verified that the items were entered into the licensee's corrective action program for evaluation.

Verification of Dose Estimates and Exposure Tracking Systems: The inspectors reviewed select ALARA work packages and discussed assumptions with responsible planning personnel regarding the bases for the current estimates. The licensee's on-line RWP cumulative dose data bases used to track and trend current personal and cumulative exposure data and/or to trigger additional ALARA planning activities in accordance with current procedures were reviewed and discussed. Selected work-in-progress reviews for steam generator secondary side activities and adjustments to cumulative exposure estimate data were evaluated against work scope changes or unanticipated elevated dose rates.

Source Term Reduction and Control: The inspectors reviewed historical dose rate trends for shutdown chemistry, cleanup, and resultant chemistry and radiation protection trend-point data against the current Unit 1 EOC 20 RFO data. Licensee actions to mitigate noble gas and iodine exposures resulting from fuel leaks were discussed in detail.

Problem Identification and Resolution: The inspectors reviewed and discussed selected PIPs associated with ALARA program implementation. The reviewed items included PIPs, self-assessments, and quality assurance audit documents. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure NSD 208, PIP, Rev. 31. The licensee's ALARA program activities and results were evaluated against the requirements of UFSAR Section 12; TS Sections 5.4 and 5.7; 10 CFR Parts 19 and 20; and approved licensee procedures. Records reviewed are listed in the Attachment.

Radiation worker performance was reviewed as part of observations conducted for IP 71124.01 and is documented in section 2RS1. The inspectors completed all specified line-items detailed in IP 71124.02 (sample size of 1).

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation

a. Inspection Scope

Engineering Controls: The inspectors reviewed the use of temporary and permanent engineering controls to mitigate airborne radioactivity during the refueling outage. The inspectors observed the use of high efficiency particulate air ventilation and vacuums to

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control contamination during surface disturbing work. Use of containment purge to reduce airborne levels in general areas was reviewed. The inspectors evaluated the effectiveness of continuous air monitors and air samplers placed in work areas to provide indication of increasing airborne levels.

Respiratory Protection Equipment: The inspectors reviewed the use of respiratory protection devices to limit the intake of radioactive material. This included review of devices used for routine tasks and devices stored for use in emergency situations. Selected Self-Contained Breathing Apparatus (SCBA) units and negative pressure respirators staged for routine and emergency use in the Main Control Room and other locations were inspected for material condition, SCBA bottle air pressure, number of units, and number of spare masks and air bottles available. The inspectors reviewed maintenance records for selected SCBA units for the past two years and evaluated SCBA and negative pressure respirators' compliance with National Institute for Occupational Safety and Health certification requirements. The inspectors also reviewed records of air quality testing for supplied-air devices and SCBA bottles.

Due to limited respirator use during the period of inspection, the inspectors reviewed training curricula for various types of respiratory protection devices and interviewed radworkers and control room operators on use of the devices including SCBA bottle change-out and use of corrective lens inserts. Respirator qualification records and medical fitness cards were reviewed for several Main Control Room operators and emergency responder personnel in the Maintenance and RP departments. In addition, qualifications for individuals responsible for testing and repairing SCBA vital components were evaluated through review of training records.

Problem Identification and Resolution: PIPs associated with airborne radioactivity mitigation and respiratory protection were reviewed and assessed. The inspectors evaluated the licensee's ability to identify and resolve the issues in accordance with procedure NSD-208, PIP, Rev. 31.

Licensee activities associated with the use of engineering controls and respiratory protection equipment were reviewed against 10 CFR Part 20; UFSAR Chapter 12; Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection; and applicable licensee procedures. Documents reviewed are listed in the Attachment.

The inspectors completed all specified line-items detailed in IP 71124.03 (sample size of 1).

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment

a. Inspection Scope

The inspectors evaluated current RP program activities and results associated with internal and external radiation exposure monitoring of occupational workers. The review included program guidance, equipment and changes, as applicable; quality assurance activities, results, and responses to identified issues; and individual dose results for occupational workers.

External Dosimetry: The inspectors reviewed and discussed RP program guidance for monitoring external and internal radiation exposures of occupational workers. The inspectors verified National Voluntary Laboratory Accreditation Program certification data and discussed program guidance for storage, processing and results for active and passive personnel dosimeters currently in use. Comparisons between direct reading dosimeter and thermoluminescent dosimeter data were reviewed and discussed.

Internal Dosimetry: Program guidance, instrument detection capabilities, and select results for the internally deposited radionuclides were reviewed in detail. The inspectors reviewed routine termination and follow-up *in vivo* (Whole Body Count) analyses, as well as, *in vitro* bioassays conducted for tritium monitoring for divers in calendar year 2009. In addition, guidance for collection and conduct of special bioassay sampling were discussed in detail.

Special Dosimetric Situations: The inspectors reviewed monitoring conducted and results for special dosimetric situations. The methodology and results of monitoring occupational workers within non-uniform external dose fields included evaluations for divers. In addition, the adequacy of dosimetry program guidance and its implementation were reviewed for shallow dose assessments and supporting calculations for two separate discrete radioactive particle skin contamination events which occurred during the previous refueling outage. The inspectors reviewed monitoring conducted, and results for selected declared pregnant workers documented in licensee records since January 1, 2008. In addition, proficiency of RP staff involved in conducting skin dose assessments, neutron monitoring, and whole body count equipment operations were evaluated through direct interviews, onsite observations, and review and discussions of completed records and supporting data.

Problem Identification and Resolution: The inspectors reviewed and discussed selected PIPs associated with occupational dose assessment. The reviewed items included PIPs, self-assessments, and quality assurance audit documents. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve identified issues in accordance with licensee procedure, NSD 208, PIP, Rev. 31.

RP program occupational dose assessment guidance and activities were evaluated against the requirements of the UFSAR Section 12; TS Sections 5.4 and 5.7; 10 CFR Parts 19 and 20; and approved licensee procedures. Documents reviewed are listed in the Attachment.

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The inspectors completed all specified line-items detailed in IP 71124.04 (sample size of 1).

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

a. Inspection Scope

Radioactive Material Storage: The inspectors observed radioactive material storage areas where containers were labeled. Inspectors evaluated the labeling on containers and verified the storage areas were controlled and posted in accordance with 10 CFR Part 20.

During the inspection responsible staff was interviewed and a process for monitoring and tracking radioactive waste and materials was discussed. While inspecting the nuclear plant the integrity of the waste containers were observed at the same time still maintaining ALARA principles.

Waste Processing and Characterization: The inspectors reviewed and discussed the currently installed radwaste processing system as described in UFSAR Section 11. In addition, stored and disposed radwaste types and quantities as documented in Effluent Release Reports for CY 2008 were reviewed.

During the inspection, the operability and configuration of selected liquid and solid radwaste processing systems and equipment were evaluated. A walk down of accessible portions of the liquid and solid radwaste processing systems was completed with the escort of cognizant chemistry personnel. Inspection activities included reviews of procedures and records, interviews with plant personnel, and direct inspection of processing equipment and piping. The inspectors directly observed equipment material condition and configuration for liquid and solid radwaste processing systems. Licensee staff was interviewed regarding equipment function and operability. There was no inoperable equipment identified at the time of the walk down. The licensee's policy regarding abandoned radwaste equipment was reviewed and discussed with cognizant licensee representatives. Chemistry staff was interviewed to assess knowledge of radwaste system processing operations. Procedural guidance involving transfer of resin and filling of waste packages was reviewed for consistency with the licensee's Process Control Program and UFSAR details.

Licensee radionuclide characterizations of each major waste stream were evaluated. For DAW, primary resin, secondary resin, and filters, the inspectors evaluated Process Control Program and licensee procedural guidance against 10 CFR 61.55 and the Branch Technical Position on Radioactive Waste Classification details. The licensee's

analyses and current scaling factors for quantifying hard-to-detect nuclides were assessed.

The inspectors discussed potential for changes to plant operating conditions and reviewed selected DAW waste stream radionuclide data to determine if known plant changes were assessed and radionuclide composition remained consistent for the period reviewed. Effects of zinc addition on primary chemistry and waste streams were discussed with chemistry and radwaste staff.

Transportation: The inspectors evaluated the licensee's activities related to transportation of radioactive material. The evaluation included review of shipping records and procedures, assessment of worker training and proficiency, and direct observation of shipping activities. Two shipments were directly observed by inspectors: shipment RSR Nos. MNS 10-009 and 10-0021.

The inspectors assessed shipping-related procedures for compliance with applicable regulatory requirements. Selected shipping records from January through March 2010 were reviewed for completeness and accuracy, and for consistency with licensee procedures. Training records for individuals qualified to ship radioactive material who were working on observed shipments were verified. Inspectors directly observed radiation and contamination surveys for a shipment of DAW.

The inspectors directly observed radiation surveys of the boxes and the transport vehicle being prepared for shipment. Responsible staff was interviewed to assess their knowledge of package radiation and contamination controls and applicable limits.

Transportation program guidance and implementation were reviewed against regulations detailed in 10 CFR 71.5, 49 CFR 170-189, and applicable licensee procedures listed in the Attachment to this report. In addition, training activities were assessed against 49 CFR 172 Subpart H, and the guidance documented in NRC Bulletin 79-19.

Problem Identification and Resolution: Licensee PIPs associated with radwaste processing and transportation activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with NSD-208, PIP, Rev. 31. Documents reviewed are listed in the Attachment.

The inspectors completed all specified line-items detailed in IP 71124.08 (sample size of 1).

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee data to confirm the accuracy of reported PI data for the following four indicators. 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. 4.

Mitigating Systems Cornerstone

- Safety System Functional Failures (Unit 1)
- Safety System Functional Failures (Unit 2)

The inspectors reviewed the documents listed in the Attachment for the period July 2009 to June 2010 to determine if the licensee had correctly calculated and reported the data for the above PIs.

Occupational Radiation Safety Cornerstone

The inspectors reviewed the Occupational Exposure Control Effectiveness PI results for the ORS Cornerstone from May 2009 to March 2010. For the assessment period, the inspectors reviewed ED alarm logs and selected PIPs related to controls for exposure significant areas. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the Attachment.

Public Radiation Safety (PS) Cornerstone

The inspectors reviewed the Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences PI results from May 2009 through March 2010. The inspectors reviewed PIPs, effluent dose data, and licensee procedural guidance for classifying and reporting PI events. The inspectors also interviewed licensee personnel responsible for collecting and reporting the PI data. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

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 condition reports, attending some daily screening meetings, and accessing the licensee's computerized database. Documents reviewed are listed in the Attachment.

Selected Issue Follow-Up Inspection: The inspectors selected PIP M-09-5948, Low Temperature Overpressure Protection (LTOP) TS violated for detailed review (See also 4OA3 for associated Licensee Event Report closure). The inspectors reviewed this report to determine whether the licensee identified the full extent of the issue, performed an appropriate evaluation, and specified and prioritized appropriate corrective actions. The inspectors evaluated the licensee documents against the requirements of the licensee's corrective action program and implementing procedures, and 10 CFR 50, Appendix B. Documents reviewed are listed in the Attachment.

Semi-Annual Review to Identify Trends: The inspectors performed a trend review to determine if trends existed which were not contained in the corrective action program that could indicate the existence of a more significant safety issue. The inspector's review was focused on repetitive equipment issues, but also considered the results of daily inspector corrective action program item screening discussed above, licensee trending efforts, and licensee human performance results. The review also included issues documented outside the normal CAP in major equipment problem lists, plant health team vulnerability lists, focus area reports, system health reports, self-assessment reports, maintenance rule reports, and Safety Review Group Monthly Reports. The inspectors compared and contrasted their results with the results contained in the licensee's latest quarterly trend reports. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified. No new trends were identified. The inspectors had previously identified a trend associated with UFSAR accuracy and completeness due to numerous violations for failing to update the FSAR in accordance with regulations outlined in 10 CFR Part 50.71(e). During the six month period for the first half of 2010, one additional issue that dealt with UFSAR accuracy was identified by the NRC. The issue dealt with incorporation of the Fire Protection Program by reference and the fact that the licensee was not providing updates of those documents as required (NCV 05000369,370/2010002-01).

4OA3 Followup of Events

.1 Reactor Trip

a. Inspection Scope

The inspectors reviewed the licensee's actions associated with the Unit 1 manual reactor trip that occurred on June 12th. The unit was tripped from 48% power due to a 2nd dropped rod, shutdown bank B rod J-13. The inspectors observed plant parameters

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for mitigating systems, evaluated performance of systems and operators, and confirmed proper classification and reporting of the event.

b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report (LER) 05000370/2009-001: Failure to Comply with the Requirements of TS 3.4.12, LTOP System, due to a Safety Injection Pump Not Double Isolated from the RCS during ESF Test Alignment.

On September 29, 2009, while aligning for the Unit 2 train B Engineered Safety Features (ESF) Actuation test, the licensee placed the plant in an alignment that violated TS 3.4.12, LTOP System, by having two safety injection pumps and one charging pump capable of injecting into the reactor coolant system (RCS). This exceeded the allowance of Condition A which allowed two pumps to be capable of injecting for up to 15 minutes while performing pump swap operation. The unit was in Mode 6 at the time with the reactor vessel head in place, but not tensioned, with pressurizer power operated relief valve 2NC-36B being used as a vent path. The condition occurred during the test alignment when the alignment change sequencing was not properly controlled. The licensee identified this condition from a main control board walk-down by the on-shift licensed reactor operator. The condition was corrected within a short period of time by opening the safety injection pump breaker. Improper alignment of the emergency core cooling system during LTOP conditions can lead to an initiating event. The inspectors reviewed the licensee's proposed corrective actions identified in the LER and associated corrective action document PIP M-09-5948, and found them to be adequate. The enforcement aspects of this finding are discussed in Section 4OA7.

.3 Personnel Performance

a. Inspection Scope

Operator performance was evaluated in planned and unplanned non-routine events and transients. For unplanned events, the initiating cause was examined as well as the response to determine if the response was appropriate and in accordance with procedures.

- DCS Ovation Plant Transient Testing on May 7
- AP/1/A/5500/20, Loss of RN, due to pipe plug that failed on 2B nuclear service water flow indicating orifice flange that caused a 5 gallon per minute leak
- AP/1/A/5500/15, Loss of Vital or Aux Control Power, due to breaker E3 on DC panel board EVDB opening and interrupting power to vital inverter 1EVIB and downstream 120 volt vital bus 1EKVB
- Unit 1 startup from the refueling outage including initial criticality and power escalation
- AP/1/A/5500/14, Rod control malfunction, and AP/1/A/5500/04, Rapid Downpower, due to dropped shutdown bank B control rod N-7

b. Findings

No findings were identified.

40A5 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. No findings of were identified.

.2 Confirmatory Order dated June 2, 2010 (EA-09-252)

By letter dated June 2, 2010, the NRC issued a Confirmatory Order to Duke Energy Carolinas, LLC (Duke Energy) McGuire Nuclear Station to resolve an issue involving an incident that occurred in October 2008, in which a contract employee introduced and used an illegal drug inside the Protected Area at the McGuire Nuclear Station. This behavior was observed by another contract employee who failed to report it as required by procedure. The NRC closed two apparent violations associated with the occurrence and characterized the issue as one violation of 10 CFR Part 26, with a significance of Severity Level IV.

40A6 Meetings, Including Exit

On July 6, 2010, the resident inspectors presented the inspection results to Mr. Regis T. Repko and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

40A7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- TS 3.4.12 specifies that an LTOP System shall be operable with a maximum of one centrifugal charging pump or one safety injection pump capable of injecting into the RCS. Condition A specifies required actions for a combination of two pumps capable of injecting into the RCS and that two centrifugal charging pumps may be capable of injecting into the RCS during pump swap operation for less than 15 minutes.

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Contrary to the above, on September 29, 2009, the licensee placed Unit 2 in an alignment which included two safety injection pumps and one charging pump capable of injecting into the reactor coolant system for a period greater than 15 minutes. The reported condition was considered to be of very low safety significance (Green) because the safety injection pump isolation valves remained shut, the breaker was only shut for a short period of time prior to the control room reactor operator's identification, there were no charging or safety injection pumps running at the time, the reactor coolant system was not water solid, and the residual heat removal pump suction relief valve was available for relief capability. This issue was documented in the licensee's corrective action program as PIP M-09-5948.

- Technical Specification 5.7.2 requires in part that in addition to the requirements of Specification 5.7.1, areas with radiation levels > 1000 mrem/hr at 30 cm (12in.) from the radiation source or from any surface which the radiation penetrates shall be provided with locked or continuously guarded doors to prevent unauthorized entry. Doors shall remain locked except during periods of access by personnel under an approved RWP that shall specify the dose rate levels in the immediate work areas and the maximum allowable stay times for individuals in those areas. In lieu of the stay time specification of the RWP, direct or remote continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area. Contrary to the above on January 21, 2010, four individuals entered an area with > 1000 mrem/hr at 30 cm without the controls specified by TS 5.7.2. Specifically, they were authorized to enter the Unit 1 Auxiliary Building pipe chase after having been briefed to expect a dose rate alarm along the travel path. Upon exiting the pipe chase a Radiation Protection Technician reviewed the alarm data and noted that one of the workers electronic dosimeters (EDs) had recorded a much higher dose rate 7,960 mrem/hr than the other three (718, 282, and 185 mrem/hr, respectively). A subsequent survey of the traveled path identified an area with dose rates of 15 rem/hr on contact and 5 rem/hr at 30 cm and another area with elevated dose rates was identified approximately eight feet away. Radiation Protection (RP) immediately upgraded the area to a "Locked High Radiation Area". This finding was entered in the licensee's corrective action program on March 8, 2010 as Problem Investigation Process (PIP) M-10-411, Uncontrolled Locked High Radiation Area in Aux Building Pipe Chase following 1A Mixed Bed Demineralizer Sluice. This finding is of very low safety significance because the workers were only briefly exposed in an area where they had been briefed to expect a dose rate alarm, there was no significant unexpected or unplanned personnel radiation doses to licensee personnel.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

Ashe, K., Manager, Regulatory Compliance
Black, D., Security Manager
Blanton, J., Specialist, RP
Bradshaw, S., Training Manager
Brenton, D., Superintendent, Plant Operations
Brewer, D., Manager, Safety Assurance
Burriss, R., Emergency Planning Supervisor
Capps, S., Station Manager
Correll, J., General Supervisor, Radiation Protection (RP)
Crane, K., Regulatory Compliance
Curry, C., Engineering Manager
Graham, G., Operations Training Requalification Supervisor
Hicks, J., Superintendent, Maintenance
Kunkel, N., Superintendent, Work Control
Nolin, J., Manager, Mechanical and Civil Engineering
McCorkle, D., Operations Acting Shift Operations Manager
Pope, R., Operations Training Manager
Repko, R., Site Vice President, McGuire Nuclear Station
Scott, W., Chemistry Manager
Schuerger, P., Site Training Manager
Sloan, H., General Supervisor, RP
Smith, J., Radiation Protection Manager
Snider, S., Manager, Reactor and Electrical Systems Engineering

NRC personnel

Thompson, J., Project Manager, NRR
Stamm, E., Project Engineer, RII

LIST OF ITEMS OPENED, CLOSED, AND REVIEWED

Opened and Closed

05000369/2010003-01	NCV	Inadequate Risk Assessment associated with 1EVIB Troubleshooting Activities (Section 1R13)
05000369,370/2010003-02	NCV	Failure to barricade, conspicuously post, and adequately control access to a HRA (Section 2RS1)
05000369,370/2010003-03	SLIV	Illegal Drugs Inside the Protected Area and Failure to Report the Event (Section 4OA5)

Attachment

Closed

05000369,370/2009403-01	AV	Inadequate Continuing Behavioral Observation Program (Section 40A5)
05000369,370/2009403-02	AV	Illegal Drugs Inside the Protected Area (Section 40A5)

DOCUMENTS REVIEWED**Section 1R01: Adverse Weather Protection****External Flooding**UFSAR Sections

2.4.10, Flooding Protection Requirements
 2.4.13.5, Design Bases for Subsurface Hydrostatic Loading
 3.4, Water Level (Flood) Design

Design Basis Documents

MCS-1465.00-00-0012, Design Basis Specification for Flooding From External Sources
 MCS-1154.00-00-004, Design Basis Specification for the Auxiliary Building Structures, section 2.3.13 and 3.2.1.3.3.4, external flooding
 MCS-1581.WZ-00-0001, Design Basis Specification for the WZ System

Calculations:

MCC-1223.42-00-0037, Evaluation of the Use of Non-Safety Water Sources for the Auxiliary Feedwater System, Sec. 10.8

Other Documents:

Selected Licensee Commitment 16.9.8, Ground Water Level Monitoring System
 Drawing MCFD-1581-01.00, Flow Diagram of Groundwater Drainage System
 Drawing MC 1220-21, Ground Water Drainage System (sheet 1)
 Performances of IP/0/B/3050/026, Groundwater Level Loop Calibration for last two years to satisfy SLC 16.9.8 TR 16.9.8.2 and TR 16.9.8.3 for the Auxiliary Building

Summer Readiness of Offsite & Alternate AC Power Systems

NSD 417, Nuclear Facilities / Generation Status Communications
 Duke Power Company Response to NRC GL 2006-02, Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power
 PT/0/B/4700/039, Warm Weather Equipment Checkout, dated 4/1/07

PIPs generated from this inspection:

M-10-3493, Potential missile hazards in Unit 1/Unit 2 DG roof areas

Section 1R04: Equipment AlignmentPartial System Walkdown

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

Attachment

Drawing MCFD-1609-02.01, Flow Diagram of the 1B Diesel Generator Engine Lube Oil System
 Drawing MCFD-1609-01.01, Flow Diagram of the 1B DG Engine Cooling Water System
 MCFD 1561-01.00, Flow Diagram of Residual Heat Removal system
 PT/1/A/42 04/001B, 1B ND Pump Performance Test
 PT/1/A/4200/006B, Boron Injection Valve Lineup Verification
 OP/0/A/6350/001A, 125 VDC/120 VAC Vital Instrument and Control Power System
 OP/0/A/6350/001B, 125 VDC 240/120 VAC Auxillary Control Power System

Section 1R05: Fire Protection

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

PIPs generated from this inspection:

M-10-03435

Section 1R07: Heat Sink Performance

Pictures of 1A KC heat exchanger from 1EOC20
 Pictures of 1A KC heat exchanger from 1EOC19

Section 1R11: Licensed Operator Regualification

TT/1/B/EC78241/003B, Ovation PCS Transient Testing
 OP/1/A/6100/003, Controlling Procedure for Unit Operation
 OP/1/A/6300/001, Turbine Generator operation
 OP/1/A/6250/001, Condensate and Feedwater
 Problem Investigation Process (PIP) items:
 PIP M-10-04193 (Evaluator's grading of event classification times during operator exams)
 PIP M-10-04200 (Tech specs not evaluated in all simulator exam scenarios)

Records:

License Reactivation Packages (8)
 LORP Training Attendance records, 2008 thru 2010, all licensed operators
 Medical Files (15)
 Remedial Training Records (3)
 Remedial Training Examinations (4)
 Feedback Summaries, 2008 thru 2010

Written Examinations:

All Biennial Written Exams for 2010

Procedures:

RP/0/A/5700/000, Classification of Emergency, Revision 16
 MTP-4116.1, Licensed Requalification, Revision 19
 MTP-5403.1, Operations Training Material Development, Revision 10
 MTP-5405.0, Operations Examination Development, Validation, and Security, Revision 10
 MTP-5405.2, Examination Remediation, Revision 0
 MTP-2800.0, Review of Engineering Changes For Training Impacts, Revision 3
 NSD 512, Certification for Return to Active Licensed Duty Following a Lapse in On-Shift Experience, Revision 3

Simulator Transient Tests:

Reactor Trip, 2008 and 2009
 Loss of Offsite Power, 2008 and 2009
 Load Rejection, 2008 and 2009

Simulator Discrepancy Reports (SDRs):

All Open SDRs as of 6/7/10
 All Closed SDRs since 2008

Active Scenario Exams (ASE):

ASE-38, Revision 5, Pressurizer Power Operated relief Valve Failed Open - LOCA
 ASE-107, Revision 0, Medium LOCA
 ASE-12, Revision 19, Steam Line Break Inside Containment
 ASE-03, Revision 16, Small LOCA and Loss of all Feed Water
 ASE-106, Revision 0, ATWS and Steam Break Outside Containment

JPM Packages:

OP-MC-CP-AD: 127T, Transfer of Control of Unit 1 to SSF – SSF Building Actions, Revision 16
 OP-MC-JPM-CF-CF: 079A, Locally Trip Unit 1 Main Turbine and Both FWPTs, Revision 12
 OP-MC-IC-ENB: 181-IA, Respond to Failure of Power Range Channel N-42, Revision 4
 OP-MC-ECC-NI: 166A, Align ND, NI, and NV Systems to Cold Leg Recirculation, Revision 13
 OP-MC-PS-NV: 120A, Establish Excess Letdown, Revision 13
 OP-MC-JPM-GEN-1PB: 190T, Restart a Unit 2 IPB Fan Following a "2A" Busline Lockout (86A),
 Revision 3
 OP-MC-PSS-KC: 165J, Makeup to the Unit 2 KC Surge Tanks, Revision 4
 OP-MC-SS-VI: 083A, Bypass A, B, and C VI Dryers Following a Loss of VI, Revision 22

Section 1R12: Maintenance Effectiveness

WO 01872596, Refurbish Inverter

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

NSD 403, Shutdown Risk Management (Mode 4,5,6, and No-Mode) per 10 CFR 50.65(a)4
 NSD 213, Risk Management Process
 NSD 415, Operational Risk Management (Modes 1-3) per 10 CFR 50.65 (a)(4)
 OP/0/A/6350/001A, 125 VDC/120 VAC Vital Instrument and Control Power System
 PIPs M-10-03111, M-10-03655

PIPs generated from this inspection:

M-10-03700, Red PARAGON risk for loss of 1EVIB and associated vital bus
 M-10-03719, Operator auto-log do not adequately reflect plant configurations during loss of 'B'
 train 120VAC vital bus.
 M-10-4015, 1ETA switchgear not protected as prescribed in risk assessment plan.

Section 1R15: Operability Evaluations

NSD 203, Operability/Functionality
 UFSAR 9.2.1
 RIS 2005-20

Section 1R18: Plant Modifications

A/R 00253414, Upgrade 7300 Process Control System with Ovation DCS Modification
 TT/1/B/EC78241/003A, Ovation PCS Testing During Unit Startup and Power Ascension

Modifications

EC 78241/MD10042, McGuire Nuclear Station Final Scope Document for 7300 Process Control System Replacement Project
 MD501354 - UPS System for DCS Platform Network Infrastructure

Design Documents

Updated Final Safety Analysis Report
 MCS-1399.03-RPS-0001, Design Basis Specification for the Protection System, Rev. 13
 MCS-1591.CF-00-0001, CF System, Rev. 11
 MCS-1465.00-00-0008, Design Basis Spec. for Fire Protection, Rev. 8
 MCS-1465.00-00-0022, Design Basis Spec. for the Appendix R Safe Shutdown Analysis, Rev. 8

Procedures

AP/0/A/5500/045, Plant Fire, Rev. 6
 NSD 112, Fire Brigade Organization, Training, and Responsibilities, Rev. 8
 NSD 228, Applicability Determination, Rev. 3
 NSD 313, Control of Combustible and Flammable Material, Rev. 6
 NSD 316, Fire Protection Impairment and Surveillance, Rev. 7
 NSD 320, Guidance for Performing Licensing Review of Proposed Changes to the Fire Protection Program, Rev. 1
 WNA-AR-00139-DAP, Nuclear Steam Supply System Control Systems Upgrade Failure Modes and Effects Analysis, Rev. 1
 WNA-DS-01167-DAP, Process Control System Upgrade Software Design Specification, Rev. 1
 WNA-DS-01167-DAP, Process Control System Upgrade Software Design Specification, Rev. 1
 WNA-DS-01077-DAP, Process Control System Upgrade Hardware Design Specification, Rev. 0
 WNA-DS-01224-DAP, Feedwater Control System Functional Requirements, Rev. 1
 WNA-TR-01326-DAP, NSSS Control Systems Software-In-Loop Test Report, Rev. 1
 WNA-ER-00069-DAP, Engineering Review of Duke Current Limiter Circuit, Rev. 0

Calculations

MCC-1381.16-00-0406, Electrical Design Input Calculation for MD100242/200243, Ovation Distributed Control System (DCS), W7300 PCS Upgrade Modification
 MCC-1381.06-00-0013, Unit 1/2, 125 VDC Auxiliary Control Power System (EPK) & 240/120 VAC Auxiliary Control Power System (EPF) Battery, Charger, Inverter & Regulator Sizing
 MCC-1381.05-00-0042, Auxiliary Building Electrical Equipment Mounting DCS Cabinets (Process Control System Cabinets)

Drawings

1105653, Validated Nuclear Pwr for Lvl Setpt, Sheet 305
 1105653, Feedwater High Low Graphic Setpoints, Sheet 309
 1105653, SG A Narrow Range Level & Dev Alarms, Sheet 310
 1105653, SG A WR Lvl Signal Val & Feed Fwd, Sheet 311
 1105653, SG A Steam Flow Sig/Sel/Press Comp, Sheet 312
 1105653, SG A FW Flow Signal Validation, Sheet 313

1105653, SG A Steam Press Signal Validation, Sheet 314
 1105653, SG A Steam Flow/Feed Flow Mismatch, Sheet 315
 1105653, SG A Feedwater Flow Demand Calc, Sheet 316
 1105653, SG A Main & Byp Valve Demand Logic, Sheet 317
 MCCD-1703-03.02, One Line Diagram 600 VAC Motor Control Center 1MXN, Rev. 4
 MC-1846-02.00, Lighting Auxiliary Building Cable Room Plan, Rev. 25A
 MCCD-1703-03.00, One Line Diagram 600 VAC Load Center 1LXC
 MCCD-1703-05.00, One Line Diagram 600 VAC Load Centers 1LXE, 1LXF, & 1LXG, Rev. 4
 Cable 1E1A1055, MC-1713-17.04 & MC-1846-02.00
 MC-1785-01.01, Connection Diagram Process Control System Cabinet 1, Protection I Rear View, Rev. 21A Cable 1E1A1056, & MC-1714-02.02
 MC-1785-09.01, Connection Diagram Process Control System Remote Mounted Equip., Rev. 52C Cable 1E1A1057, MC-1785-01.01 & MC-1714-02.02
 MC-1785-02.01, Connection diagram Process Control System Cabinet 2, Protection II Rear View, Rev. 20A Cable 1E1A1058, MC-1785-04.01 & MC-1714-02.02
 MC-1713-17.04, Connection Diagram Right Rear Half Input Cabinet, Rev. 10D 11C17Cable
 Connection Diagram Area Terminal Cabinet 1ATC17, Rev. 10A Cable 1E1A1061. MC-1717-
 MC-1785-09.02, Outline and Connection Diagram Process Control System (EIA) Test Patch Panel Terminal Boxes and Misc. PCS Instruments, Rev. 12A 17.01,02
 MC-1775-04.02, Connection Diagram Fdw-Pmp Turbine System Lec Cabinets & Misc. Devices, Rev. 1A
 MC-1785-09.01, Connection Diagram Process Control System Remote Mounted Equip., Rev. 52C Cable 1E0A900, MC-1713-17.01 & MC-1714-02.02
 MC-1713-17.01, Connection Diagram Left Front Half Input Cabinet 11C17, Rev. 24B Cable MC-1714-01.04, Connection Diagram Back Wall of Main Control Board 1MC1, Rev. 43A
 MC-1713-17.03, Connection Diagram Left Back Half, Rev. 25D
 MC-1789-01.03, Connection Diagram Transducer Terminal Cabinet 1TDC1-Front, Rev. 14B
 MC-1785-04.01, Connection Diagram Process Control System Cabinet 4 Protection IV Rear View, Rev. 17A
 MC-1714-03.02, Connection Diagram Main Control Board 1MC3, Rev. 14A
 MC-1785-05.01, Connection Diagram Process Control System Cabinet 5, Control 1 Rear View, Rev. 22C
 MC-1713-17.04, Connection Diagram Right Rear Half Input Cabinet 11C17, Rev. 10D
 MC-1785-07.01, Connection Diagram Process Control System Cabinet 7, Control 3 Rear View, Rev. 16D
 MC-1785-06.01, Connection Diagram Process Control System Cabinet 6, Control 2 Rear View, Rev. 18C
 MC-1790-40.00, Connection Diagram Operator Aid Computer System Cabinet 1AX3, Rev. 8A
 MC-1731-01.09, Online/Connection Diagram Reactor Coolant Sys. Misc. Terminations, Rev. 4C
 MC-1846-02.00, Lighting Auxiliary Building Cable Room Plan, Rev. 25A
 MC-1714-02.02, Connection Diagram Main Control Board 1MC2, Rev. 22C
 MC-1717-17.01-02, Connection Diagram Area Terminal Cabinet No. 1ATC18 Left Half, Rev. 40A
 MC-1785-08.01, Connection Diagram Process Control System Cabinet 8, Control 4 Rear View, Rev. 19C

Miscellaneous Documents

REF 1150, Ovation I/O Reference Manual

Attachment

Section 1R19: Post Maintenance Testing**5 yr 1A Auxiliary Feed Pump Relay Test**

MCCD-1702-02.00, One Line Diagram 4160V Essential Auxiliary Power System

MCEE-115-00.12-02, 4160V Switchgear 1ETA, UNIT #11 Auxiliary Feedwater Pump Motor #1A

IP/0/A/3250/077, Cutler-Hammer Type M Relay Bench Testing

WO #01853906

PIPs: M-10-03261, M-10-03159, M-10-02751

Section 1R20: Refueling and Other Outage Activities

OP/1/A/6100SD-22, Removal of Reactor Vessel Head

MP/1/A/7150/042A, Reactor Vessel Head Removal

PT/0/A/4150/028, Initial Criticality and Zero Power Physics Testing

PT/0/A/4150/021, Post Refueling Controlling Procedure for Criticality, Zero Power Physics, & Power Escalation Testing

OP/1/A/6100/003, Controlling Procedure for Unit Operation

OP/1/A/6100/SU-2, Refueling and Replacing Reactor Vessel Head

MP/1/A/7150/042B, Reactor Vessel Head Installation

OP/1/A/6100/SO-10, Controlling Procedure for LTOP Operation

PT/0/A/4550/003C, Core Verification

PT/0/A/4150/035, Inspection and Storage of New Fuel

PIPs M-10-2681 and M-10-2541

Section 2RS1: Radiological Hazard Assessment and Exposure Controls**Procedures, Guidance Documents, and Manuals**

HP/0/B/1003/063, Routine Surveillance, Revision (Rev.). 031

HP/0/B/1004/034, Radioactive Sources, Rev. 007

HP/0/B/1006/015, Surveying New Fuel after Receipt, Rev. 004

HP/0/B/1006/021, Diving Operations, Rev. 002

HP/0/B/1006/032, RP Controls for Underwater Vacuum /Filtration Systems, Rev. 003

HP/0/B/1006/043, Job Coverage for Spent Resin Sluice or Transfers, Rev. 001

HP/0/B/1066/044, Station Controls for Radiography, Rev. 000

HP/1/B/1006/027, Radiation Protection Controls for Loading Spent Fuel Assemblies into NAC UMS Dry Storage Casks, Rev. 003

HP/1/B/1006/031, Controls for Incore Movement, Rev. 003

HP/1/B/1006/024, Refueling Outage Controls and Surveillance, Rev. 009

McGuire Units 1 and 2 Technical Specifications 5.7 High Radiation Area

RPMP 7-1, Radiological Key Control, Rev. 011

RPMP 7-2, Decontamination, Rev. 002

RPMP 7-6, Administrative Controls of Yellow Flashing Light Process, Rev. 003

RPMP 7-8, Maintaining RCZs Associated With ISFSI, Rev. 001

RPMP 7-11, Contamination Controls, Rev. 006

RPMP 7-13, Supplemental Guidelines for Controls to Extra High Radiation Areas Greater Than 10 Rem per Hour, Rev. 001

RPMP 7-15, Supplemental Guidelines for Establishing High, Locked High and Very High Radiation Areas, Rev. 004

RPMP 7-16, Use and Control of Crane, Hoist, and Pit Hatch Locks, Rev. 001

RPMP 7-17, Responsibilities and Duties of a Dose Controller and Time Keeper, Rev. 000

SH/0/B/2000/005, Posting of Radiation Control Zones, Rev. 008

SH/0/B/2000/006, Control of Radioactive Material and use of Radioactive Material Tags, Rev. 006
 SH/0/B/2000/008, Operational Alpha Program, Rev. 005
 SH/0/B/2000/012, Access Controls for High, Locked High, and Very High Radiation Areas, Rev. 011
 SH/0/B/2000/013, Removal of Items from RCA/RCZs, Rev. 002
 SRPMP 8-2, Investigation of Unusual Radiological Occurrences, Rev. 003

Records and Data

HP/0/B/1003/063, Routine Surveillance [ISFSI], Rev. 28, Completed 06/01/09, and 07/06/09
 HP/0/B/1003/063, Routine Surveillance [ISFSI], Rev. 29, Completed 10/01/09, and 10/07/09
 HP/0/B/1003/063, Routine Surveillance [ISFSI], Rev. 30, Completed 12/07/09, and 01/08/10
 RP Source Inventory and Leak Test Worksheet (as of 03/18/10)
 Radiation Work Permit (RWP) (Number) No. 34, Radiography Operations inside the Nuclear Station Owners Control Fence, Rev.28
 RWP No. 1900 U-1 Aux Bldg: Misc Surveillance (mgmt tours, etc) Rev. 5
 RWP No. 2887, Accessing Room 789 (Unit 2 NC Filter Room) during Outage (room posted LHRA>10R/hr, Rev. 0
 RWP No. 5018, U-1 and U-2 Aux Bldg: RP Evaluation of Potential Locked High Radiation Areas, Rev. 16

Corrective Action Program (CAP) Documents

PIP M-09-00178, Work crew received more job dose than expected
 PIP M-09-00362, Two workers received ED dose alarms
 PIP M-09-00925, Worker received an ED dose alarm
 PIP M-09-02883, RP entered a posted HRA under wrong RWP entered 5.8mrem/hr field
 PIP M-09-02883, Individual entered room 638 on the wrong RWP resulting in an unexpected dose rate alarm
 PIP M-09-05506, Worker received an unexpected ED dose alarm by entering a guarded high radiation area while on an RWP that precluded HRA entry

Section 2RS2: ALARA

Procedures, Guidance Documents, and Manuals

Duke Energy, Fleet ALARA Manual, Section III, ALARA Program, Revision (Rev.) 15, Dated 04/25/08
 Duke Energy, Fleet ALARA Manual, Section IV, ALARA Planning, Rev. 18, Dated 09/25/08
 Duke Energy, Fleet ALARA Manual, Section VII, Tracking and Reporting of Station Exposure, Rev. 17, Dated 04/25/08
 Duke Energy, Fleet ALARA Manual, Section VIII, Station ALARA Committee, Rev. 17, Dated 02/10/09
 NSD 208, Problem Investigation Process (PIP), Rev. 031
 SH/0/B/2000/003, Preparation of a Radiation Work Permit, Rev. 009

Records and Data

1 EOC Post-CBCU/Shielding Radiological Conditions & Collective Dose KPI Evaluation, Station ALARA Committee Meeting, Dated 03/18/10
 2 EOC 19 Flush Script List, Undated

ALARA Planning Worksheet (APW), 1EOC20 1A NCP Seal Inspections (Including installation of articulating arm)

APW, 1EOC20 1NM-22AC Disassemble, Inspect, & Re-Build Valve (EV & MV Tasks Only)

APW, 1EOC20 Fiber Insulation Replacement Project

APW, 1EOC20 Install/Remove Temporary Shielding in RX Building

APW, 1EOC20 Remove/Replace RX Head & Upper Internals

Chemistry Trend Charts for 01 NC HL1 Grab Co-58 Gamma Isotopic uCi/ml for periods 03/01 – 03/30/10 and 01/01/07 – 03/30/10

Cobalt Control Process for Valves & Valve Related Maintenance, Undated

McGuire Nuclear Station, 1 EOC 20 ALARA Committee Meeting Minutes, Dated 03/18/10

McGuire Nuclear Station, Survey Nos. M-032510-29, Room 728 VCT, Dated 03/25/10; and M-033110-8, Room 730 Mechanical Pen Room, Dated 03/31/10

McGuire Nuclear Station, Source Term Reduction Team, Team Charter, Rev. 3, Dated 02/23/09

McGuire Source Term History Since Steam Generator Replacement, Undated

McGuire Source Term Reduction Strategy Outline, Undated

McGuire Unit 2 EOC 19 ALARA Report, Dated 10/27/10

RWP No. 36, Declared Pregnant Women

RWP No. 1242, Unit 1 RX Bldg: Under Vessel Inspection for Boron Degradation in Incore Sump

Room (Inspection Only)

RWP No. 1798, Unit 1 Aux/RX Bldg: Emergent (Unplanned) Work Support – OPS

Unit 1 Lower Containment G/A Dose Rate Comparison Post-CCB/Shielding Survey, Dated 03/17/10

Corrective Action Program (CAP) Documents

PIP G-08-00398, Annual review and evaluation of the impact of radiological source term on the overall radiation protection program at McGuire Nuclear Station,

PIP G-09-00909, 2009 Annual Radiation Protection Program Review Focused Assessment Report

PIP M-08-07887, ALARA Semi-Annual Hot Spot Assessment

PIP M-08-04457, RP Quick Hitter Assessment of ALARA Semi-Annual Hot Spot Assessment

PIP M-09-02073, Dose Reduction Suggestions

PIP M-09-02841, 1EOC19 ALARA Suggestions

PIP M-09-02996, Missed opportunity to minimize personnel exposure during loading of the lower Steam Generator lower assemblies in preparation for shipment

PIP M-09-03803, Two radioactive hot spots persist inside the Auxiliary Building pipe chase following resin sluice of the 2B mixed bed demineralizer

Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation

Procedures, Guidance Documents, and Manuals

ETQS 7107.0, NANTEL Basic Respiratory Protection Training, Rev. 11

ETQS 7107.1, Respiratory Fit Testing, Rev. 7

ETQS 7108.0, Self Contained Breathing Apparatus (SCBA) Training Program, Rev. 4

HP/0/B/1008/006, Respiratory Protective Equipment Maintenance and Storage, Rev. 017

HP/0/B/1008/007, Issue and Return of Respiratory Protective Equipment, Rev.019

HP/0/B/1008/008, Operation of the MSA Portable Air Line Filter and Regulator Unit, Rev. 008

HP/0/B/1008/011, Respiratory Equipment Use, Rev. 016

HP/0/B/1008/012, Operation of Bauer High Pressure Breathing Air Fill System, Rev. 001
TTC083, Lesson: Delta Air Supplied Suit (Mururoa Model V4F1 or MTH2), Rev.2

Records and Data

Certificate of Service Duke Energy Carolinas H19V-E3, (Training Certificate for Air Compressor), Dated 12/09/09
Grade D Analysis 2009_Jan-2010.zip [contained analysis results for period of 1 year from various compressors]
Hydrostatic Test Records for 12 batches of SCBAs
MSA BMR Certified C.A.R.E Technicians (training certificate for 2 individuals), Dated 03/28/07
SCBA Flow Test Records

CAP Documents

PIP M-08-01368, Problems found with the SCBA units
PIP M-08-07815, RP-SA08-11 RP Group Assessment: Respiratory Protection Program

Section 2RS4: Occupational Dose

Procedures, Guidance Documents, and Manuals

HP/0/B/1001-043, Operation of the Body Burden Analysis System, Rev. 006
HP/0/B/1006/021, Diving Operations, Rev. 002
NSD 208, Problem Investigation Process (PIP), Rev. 031
SH/0/B/2000/009, Neutron Dose Tracking, Rev. 004
SH/0/B/2001/001, Internal Dose Assessment, Rev. 004
SH/0/B/2001/003, Investigation of Skin and Clothing Contaminations, Rev. 010
SH/0/B/2002/001, Multiple Dosimetry, Rev. 008
SH/0/B/2002/003, Declared Pregnant Worker, Rev. 004
SRPMP 4-1, Response to Medical Radiopharmaceutical Use, Rev. 006
SRPMP 4-3, TLD Issue and Management for Active Workers, Rev. 001
SRPMP 5-3, Worker Termination, Rev. 001

Records and Data

Declared Pregnant Worker Logbook, 01/01/08 – 03/16/10
HP/0/B/1006/021, Diving Operations, Rev. 002, Enclosures 5.1, 5.2 and 5.3, Dated 07/23/09 and 07/29/09
Investigation of Skin and Clothing Contaminations, PCE Nos.: 08-078, Dated 10/04/08; and 09-032, Dated 09/19/09
NVLAP Certificate of Accreditation to ISO/IEC 17025:2005, Duke Energy Dosimetry Laboratory, Huntersville, NC, 2009-04-01 through 2010-03-31
Personnel Dosimetry Performance Testing, Test Standard: HPS N13.11-2001, Dated 08/13/08
Semi-Annual TLD Lab Assessment, 3rd and 4th Quarter 2009 Data, Undated
Special Exposure Logbook, Temporary Neutron Exposure Log for Stay Time Method, 01/01/09 03/11/10
TLD-ED Correlations for 2nd Monitoring Period 2009 (07/01/09 – 12/31/09), Dated 02/01/10
TLD-ED Correlations for 2nd Quarter 2009, Dated 07/27/09

CAP Documents

Assessment No. RP-SA-2009-0003, 1st & 2nd Quarter 2009 TLD Data Review
PIP G-08-00229, Self-Assessment RP-SA-2008-0001

PIP G-08-00954, Self-Assessment RP-SA-2008-0005
 PIP G-08-01058, Self-Assessment RP-SA-2008-0006 performed in TLD Lab using NIST Handbook 150
 PIP G-09-00004, TLD Lab Management Review for December 2008
 PIP G-09-00131, Performed the required biennial NVLAP On-site Assessment performed independently by an assigned NVLAP Assessor for review of the TLD Program using NIST Handbook 150 and 150-4 requirements.
 PIP G-09-01188, Quick hitter self assessment of the EnRad Central Calibration Facility operational quality and effectiveness
 PIP G-09-00918, 1st and 2nd Quarter Semi-Annual TLD Lab Assessment RP-SA-2009-0011
 PIP M-08-05673, PCE #: 08-078 Personnel Contamination at MNS, 103 - Decon
 PIP M-09-05328, UDO# 09-60, UDO Code # 21 ED lost inside RCA/RCZ and not found, Work Group 108, Work Group Name Valves
 PIP M-09-05503, PCE #: 09-032 Personnel Contamination at MNS, Work Group # 113 Electrical/I&C
 PIP M-10-00211, Discrepancy of 425 mrem noted between actual and estimated on-line Dose

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Procedures, Guidance Documents, and Manuals

HP/0/B/1004/001, Receipt & Opening of Radioactive Material Packages and Receipt of Vehicle for Shipment of Radioactive Waste, Rev 13
 HP/0/B/1004/012, Utilization of Polyethylene High Integrity Containers, Rev. 5
 HP/0/B/1004/026, Waste Handling and Segregation, Rev. 10
 HP/0/B/1004/032, Packaging Radioactive Filters, Rev. 11
 HP/0/B/1009/025, Off-Site Radiological Transportation Incidents, Rev. 6
 NSD 208, Problem Investigation Process, Rev. 31
 OP/0/B/6200/029, WM Operation, Rev. 50
 OP/0/A/6200/032, Solid Waste System Operation, Rev. 33
 OP/0/B/6200/030, Waste Monitor Tank Operation, Rev. 20
 OP/0/B/6200/064, Transferring and Dewatering Media, Rev. 26
 PT/0/B/4600/069, Sample Analysis Requirements for Determination of Waste Classification Scaling Factors, Rev. 5
 PT/0/B/4600/109, Inspection of Low-Level Radioactive Waste Containers in Storage, Rev.02
 Radioactive Waste Process Control Program Manual, Rev. 15
 Radioactive Waste Process Control Program Manual, Appendix B, McGuire Nuclear Station, Process Control Program, Rev. 18
 Radioactive Waste Process Control Program Manual, Appendix H, Revision Summary Licensed Initiated Changes
 SH/0/B/2004/001, Preparation and Shipment of Radioactive Material, Rev. 6
 SH/0/B/2004/002, Preparation and Shipment of Radioactive Waste, Rev. 7
 SH/0/B/2004/003, Determination and Documentation of 10CFR61 Radioactive Waste Classification and Waste Form Implementation Program Data, Rev. 00

Records and Data

Energy Solutions, Cask Book for Model CNS 8-120A
 McGuire Nuclear Station (MNS), 2008 Effluent Release Data

Memorandums to File, McGuire Nuclear Site, New Standard Filter Waste Stream, Dated 11/05/07; and DAW Sample Comparisons, Dated 11/12/07
 McGuire Nuclear Station, 10CFR61 Report for Analysis of DAW Smears, Dated 10/27/09
 McGuire Nuclear Station, 10CFR61 Analysis Report for filters and Powdex Resin, Dated 01/15/10
 MNS Employee Qualification Report printouts for Radioactive Materials Shipper select personnel
 MNS Radwaste and Radioactive Material Shipping Logs
 Radioactive Shipment Record (RSR) No. 08-0020, Metal Box (LQ), Dated 03/17/08
 RSR No. MNS 10-0021, Dated 03/19/10
 RSR No. MNS 10-009, Dated 03/31/10

CAP Documents

PIP G-09-00190, Operating Experience on radioactive shipping incident for review of NGO/RP, Dated 02/23/10
 PIP G-09-00438, Documented an informal benchmark of the use of gate/truck monitors for vehicles with radioactive material shipments, Dated 04/28/10
 PIP M-09-04862, This PIP documented a limited quantity waste shipment not expected to reach disposal site within 20 days, Dated 09/03/09

Section 40A1: Performance Indicator Verification

Procedures, Guidance Documents and Manuals

SRPMP 10-1, NRC Performance Indicator Data Collection, Validation, Review and Approval, Rev. 003

Records and Data Reviewed

2008 RETS/ODCM Radiological Effluent Release Occurrences summarized in January 2009
 2009 RETS/ODCM Radiological Effluent Release Occurrences summarized in January 2010
 PIP M-09-02596, Radiation Protection Self Assessment RPS-SA09-01, 1st Trimester 2009 Dose Rate Alarms

Corrective Action Program

PIP M-09-00362, Two workers received ED dose alarms
 PIP M-09-00925, Worker received an ED dose alarm
 PIP M-09-02883, RP entered a posted HRA under wrong RWP
 PIP M-09-05506, Crane flagman entered a guarded but unposted HRA on RWP that did not allow access to HRA
 PIP M-09-06505, Operations entered upper containment of both units on wrong RWP
 PIP M-10-00411, Individual encountered higher than expected dose rates in aux building pipe chase

Section 40A2: Problem Identification and Resolution

NSD 208, Problem Investigation Process (PIP)
 NSD 201, Reporting Requirements
 NSD 202, Reportability
 TS 3.4.12, LTOP and associated bases
 Auto-log for 9/29-30/2009

OP/2/A/6100/SO-10, Controlling Procedure for LTOP Operation
 PT/2/A/4200/009, Engineered Safety Features Actuation Periodic Test Train B

Section 40A3: Followup of Events and Notices of Enforcement Discretion

OP/1/A/6100/003, Controlling Procedure for Unit Operation
 PT/0/A/4150/028, Initial Criticality and Zero Power Physics Testing
 PT/0/A/4150/047, 1/M Monitoring During Startup
 PT/0/A/4150/021, Post Refueling Controlling Procedure For Criticality, Zero Power Physics, & Power Escalation Testing
 Reactor Startup 91-01 briefing package
 TT/1/B/EC78241/003B, Ovation PCS Plant Transient Testing

Section 40A7: Licensee Identified Violations

PIP M-10-00411, Worker received unexpected dose rate alarm in auxiliary building pipe chase.
 PIP M-10-411, Root Cause Failure Analysis Report, Uncontrolled Locked High Radiation Area in Aux Building Pipe Chase following 1A Mixed Bed Demineralizer Resin Sluice

LIST OF ACRONYMS

ALARA	As Low As is Reasonably Achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
cm	centimeters
CY	Calendar Year
DAW	dry active waste
ED	electronic dosimeter
EOC	End of Cycle
HRA	High radiation area
I&C	Instrument and Control
IP	Inspection Procedure
LCO	Limiting Condition for Operations
LHRA	Locked High Radiation Area
LTOP	Low Temperature Overpressure Protection
mrem/hr	millirem per hour
NCV	Non-Cited Violation
NSD	Nuclear System Directive
ORS	Occupational Radiation Safety
PI	Performance Indicator
PIP	Problem Investigation Process
radwaste	Radioactive waste
RCA	Radiologically Controlled Area
RCS	Reactor Coolant System
Rev.	Revision
RFO	Refueling Outage
RP	Radiation Protection
RTP	Rated Thermal Power
RWP	Radiation Work Permit
SCBA	Self-contained Breathing Apparatus

SDP	Significant Determination Process
S/N	Serial Number
SSC	Structures, Systems and Components
TS	Technical Specification
TYRA	Three-year Rolling Average
UFSAR	Updated Final Safety Analysis Report
VHRA	Very high radiation area