UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

April 21, 2003

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

SUBJECT: MCGUIRE NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT 50-369/03-02 AND 50-370/03-02 AND INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION REPORT 72-38/03-01

Dear Mr. Jamil:

On March 22, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station. The enclosed report documents the inspection findings which were discussed on March 26, 2003, with Mr. H. Sloan and on March 27, 2003, with Mr. T. Harrall 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.

Based on the results of this inspection, there were four findings of very low safety significance (Green) identified in the report which were determined to be violations of NRC requirements. However, because of the very low safety significance and because the issues were entered into your corrective action program, the NRC is treating the findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the McGuire facility.

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

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

Sincerely,

/RA/

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

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

Enclosure: NRC Integrated Inspection Report 50-369/03-02, 50-370/03-02, 72-38/03-01
w/Attachment - Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-369, 50-370, 72-38
License Nos:	NPF-9, NPF-17
Report Nos:	50-369/03-02, 50-370/03-02, 72-38/03-01
Licensee:	Duke Energy Corporation
Facility:	McGuire Nuclear Station, Units 1 and 2
Location:	12700 Hagers Ferry Road Huntersville, NC 28078
Dates:	December 22, 2002 - March 22, 2003
Inspectors:	S. Shaeffer, Senior Resident Inspector E. DiPaolo, Resident Inspector K. VanDoorn, Senior Reactor Inspector (Sections 1R02 and 1R17) M. Scott, Senior Reactor Inspector (Sections 1R02 and 1R17) J. Lenahan, Senior Reactor Inspector (Sections 1R02 and 1R17) G. Kuzo, Team Leader, Senior Radiation Specialist (Sections 2OS1, 2OS3, and 4OA.2 and 3) J. Kreh, Radiation Specialist (Section 2PS1) E. Testa, Senior Radiation Specialist (Section 2PS3)
Approved by:	Robert C. Haag Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR05000369/03-02, IR05000370/03-02; Duke Energy Corporation; 12/22/2002 - 03/22/2003; McGuire Nuclear Station, Units 1 and 2; Adverse Weather, Operability Evaluations, Surveillance Testing, and Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems.

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

A. Inspector Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. Inadequately installed freeze protection resulted in freezing of the refueling water storage tank (FWST) level instrument lines during adverse cold weather on January 24, 2003.

  A self-revealing NCV of Technical Specification 5.4.1.a was identified for failure to follow a maintenance procedure for work on the FWST level instrument freeze protection system. The finding is greater than minor because the safety function that these channels provide to the automatic switchover feature was lost. This finding was of very low safety significance because of the short time interval that the three channels were inoperable. (Section 1R01)

- Green. Inadequate corrective actions regarding venting of emergency core cooling system (ECCS) piping following system restoration for refueling outages.

  An NCV was identified for failure to comply with 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, regarding repetitive gas accumulation in the ECCS piping following refueling outages. This finding is greater than minor because some gas would be directed through the ECCS pumps, thereby affecting their reliability. This finding was of very low safety significance due to the determination that the majority of the gas would have been released from the ECCS piping into the containment volume via back leakage through the ECCS sump valves upon sump realignment and prior to sweeping the gas to the ECCS pumps. Since the resolution for a previous ECCS venting problem was not adequate, this finding is indicative of a potential corrective action thoroughness deficiency. (Section 1R15)

Cornerstone: Initiating Events

- Green. Failure to follow a main turbine overspeed test program procedure which resulted in an unexpected excursion in reactor power.

A self-revealing NCV was identified for failure to meet TS 5.4.1 by failing to follow PT/1/A/4250/004A, Turbine Valve Movement Test, on February 1, 2003, due to an operator incorrectly raising governor valve demand when the procedure required lowering governor valve demand. This resulted in a reactivity excursion and reactor power increase. Although this finding contributed to the likelihood of a reactor trip, this issue was determined to be of very low safety significance because mitigation equipment was not affected. This error in following procedural guidance in response to a recognized plant condition is indicative of a human performance deficiency. (Section 1R22.1)

Cornerstone: Public Radiation Safety

- Green. The licensee failed to have proper sample line configuration and flow characteristics to assure sample representativeness of particulate radionuclides collected for monitoring and quantifying the Unit 1 and Unit 2 Main Plant Vent airborne effluents in accordance with the Selected Licensee Commitment (SLC) Manual Table 11.7.11-1.

  An NCV of 10 CFR 20.1501(a) was identified. This violation is greater than minor in that the failure to have proper sample line configurations and flow characteristics could result in non-representative collection of particulate radionuclides used to evaluate doses to members of the public from airborne effluent releases. This issue is associated with the process attributes of the Public Radiation Safety Cornerstone and affected the cornerstone objective to protect public from exposure to radiation. The violation is of very low safety significance because current operations have resulted in negligible release of particulate radionuclides and resultant doses to the public (Section 2PS1.1).

B. Licensee Identified Violations

None

Report Details

Summary of Plant Status:

Unit 1 began the inspection period at approximately 100 percent rated thermal power (RTP). On January 27, 2003, Unit 1 reduced power to approximately 89% to allow repairs to the 1B1 feedwater heater. While at 89% RTP, turbine governor valve testing was performed. During this testing, the unit experienced an unplanned power increase of approximately 4%. Once the control and impact problems were identified, the test was satisfactorily completed and the unit returned to 100% RTP on February 1, 2003. The unit remained at approximately 100% RTP for the remainder of the inspection period.

Unit 2 began the inspection period at approximately 100 percent RTP. On January 15, 2003, Unit 2 experienced an unplanned trip of the 2A main feed pump and an automatic runback to approximately 48% RTP. The pump trip was due to low control oil pressure caused by excessive seat leakage on both of the turbine trip solenoid valves. After repairs were made to the solenoid valves on the 2A main feed pump, the unit was returned to approximately 100% RTP on January 17, 2003. On February 28, power was briefly reduced to approximately 40% RTP to facilitate repairs to the 2B main feed pump after leakage was detected on the turbine trip solenoid valve. On March 14, reactor power was reduced to 92% RTP to perform turbine governor valve testing. Due to problems with control of the testing activities and incomplete understanding of the impact of the governor valve movement, the unit experienced a power increase of 2.4%. The licensee deferred further testing until the control and impact problems could be evaluated. The unit returned to 100% RTP on the same day. The unit remained at approximately 100% RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

On January 24, the sensing lines for the Unit 1 refueling water storage tank (FWST) level transmitters froze as indicated by the level indications failing high. The inspectors reviewed the licensee's compensatory measures used to thaw and maintain the sensing lines warm for the remainder of the expected cold weather period. This included increased periodic checks to ensure that the FWST heat trace control system alignments were in accordance with the established compensatory measures.
To assess the licensee's identification and resolution of problems in this area, the inspectors reviewed Problem Investigation Process reports (PIP) M-03-0352 regarding the failed high FWST transmitters and PIP M-03-0604, which documented an issue associated with the monitoring of heat trace systems in alarm and abnormal configuration status following the event.

b. Findings

Introduction: A Green finding was identified and dispositioned as an NCV for a failure to follow maintenance procedures for the Unit 1 FWST level instrument freeze protection system.

Description: At 11:39 p.m., on January 23, 2003, the Unit 1 control room received indications of one required channel and the narrow range channel (nonsafety-related) of FWST tank level failing high. For several hours prior to the event, outside ambient air temperature was unusually low for the area and averaged less than 10 degrees Fahrenheit. Operators entered the Required Action of TS LCO 3.3.2, ESFAS Instrumentation, for one required channel of FWST level instrumentation inoperable. At 12:45 a.m., on January 24, Unit 1 entered TS LCO 3.0.3 when a second required channel of FWST level instrumentation failed high. The third required channel failed high at 1:03 a.m.

The three safety-related instrument loops measure FWST level through independent sensing lines; one sensing line is shared with an additional nonsafety-related instrument loop which provides narrow range tank level indication and alarm functions only. The safety-related loops function in a two-out-of-three logic to produce an FWST low level signal. This signal coincident with a safety injection signal provides protection against a loss of water source for the emergency core cooling system (ECCS) pumps by automatically switching the suction for the residual heat removal (ND) pumps from the FWST to the containment sump. This indicates the end of the injection phase of a loss of coolant accident (LOCA) and the beginning of the recirculation phase. The temperatures experienced on the night of January 23-24 had apparently been low enough to cause FWST water in the level instrument sensing lines to freeze. Because of the resultant expansion of water as it froze, the FWST level instrument loops failed to an erroneous high level. This resulted in a loss of the Automatic Switchover to Containment Sump function. Unit 2 experienced no problems with the instrument loops.

At 2:00 a.m., operators placed the heat trace controller associated with instrument sensing lines in manual override which provided continuous heating. At 2:36 a.m., all indications for FWST level began to return to expected values. TS LCO 3.0.3 was exited at 3:42 a.m., when two of the three channels were declared operable based on an engineering operability assessment, and compensatory measures to maintain the heat trace system in manual override and to increase monitoring of system operation.

The FWST heat trace control system was designed to prevent water in the sensing lines from freezing by inputting heat to the sensing lines through the use of electrical heat trace cable. The controller for the system turned power on and off based on predetermined temperatures, as measured by thermocouples installed on the sensing line. Layers of insulation surround the arrangement to minimize heat loss. Post event thermal imaging did reveal that the Unit 1 sensing lines had excessive heat loss as compared to the same equipment in Unit 2. The licensee determined that two root

causes prevented the FWST heat trace control system from protecting the sensing line from freezing:

1) Design - Some thermocouples were mounted in close proximity to the respective heat trace cables, which overly influenced the thermocouple temperature measurement. This caused the heat trace system to prematurely de-energize the associated heat trace cables, resulting in reduced heat input to the sensing lines. Additionally, some portions of the heat trace cable were not adequately contacting the sensing line which hindered the heat transfer capability.

(2) Configuration Control -The sensing lines were not insulated in accordance with design documents. The as-found condition revealed that a one-inch layer of insulation, wrapped around each of the sensing lines/heat trace cables, was not installed as required.

Analysis: Inadequately designed and installed freeze protection failed to protect the FWST level instrument lines from freezing during adverse cold weather on January 24, 2003. This resulted in a failure of the Automatic Switchover to Containment Sump function. This function is necessary for proper operation of the emergency core cooling mitigating system during plant events requiring high and/or low pressure recirculation.

A Phase 3 analysis under the Significance Determination Process was performed by the regional Senior Reactor Analyst assuming a loss of FWST instrumentation for four hours. Because of the short time interval involved, the finding was determined to be of low safety significance.

Enforcement: TS 5.4.1.a requires that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33 requires procedures for performing maintenance. Work Order (WO) 98023343 contained procedures for performing maintenance on the Unit 1 FWST level instrument freeze protection system. Contrary to WO 98023343, on September 29, 1998, maintenance workers failed to properly insulate the instrument sensing lines in accordance with instructions. The failure to properly install the insulation allowed all the Unit 1 FWST level instrument sensing lines to freeze during adverse (cold) weather on January 24, 2003, rendering the instrument channels non-functional. Because the finding is of very low safety significance (Green) and is captured in the licensee's corrective action program as PIP M-03-0352, it is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. Accordingly, it is being identified as NCV 50-369/03-02-01: Failure to Follow Maintenance Procedure for FWST Level Instrument Freeze Protection System.

1R02 Evaluations of Changes, Tests or Experiments

a. Inspection Scope

The inspectors reviewed selected samples of evaluations to confirm that the licensee had appropriately considered the conditions under which changes to the facility, Updated Final Safety Analysis Report (UFSAR), or procedures may be made, and tests

conducted, without prior NRC approval. The inspectors reviewed evaluations for six changes and additional information, such as calculations, supporting analyses, the UFSAR, and drawings to confirm that the licensee had appropriately concluded that the changes could be accomplished without obtaining a license amendment.

The inspectors also reviewed samples of changes such as design changes, UFSAR changes, commercial grade dedication packages, a procedure change, a Technical Specification Bases change, and a Selected Licensee Commitments change for which the licensee had determined that evaluations were not required, to confirm that the licensee's conclusions to "screen out" these changes were correct and consistent with 10CFR50.59.

The inspector also reviewed a recent audit of the 10CFR50.59 process and selected Problem Investigation Process (PIP) forms to confirm that problems were identified at an appropriate threshold, were entered into the corrective action process, and appropriate corrective actions had been initiated.

Documents reviewed during this inspection are listed in the Attachment to the report.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

For the systems identified below, the inspectors reviewed plant documents to determine correct system lineup, and conducted walkdowns to verify that the systems were correctly aligned when the redundant trains were inoperable or out-of-service. For the Unit 1 auxiliary feedwater (CA) system, the walkdowns were performed before and during the time period when Unit 1 exceeded the specified Completion Time associated with TS LCO 3.7.5, Auxiliary Feedwater System, with one train of CA inoperable. This occurred after the licensee received a Notice of Enforcement Discretion (see Section 4OA3) in order to facilitate repairs to Unit 1 steam generator isolation valve 1CA42B.

- Unit 1 B Safety Injection (NI) train when the A NI pump was out-of-service for scheduled preventive maintenance on January 22, 2003.
- The Unit 1 A motor-driven CA and turbine-driven CA trains during emergent work to repair 1CA42B on February 6-7, 2003.
- B train control room ventilation system including periods of time coincident with A train outages.

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

ability to identify and correct problems. This included PIP M-03-1157, Power cable cover pulled out of its connector on Valve 1YC39B.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

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

- Fire pump rooms
- Unit 1 CA pump room
- Unit 2 interior mechanical penetration room
- Unit 2 CA pump room
- Units 1 and 2 nuclear service water (RN) pump area
- Unit 1 exterior steam valve vault
- Various cable spreading room areas

The inspectors also reviewed the licensee's corrective action system to assess the licensee's ability to identify and correct problems. Included in this review was PIP M-03-0953, Missing sprinkler assist clips.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On February 5, 2003, the inspectors observed an active simulator examination, as well as the subsequent evaluation and critique, during licensed operator requalification training. The inspection focused on high-risk operator actions, emergency plan implementation, and lessons learned from previous plant experiences. The simulator examination evaluated operator response to a steam generator tube rupture and use of the Emergency Procedures EP/1/A/A/5000/E-0, Reactor Trip or Safety Injection, and EP/1/A/5000/E-3, Steam Generator Tube Rupture, as well as various system failures and abnormal procedures. The inspectors assessed whether appropriate feedback was provided to the licensed operators.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

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

PIP Number	Title/Description.
M-02-4608 M-02-4763 M-02-4774	Configuration control and defective replacement part issues associated with motor-operated valve operator (Rotork) auxiliary contact switch mechanisms (add-on-pack). These issues were discovered during the implementation of corrective actions for a 10CFR Part 21 Notification involving nonconforming (not annealed during manufacture and subject to malfunction in a high temperature environment) add-on-packs provided by Rotork.
M-03-0066	Damage to B Control Room Chiller due to 1YC452 being inadvertently opened during maintenance

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

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

The inspectors also reviewed work orders (WOs) and PIPs to verify the adequacy of planned and implemented corrective actions. During repair activities for the Unit 1 B

motor-driven CA pump flow isolation valve to the D steam generator (1CA42B), the inspectors reviewed implementation of compensatory actions to reduce plant risk as outlined in the licensee's request for a Notice of Enforcement Discretion (NOED) for TS LCOs 3.7.5 and 3.6.3, dated February 7, 2003.

PIP Number/ WO/Procedure	Title/Description
M-03-0543	Unit 1 B motor-driven CA pump flow isolation valve to the D steam generator (1CA42B) repair following catastrophic failure of the valve stem (emergent). See related Section 4OA3.3.
M-03-0188	Troubleshoot and repair Unit 2 A main feed pump unplanned trip (emergent)
M-03-0069	1YC-88 relief valve lifted causing water intrusion into 1EMXA electrical board (emergent)
M-03-0740	B control room air handling unit fan shaft bearing failure and compensatory actions to maintain A train operable during repair activities (emergent)
M-03-0892	Unit 2 B emergency diesel generator lubricating oil strainer vent line failure (emergent)
M-03-0954	Leaking turbine oil trip solenoid valve on the Unit 2 B main feed pump requiring unit load decrease for repair (emergent)

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

The inspectors reviewed the operating crews' performance during the following non-routine evolutions and/or transient conditions to determine if the response was appropriate to the event and in accordance with procedures and training. Operator logs, plant computer data, and associated operator actions were reviewed. For M-03-0482, the review focused on personnel actions following identification of the reactivity problem which is discussed further in Section 1R22.

PIP Number	Title/Description
M-03-0188	Unit 2 entered Abnormal Procedure AP/2/A/5500/003, Load Rejection, due to unplanned trip of the A main feedwater pump on January 15, 2003

M-03-0482	Unplanned Power increase during turbine valve movement test on February 1, 2003.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

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

PIP Number	Title/Description
M-02-4441	Containment closure was compromised when the blind flange associated with the Unit 1 fuel transfer tube was removed when the associated containment isolation valve (1KF-122) was open
M-03-0368	A and B control room chillers tripped and shutdown, respectively, during low load conditions
M-03-0499	Part 21 operability for Whiting Crane bolting issues
M-03-0338	Increased Unit 2 RCS total leakage amounts
M-02-5370	Substantial amount of gas below valve 1NI-185A, ECCS suction from the containment sump (train A)
M-03-1101	B Control Room area air handling unit tripped while attempting to swap trains

In addition, to assess the licensee's identification and resolution of problems in this area, the inspectors reviewed PIP M-03-476 associated with an issue for not considering time critical operator actions in the evaluation of compensatory actions for maintaining the A and B YC chillers operable (M-03-368) while in a degraded condition.

b. Findings

Introduction: A Green finding was identified and dispositioned as an NCV for inadequate corrective actions regarding venting of emergency core cooling system piping (i.e., ND systems) following system restoration for refueling outages.

Description: On October 18, 2002, with Unit 1 in Mode 1, while performing ECCS venting using PT/1/A/4200/19, ECCS Pumps and Piping Vent, Revision 34, the licensee identified a substantial amount of gas below valve 1NI-185A, ECCS suction from the

containment sump (train A). This was the first ECCS venting following restart from the Unit 1 End of Cycle (EOC) 15 refueling outage. Based on the potential significance of the gas accumulation affecting the past and present operability of the ECCS, the licensee initiated a Category 2 PIP, M-02-5370, performed vent verifications using various methods, and subsequently performed a detailed analysis of the identified gas to determine the effect it would have had on the ECCS during a safety injection or other event requiring system operation. Following additional venting and based on the initial reviews of the source of the gas, the licensee concluded that the ECCS was currently operable. The root cause of the gas accumulation was determined to be that the previous venting performed in Mode 5 during restart from the EOC 15 refueling outage did not ensure that the RHR system was fully depressurized to ensure most gas was not entrained and available to be vented.

During the previous Unit 1 EOC 14 refueling outage, a similar identification of unknown residual gas occurred following the first Mode 1 performance of PT/1/A/4200/19, as documented in PIP M-01-2284. NRC Inspection Report 50-369,370/01-03 previously identified an NCV of TS 5.4.1.a for inadequate surveillance procedure PT/1/A/4200/19, ECCS Pumps and Piping Vent, Revision 31 . However, in this previous case, the procedure inadequacy was determined to be that the pre-outage venting was performed with the ND pumps still in service, which did not allow entrained gas to come out of solution for venting. The corrective actions for PIP M-01-2284 included that the ND system should be vented after the ND pumps are secured and depressurized. However, while procedural changes were made to ensure venting would be performed with the ND pumps secured, no procedural controls or guidance were established to ensure ECCS venting would be conducted after the ND system was allowed to depressurize after being secured. Wrong assumptions were made as to the amount of time ND depressurization would take following securing the RHR pumps.

Analysis: This issue affects the Mitigating System Cornerstone. TSSR 3.5.2.3 requires periodic venting of ECCS discharge piping to ensure ECCS systems remain capable of meeting their design basis function. Following system draindown for refueling outages, the licensee performs venting of the ECCS system prior to entering Mode 4. If adequate venting is not accomplished, unknown quantities of gas could remain in the ECCS pumps and piping and significantly degrade or make inoperable multiple train ECCS systems via pump gas binding/failure and water hammer concerns. For the identified condition, an unknown amount of gas remained in the Unit 1 ECCS ND piping with the unit in Mode 1 operation for approximately two weeks. Unknown large amount of gas in ECCS systems could reasonably be viewed as a precursor to a significant event and, if left uncorrected, would become a more significant safety issue by increasing the likelihood of a failure of required mitigating systems. Although the identified gas could have degraded the performance of the ECCS systems, this issue was determined to be of very low safety significance (Green). This was based on the licensee's detailed analysis of the gas volume. The analysis concluded that the majority of the gas, conservatively maximized at 138 standard cubic feet for the purpose of the analysis, would have been released from the ECCS piping into the containment volume via back leakage through the ECCS sump valves upon ECCS sump realignment prior to sweeping the gas to the ECCS pumps.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. In the case for significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. NRC Inspection Report 50-369,370/01-03 previously identified a non-cited violation of TS 5.4.1.a for an inadequate surveillance procedure PT/1/A/4200/19, ECCS Pumps and Piping Vent, Revision 031. Because of the inadequate procedure, during the performance of the PT following the EOC 14 refueling outage TSSR, system conditions were not adequate for effective ECCS venting. This resulted in a large amount of gas being left in the ECCS piping for approximately three weeks.

Following the EOC 15 Unit 1 refueling outage, ECCS venting was accomplished with the revised procedure. However, contrary to 10 CFR 50, Appendix B, Criterion XVI, corrective actions were inadequate, in that, no procedural controls or guidance were established to ensure ECCS venting would be conducted after the RHR system was allowed to depressurize after being secured. Verifying the RHR system is depressurized prior to performing ECCS venting ensures entrained gas is allowed to come out of solution and be able to be vented as required by TSSR 3.5.2.3. Because the finding is of very low safety significance (Green) and is captured in the licensee's corrective action program as PIPs M-02-5370 and M-02-5394, it is being treated as a non-cited violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. Accordingly, it is being identified as NCV 50-369/03-02-02: Inadequate Corrective Actions to Preclude Repetitive Unknown Gas Accumulation in ECCS Piping.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors evaluated the operator workaround described in M-02-5504 for required manipulations to component cooling water (KC) system flow/pressures to allow establishing KC flow to the reactor coolant pump thermal barrier heat exchangers. The workaround was reviewed to determine: (1) if the functional capability of the system or human reliability in responding to an initiating event was affected; (2) the affect on the operator's ability to implement abnormal or emergency procedures; and (3) if operator workaround problems were captured in the licensee's corrective action program. The inspectors reviewed the potential abnormal plant configurations and conditions to assess if the conditions could increase the likelihood of an initiating event or affect multiple mitigating systems and that implemented and planned licensee actions were appropriate to address the issue.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors evaluated design change packages for 10 modifications, in the Initiating Events and Mitigating Systems cornerstone areas, to evaluate the modifications for adverse affects on system availability, reliability, and functional capability. The modifications and the associated attributes reviewed are as follows:

NSM MG-12529/00, Atmospheric Dump Valve Deletion (Initiating Events,Mitigating Systems)

- Conformance to design basis
- Field installation
- Functional test plan and results
- Plant procedure, critical drawing, design basis information, FSAR updating
- Operations training
- 10CFR50.59 Evaluation

MGMM-12124, Replace Nuclear Service Water Valves 1RN-134A and 1RN-137A (Mitigating Systems)

- Materials/Replacement Components material compatibility, Code requirements, and seismic requirements
- Conformance to design basis
- Functional test criteria and results
- Updating of equipment list and valve motor data sheets
- 10CFR50.59 Screening

MGMM-12950, Unit 1 TD Auxiliary Feedwater Pump Speed Change (Mitigating Systems)

- Control signals for accident/event conditions
- Functionality under accident/event conditions
- Test plan and results
- Operations procedures updating
- Operations training
- 10CFR50.59 Screening

MGMM-13186, Change Unit 1 Component Cooling Setpoint Alarms (Mitigating Systems)

- Functionality under accident/event conditions
- Pressure boundary integrity
- Test plan and results
- Operations procedures updating
- Operations training
- 10CFR50.59 Screening

NSM MG-22522/P2, Vital Inverter Change Out (Initiating Events, Mitigating Systems)

- Functionality under accident/event conditions
- Seismic qualification
- Test plan and results
- Operations procedures updating
- Operations training
- 10CFR50.59 screening

NSM MG-22518/P1, Provide CA System Storage Tie-ins (Mitigating Systems)

- Materials type/classification/pressure boundary
- Seismic considerations
- Functional requirements to support design bases for flow and pressure control
- Functional test results
- Plant procedure and critical drawing updating
- Operations training
- 10CFR50.59 screening

NSM MG-22518/P2, CA Storage Tank Addition (Initiating Events, Mitigating Systems)

- Materials/Replacement Components material compatibility, Code requirements, and seismic requirements
- Inspection requirements
- Functional test criteria and results
- Supporting vendor analyses
- Plant procedure and critical drawing updating
- 10CFR50.59 screening

MGMM 12450, Modify 1C RCP Pipe Supports to Fit New Motor (Initiating Events, Mitigating Systems)

- Structural integrity
- Structural effects upon attachment points
- Seismic considerations
- Updating of drawings and affected plant procedures
- 10CFR50.59 screening

MGMM 12974, Installation and Removal of Fuel Assembly Anchors (Barrier Integrity)

- Structural integrity
- Structural effects upon attachment points
- 10CFR50.59 evaluation

MGMM 11592, Offset RN Corrosion by Reinforcement Added to Tee (Mitigating Systems)

- Code and safety classification
- Structural integrity

- Seismic considerations
- Corrective actions for post modification problems
- 10CFR50.59 screening

For selected modification packages, the inspectors observed the as-built configuration. Documents reviewed included procedures, engineering calculations, modifications design and implementation packages, work orders, site drawings, corrective action documents, applicable sections of the UFSAR, supporting analyses, Technical Specifications, and design basis information.

The inspectors also reviewed selected PIPs associated with modifications to confirm that problems were identified at an appropriate threshold, were entered into the corrective action process, and appropriate corrective actions had been initiated.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT)

a. Inspection Scope

The inspectors reviewed PMT instructions and/or observed testing activities for the equipment below to ensure the equipment was returned to service satisfactorily. The inspectors evaluated the PMT to ensure it properly addressed the work performed and that equipment functional capabilities were adequately verified. The inspectors also reviewed various PIPs to verify the adequacy of planned and implemented corrective actions.

PIP/Work Order (WO) Number	Title/Description
M-03-0543	Unit 1 B motor-driven CA pump flow isolation valve to the D steam generator (1CA42B) repair following catastrophic failure of the valve stem
WO-98576686	Replace B control room air handling unit fan shaft and bearings
WO-98578110	Change motor operator torque switch setting associated with the Unit 2 turbine-driven CA pump flow isolation valve to B steam generator (2CA-54AC)
M-02-6111	2B MG set breaker found open
WO-98587013 and WO-98586893	Change Unit 2 A and B CA pump breaker time delay overcorrect relay settings

M-02-5966	2A Main Feedwater Pump speed control cable failure, diagnosis, and replacement

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

.1 Routine Surveillance Testing

a. Inspection Scope

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

Procedure	Title/Description
PT/1/A/4250/004A	Turbine Valve Movement Test
PT/1/A/4252/001	Turbine-driven Auxiliary Feedwater (TDCA) Pump Performance Test
PT/1/A/4150/001B	Reactor Coolant Leakage Calculation
PT/2/A/4350/002B	Diesel Generator 2B Operability Test
PT/0/A/4601/008B	Solid State Protection System (SSPS) Train B Periodic Test With Reactor Coolant System Pressure >1955 PSIG (performed on Unit 1)

b. Findings

Introduction: A Green finding was identified and dispositioned as an NCV for failure to follow a main turbine overspeed test program procedure which resulted in an unexpected excursion in reactor power.

Description: Performance Test PT/1/A/4250/004A, Turbine Valve Movement Test, Revision 042, tests the main turbine's Throttle, Governor, Intercept, and Reheat-Stop Valves for freedom of movement by cycling each valve. During the stroking of the main turbine Governor Valves, which are throttled to control main turbine load and thus reactor power, the procedure requires the reactor operator at the controls (ROATC) to maintain turbine load, as measured by turbine impulse pressure, stable by opening or closing the governor valves not being tested. This is accomplished by using the "GV RAISE" or "GV LOWER" pushbuttons on the turbine control panel in the control room.

On February 1, 2003, with reactor thermal power at 89.8%, the Unit 1 ROATC commenced testing Governor Valve No. 1. As turbine impulse pressure decreased in response to the closure of the valve, the operator pushed the "GV RAISE" pushbutton. The operator observed that turbine impulse pressure increased more than expected. The operator responded to the increase in impulse pressure by incorrectly depressing the "GV RAISE" pushbutton several more times. Main turbine load increased approximately 10 percent in approximately 30 seconds. The Operations Shift Manager observed that all the governor valves were opening and directed the ROATC to close the governor valves which terminated the transient. The increase in reactor thermal power during the transient was later determined to be approximately 4%. The total duration of the transient (from initiation to the time of peak power) was approximately one minute. Additionally, the transient caused pressurizer pressure drop below the departure from nucleate boiling limits of TS LCO 3.4.1 for a short duration (approximately one minute); however, pressure was restored well within the action time of two hours.

Based on the significance of the reactivity excursion (>2% increase on primary power power), the licensee initiated a Significant Event Investigation Team (SEIT). The team concluded that breakdowns in the following processes were major contributors to the event: 1) administrative procedure adherence; 2) pre-job briefs; 3) use of appropriate operating experience; 4) peer checks; 5) supervisory/management oversight; and 6) lack of just-in-time training. Additionally, through the review of PIPs and data from previously performed tests, the team concluded that there were historic difficulties in performing infrequently performed tests.

Analysis: Incorrect manipulation of turbine controls during main turbine valve movement testing resulting in reactivity excursions could reasonable be viewed as a precursor to a significant event and, if left uncorrected, would become a more significant safety by increasing the likelihood of an initiating event. Although this finding contributed to the likelihood of a reactor trip, this issue was determined to be of very low safety significance (Green) because mitigation equipment was not affected.

Enforcement: Technical Specification 5.4.1.a. requires that written procedures shall be implemented covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33 requires procedures for power operation. Performance Test PT/1/A/4250/004A, Turbine Valve Movement Test, Revision 042, contained procedural requirements for operator actions to maintain turbine power/reactor power stable while testing the main turbine governor valves. Contrary to PT/1/A/4250/004A, on February 1, 2003, the ROATC incorrectly raised governor valve demand when the procedure required lowering governor valve demand. This resulted in an unplanned reactivity excursion and reactor power increase.

Because the finding is of very low safety significance (Green) and is captured in the licensee's corrective action program as PIP M-03-0482, it is being treated as a non-cited violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. Accordingly, it is being identified as NCV 50-369/03-02-03: Failure to Follow Main Turbine Valve Movement Test Procedure.

.2 Inservice Surveillance Testing

a. Inspection Scope

The inspectors reviewed the results of PT/1/A/4403/001A, 1A Nuclear Service Water (RN) Pump Performance Test, performed on Unit 1. The inspectors evaluated the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing program to determine equipment availability and reliability. The inspectors evaluated selected portions of the following areas: (1) testing procedures; (2) acceptance criteria; (3) testing methods; (4) compliance with the licensee's in-service testing program, TS, Selected Licensee Commitments, and code requirements; (5) range and accuracy of test instruments; and (6) required corrective actions. The inspectors also assessed whether corrective actions were taken as applicable.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following McGuire temporary modification (MGTM) to determine if the safety function of associated systems was affected. The inspectors reviewed the MGTM design and the procedural controls for the installation and removal of the MGTM. The impact of the MGTM on system operability and accident mitigation functions was also assessed. The inspectors reviewed the 10CFR50.59 screening evaluation and/or safety evaluation, as applicable, for the modification. For MGTM-0273 necessary plant operating procedure changes to declare the valve operable were also reviewed. Additionally, the modification was reviewed by NRC Headquarters motor-operated valve specialists. This issue is also discussed in Section 4OA3.3.

Number	Title/Description
MGTM 0273	Temporary repair of the Unit 1 B CA pump flow isolation valve to the D steam generator (1CA42B) following catastrophic failure of the valve stem following testing

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed the licensee's emergency preparedness training evolution conducted on February 12, 2003. The inspectors reviewed the drill scenario narrative to

identify the timing and location of classification, notification, and protective action recommendation (PAR) development activities. During the drill the inspectors assessed the adequacy of event classification and notification activities. The results of the licensee's drill critique were also reviewed. The inspectors assessed the licensee's evaluation of drill performance with respect to performance indicators. The inspectors also assessed whether identified drill performance deficiencies were entered into the licensee's corrective action program.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

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

2OS1 Access Controls To Radiologically Significant Areas

.1 Access Controls

a. Inspection Scope

Licensee program activities for monitoring workers and controlling access to radiologically significant areas and tasks were inspected. The inspectors evaluated procedural guidance; directly observed implementation of administrative and established physical controls; assessed worker exposures to radiation and radioactive material; and appraised radiation worker and technician knowledge of, and proficiency in implementing radiation protection program activities.

During the onsite inspection, radiological controls for maintenance activities were observed and discussed. In addition, access controls and monitoring for five radiologically significant tasks associated with the previously completed Unit 1 End-of-Cycle 15 Refueling Outage were evaluated. The evaluations included, as applicable, Radiation Work Permit (RWP) details; use and placement of dosimetry to monitor occupational exposures involving significant dose gradients; and electronic dosimeter (ED) set-points and use in loud noise areas. Effectiveness of established controls were assessed against area radiation and contamination survey results, potential for transient elevated dose rates, and occupational doses received. Physical and administrative controls and their implementation for locked-high radiation area (LHRA) keys and for storage of highly activated material within the spent fuel pools were evaluated through direct observation and record reviews.

Occupational workers' adherence to selected RWPs and Health Physics Technician (HPT) proficiency in providing job coverage were evaluated through direct observations, review of selected exposure records and investigations, and interviews with licensee staff. Occupational exposure data associated with direct radiation, potential radioactive material intakes, and from discrete radioactive particle (DRP) or dispersed skin

contamination events identified from March 1, 2002, through January 27, 2003, were reviewed and assessed independently.

During the week of January 27, 2003, radiological postings and physical controls for access to designated HRA and LHRA locations within the Unit 1 (U1) and Unit 2 (U2) Spent Fuel Pool (SFP) and Reactor Auxiliary Building (RAB) areas were evaluated during facility tours. In addition, the inspectors independently measured radiation dose rates and evaluated established posting and access controls for the waste gas decay tank room, the Independent Spent Fuel Storage Installation (ISFSI) storage casks and general areas; ISFSI cask loading activities conducted within the U1/U2 SFP loading areas; and elevated dose rate areas associated with piping and equipment within the U1 and U2 RAB areas.

Radiation protection program activities were evaluated against 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Updated Final Safety Analysis Report (UFSAR) details in Section11, Radioactive Waste Management and Section12, Radiation Protection; Technical Specification (TS) Sections 5.4P, Procedures, and 5.7, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

.2 Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

Access controls and surveillance results for the licensee's ISFSI activities were evaluated. The evaluation included review of ISFSI radiation control surveillance procedures and assessment of ISFSI radiological surveillance data. During tours of the ISFSI cask loading areas and storage facilities, the inspectors observed access controls, thermoluminescent dosimeter (TLD) locations, material condition, and radiological postings on the perimeter security fence. The inspectors conducted independent radiation surveys of the ISFSI general areas and six casks currently stored on the Storage Pads. Survey results were compared to current licensee survey data.

Program guidance, access controls, postings, equipment material condition and surveillance data results were reviewed against details documented in applicable sections of the UFSAR; 10 CFR Parts 20 and 72; and applicable licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the report Attachment.

b. Findings

No findings of significance were identified.

.3 Problem Identification and Resolution

Licensee Corrective Action Program (CAP) Problem Investigation Process (PIP) documents associated with radiological controls, personnel monitoring, and exposure assessments were reviewed and discussed with responsible licensee representatives. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure Nuclear System Directive, 208, Problem Investigation Process (PIP), Revision (Rev.) 24. Specific PIP documents reviewed and evaluated in detail for these program areas are identified in Section 2OS1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment

.1 Area Radiation Monitoring and Post-Accident Sampling Systems

a. Inspection Scope

The operability, availability, and reliability of selected direct area radiation monitor (ARM) equipment used for routine and accident monitoring activities were reviewed and evaluated. The inspectors observed material condition, installed configurations (where accessible), and results of performance checks and calibrations for selected ARMs listed in Section 2OS3 of the report Attachment. The inspectors reviewed the licensee's recently revised commitments with respect to post-accident gas and liquid sampling, and examined the modified Post-Accident Gas Sampling System (PAGSS) for general material condition and identification of abandoned equipment.

Licensee program activities in this area were reviewed against requirements specified in applicable procedures and in Sections 11 and 12 of the UFSAR, and the Safety Evaluation Report details issued with License Amendments Numbers (Nos.) 199 and 180, issued September 17, 2001. Licensee guidance documents, records, and data reviewed are listed in Section 2OS3 of the report Attachment.

b. Findings

No findings of significance were identified.

.2 Personnel Survey Instrumentation

a. Inspection Scope

Current program guidance, including calibration and maintenance procedures, and its implementation to maintain operability, accuracy, and availability of selected portable survey instruments was reviewed and evaluated at the Duke Power Company's (DPCs) Central Calibration Facility (CCF). During the week of January 6, 2003, the inspectors reviewed current quality control and calibration data for selected calibration and personnel survey instruments, and assessed operability of various portable survey

instruments ready for shipment to licensee facilities. Responsible staff's knowledge and proficiency regarding portable survey instrumentation calibration activities were evaluated through interviews, record reviews, and direct observation of calibration activities associated with a Teletector Model 6112B Geiger Counter portable survey instrument (Serial Number 00966) using the Shepherd Model 89 Irradiator. Availability of portable instruments for licensee use was evaluated through discussion of the portable instrumentation management program and review of current reports generated for licensee innage and outage usage needs, assigned site instruments, site instruments requiring calibration in less than 45 days, CCF portable instrument status and instruments ready for shipment. In addition, the inspectors assessed licensee program guidance for portable instruments received from the licensee and found to be out-of-calibration/tolerance.

Current program guidance, including operation procedures, and its implementation to maintain operability and accuracy of selected on-site portable survey instruments was reviewed and evaluated. The inspectors reviewed current calibration data for selected personnel survey instruments maintained onsite and assessed operability of various portable survey instruments staged, or in use by the radiation protection (RP) staff. Responsible staff's knowledge and proficiency regarding portable survey instrument calibration activities were evaluated through interviews, record reviews, and direct observation of daily performance checks of selected instruments. The accuracy and operability determinations for instrumentation used to perform surveys in high radiation or greater areas were assessed. The portable instruments which were inspected are listed in Section 2OS3 of the report Attachment.

Operability and analysis capabilities of Personnel Contamination Monitoring equipment used to survey individuals exiting the radiologically controlled area (RCA) were evaluated. The inspectors directly observed functional checks of three monitors. In addition, operability and analysis capabilities of the whole body counting (WBC) equipment was evaluated. Selected WBC data analysis sheets results were reviewed and discussed with responsible staff to assess knowledge and proficiency in evaluating WBC results. The licensee's capabilities to expand the routinely used WBC radionuclide library data was assessed.

Licensee activities associated with personnel radiation monitoring instrumentation were reviewed against TS, 10 CFR 20.1204 and 20.1501, and applicable licensee procedures listed in the Section 2OS3 in the report Attachment.

b. Findings

No findings of significance were identified.

.3 Respiratory Protection - Self Contained Breathing Apparatus (SCBA)

a. Inspection Scope

The licensee's respiratory protection program guidance and its implementation for SCBA equipment use were evaluated. The SCBA units staged for emergency use in the Control Room and selected locations were inspected for material condition, air pressure, and number of units available. The inspectors reviewed and evaluated current

records associated with supplied air quality and maintenance of SCBA equipment. Proficiency and knowledge of staff responsible for maintaining SCBA equipment were evaluated through discussions and demonstration of an SCBA monthly functional test. Control Room operations personnel were interviewed to determine their knowledge of available SCBA equipment locations and proper use. The inspectors also assessed the licensee's arrangements for transporting replacement air bottles to the Control Room and Operations Support Center.

Licensee activities associated with maintenance and use of SCBA equipment were reviewed against 10 CFR Part 20.1703; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection, Revision 1, October 1999; ANSI-Z88.2-1992, American National Standard Practices for Respiratory Protection; and applicable procedures as listed in Section 2OS3 of the report Attachment.

b. Findings

No findings of significance were identified.

.4 Problem Identification and Resolution

a. Inspection Scope

Selected licensee PIP documents associated with area radiation monitoring equipment, portable radiation detection instrumentation, and respiratory protective program activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure Nuclear System Directive, 208, Problem Investigation Process (PIP), Rev. 24. Specific documents reviewed and evaluated are listed in Section 2OS3 of the report Attachment.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

.1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

The operability, availability, and reliability of selected effluent process sampling and detection equipment used for routine and accident monitoring activities were reviewed and evaluated. Inspection activities included record reviews and direct observation of equipment installation and operation. Current source transfer and loop calibration data were reviewed for the selected process monitors associated with steam generator blow-down, liquid effluents, waste gas decay tank, and main plant vent releases.

During the week of January 27, 2003, the inspectors directly observed process effluent sampling and monitoring equipment material condition, installed configurations (where accessible), and operability; evaluated selected effluent release and sample flow rate

data; and reviewed and evaluated established release set-points. In addition, five effluent release permits completed and documented between January 1, 2002, and December 31, 2002, were reviewed, discussed, and evaluated. The evaluation assessed effluent sample representativeness, radionuclide concentration sensitivities,

achieved analyses accuracies; pre-release dose calculation completeness, and adequacy of effluent radiation monitor set-point determinations.

The licensee's counting laboratory quality control (QC) program activities for liquid and airborne sample radionuclide analyses were evaluated. The inspectors discussed and reviewed, as applicable, current gamma spectroscopy and liquid scintillation detection equipment calibrations and daily system performance results; preparation, processing and storage of composite samples; radionuclide lower limit of detection (LLD) capabilities and achieved accuracies; and results of the quarterly cross-check spiked radionuclide samples.

The inspectors directly observed and evaluated staff proficiency in conducting laboratory analyses, pre-release processing, sampling, and gamma spectroscopy analyses. Interviews were conducted with counting room technicians to evaluate staff proficiency and knowledge of effluent release requirements, equipment capabilities, and procedural details.

Equipment configuration, material condition, and operation for the effluent processing, sampling, and monitoring equipment were reviewed against details documented in TS; 10 CFR Part 20, UFSAR Section 11, Selected Licensee Commitment (SLC) Manual, Section 16.11, Rev. 27; Offsite Dose Calculation Manual (ODCM), Rev. 43; American Nuclear Standards Institute (ANSI)-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; ANSI-N13.10-1974, American National Standard (ANS) Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents, and approved procedures listed in the report Attachment.

Effluent sampling task evolutions, and offsite dose results were evaluated against 10 CFR Part 20 requirements, Appendix I to 10 CFR Part 50 design criteria, TS, UFSAR details, ODCM, and applicable procedures listed in Section 2PS1 of the Attachment to this report. Laboratory QC activities were evaluated against RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plant, June 1974; and RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment, December 1977.

b. Findings

Introduction. A Green NRC-identified finding was identified for the failure to conduct representative sampling for required surveys of airborne effluent particulates released from the Unit 1 and Unit 2 main plant vents.

Description. During walk-downs and discussions regarding of U1 and U2 main plant vent effluent sampling line configurations and operating characteristics, the inspectors identified concerns associated with sample representativeness for particulate radioactive

material collected to continuously monitor airborne effluents in accordance with Selected Licensee Commitment (SLC) Manual Table 11.7.11-1. Specifically, the inspectors noted that both the U 1 and U 2 Regulated Air Pump (RAP) -1 sample lines used to collect main plant vent iodine and particulate samples drew suction from "T" connections, rather than isokinetic sample nozzles, in their respective main plant vent sample headers. These main plant headers supply the original vendor-provided effluent monitoring (EMF) particulate (EMF 35), noble gas (EMF-36), and iodine (EMF-37) monitoring equipment. Licensee representatives stated that as a result of problems with sample change-out using the EMF particulate and iodine monitoring equipment, the RAP-1 equipment was installed in association with plant startup to collect and monitor the particulate and iodine radionuclides released from the main plant vents.

The inspectors noted that UFSAR section 11.4.2 specifies that operating limits for continuous monitoring are based on RG 1.21, Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants which references ANSI N13.1-1969, Guide to Sampling Airborne Radioactive Material in Nuclear Facilities for general principles and guidance for sampling airborne radioactive materials. The ANSI guidance specifies that abrupt changes in sample flow direction and velocity differences would result in anisokinetic sampling of particulate materials in airborne effluent streams. Further UFSAR Section 11.4.2.2.3, Unit Vent Monitor specifies that sample piping length is minimized and bends are limited to long radii to reduce particulate plate-out. Based on the U1 and U2 main plant vent effluent flow characteristics, the inspectors noted that the observed RAP-1 flow characteristics, i.e., flow rates of 0.7 standard cubic feet per minute and velocity of approximately 200 feet per minute (ft/min) combined with the use of the "T" connection in the EMF header degraded the ability of the system to collect representative samples of large diameter particulate radionuclides in the U1 and U2 main plant vent effluents. Although licensee representatives stated that the plant vent effluent releases are filtered through non-safety related High Efficiency Particulate Air (HEPA) filters resulting in the majority of particulates being less than 1 micron diameter in size which are not readily affected by the identified system design concerns, the inspectors noted sample parameters should be established for large diameter particles in case of leakage or by-pass of HEPA filters. The inspectors noted that based on U 1 and U2 main plant vent flow characteristics, the failure to use isokinetic nozzles to take suction for the RAP-1 equipment, and RAP-1 sample line flow characteristics would result in non-representative, non-conservative sampling of large diameter radioactive particulate materials in the U1 and U2 main plant vent effluents.

Analysis. The inspectors determined that this finding was greater than minor. The failure to maintain proper RAP-1 sample line configurations and flow characteristics to assure representative sample collection from the U1 and U2 main plant vent effluent streams could result in non-conservative measurement and reporting of airborne particulate radionuclides in samples and resultant doses estimates associated with radiation protection program and process attributes of the Public Radiation Safety Cornerstone objective. This finding was evaluated using the Public Radiation Safety Significance Determination Process (SDP). This finding is of very low safety significance based on current operations and processing of the main plant vent effluents which result in small diameter particulates which are not readily affected by the observed conditions. Review and discussion of gross main plant effluent particulate

results collected using the EMF-35 monitoring equipment which was designed and operated to collect representative particulate samples from the main plant vent corroborated that particulate releases and subsequent offsite doses to be negligible.

Enforcement. 10 CFR 20.1501(a) details, in part, that each licensee make or cause to be made surveys that may be necessary for the licensee to comply with the regulations in this part. 10 CFR CFR 50, Appendix I, Section IV (B) requires, in part, licensees to establish an appropriate surveillance and monitoring program to provide data on the quantities of radioactive material released in effluents to assure that provisions of Paragraph A of this section are met. Selected Licensee Commitment (SLC) Manual Table 11.7.11-1, specifies instrumentation used for radioactive effluent monitoring. Contrary to the above, the licensee failed to conduct representative sampling for potential particulate radionuclides released from the U1 and U2 main plant vent to the off-site environs. Because the failure to conduct adequate surveys of particulate radionuclides in effluents was determined to be of very low safety significance and has been entered into the licensee's corrective action program (PIP Number M-02-5770) this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. It will be identified as NCV 50-369,370/03-04: Failure to Conduct Adequate Surveys of Unit 1 and Unit 2 main Plant Vent Particulate Radionuclides.

.2 Problem Identification and Resolution

a. Inspection Scope

Licensee CAP documents associated with effluent processing and monitoring activities were reviewed. Five PIPs documented in Section 2PS1 of the report Attachment were reviewed and evaluated in detail. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure Nuclear System Directive, 208, Problem Investigation Process (PIP), Rev. 24.

b. Findings

No findings of significance were identified

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

.1 Radiological Environmental Monitoring Program (REMP) Implementation

a. Inspection Scope

The licensee's 2001 Annual Radiological Environmental Operating Report describing Radiological Environmental Monitoring Program (REMP) implementation and assessment of program results was reviewed and discussed with licensee representatives. The inspectors assessed surveillance results, data analysis details, land use census results, inter-laboratory comparison program details, and permitted program deviations. The report details were assessed for required sample types, sampling locations, and monitoring frequencies.

During the week of January 6, 2003, analytical laboratory activities conducted at the Duke Power Company (DPC) Environmental Radiation (EnRad) facilities used to conduct quantitative radionuclide analyses for licensee REMP samples were reviewed and evaluated. The inspectors reviewed and evaluated procedural guidance and its implementation and assessed knowledge and proficiency of responsible staff. In addition, laboratory analysis quality control (QC) activities for sample preparation and for gamma spectroscopy, liquid scintillation counting, and gross beta analysis instrumentation were reviewed and evaluated. The program policy and QC data reviewed and discussed included sample receipt and storage; sample preparation and chain of custody implementation; analytical instrument calibration and performance data; inter-laboratory sample comparison results; and quantitative radionuclide measurement accuracy, and LLO capabilities.

On January 29, 2003, the inspectors toured and evaluated selected sampling stations for location and material condition of REMP equipment. The inspectors independently assessed six air sampling station locations against ODCM specifications using NRC global positioning equipment. Collection of air particulate filters and charcoal cartridges, and flow rate determinations were observed at air sampling stations 133,192, 125,121, and 195. In addition, material condition, and the placement and location of four off-site TLDs at sampling stations 145,182,182,191, one surface water at sampling station 128, and milk collection sites 138 and 139 were evaluated. The proficiency and knowledge of workers collecting the samples and adequacy of collection techniques were assessed.

Program guidance, procedural implementation, and environmental monitoring results were reviewed against TS; 10 CFR Parts 20 and Appendix I to 10 CFR Part 50 design criteria requirements; FSAR details; ODCM guidance; and applicable procedures listed in Section 2PS3 of the Attachment to this report. Specific laboratory QC activities were evaluated against RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials In Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plant, June 1974; and RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment, December 1977.

b. Findings

No findings of significance were identified.

.2 Meteorological Monitoring Program

a. Inspection Scope

Licensee program activities to assure accuracy and availability of meteorological data were evaluated. Calibration procedures and records for the three most recent calibrations of the meteorological monitoring instruments for air temperature, wind speed, and wind direction were reviewed and evaluated. During the week of January 27, 2003, the inspectors assessed material condition and operability during tours and observation of meteorological monitoring equipment. Accuracy of meteorological data was assessed. The inspectors evaluated and reviewed instrument operability and assessed availability and accuracy of current meteorological data within the Control Room.

The meteorological program implementation and activities were reviewed against TS, 10 CFR Part 20, SLC Manual, UFSAR Section 2, ODCM, ANSI - 3.11-2000, Determining Meteorological Information, and applicable procedures documented in the Attachment to this report.

b. Findings

No findings of significance were identified.

.3 Unrestricted Release of Materials from the Radiologically Controlled Area (RCA)

a. Inspection Scope

The inspectors reviewed and evaluated radiation protection program activities associated with the unconditional release of materials from the RCA. During the week of January 27, 2003, inspectors directly observed surveys of potentially contaminated materials released from the RCA for unrestricted use. Licensee data to evaluate survey requirements for hard-to-detect radionuclides were reviewed and discussed.

The inspectors challenged three Small Article Monitor (SAM) detectors using a 0.004 microcurie (as of August 8, 2001) source. These detectors were located at the Main RCA exit (2 detectors) MCHPS Nos. 26902, 26903 and Green Tag Table (1 detector) No. 26947.

The licensee practices and implementation of their monitoring activities were evaluated against 10 CFR Part 20, UFSAR, and applicable procedures documented in the attachment to this report.

b. Findings

No findings of significance were identified.

.4 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed selected PIPs associated with REMP operations, and with the unrestricted release of materials from the RCA. Specific PIPs reviewed and evaluated in detail are identified in the Attachment to this report. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with licensee procedure Nuclear System Directive, 208, Problem Investigation Process (PIP), Rev. 24.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Reactor Safety PI Verification

a. Inspection Scope

The inspectors reviewed data for the following three Reactor Safety PIs for Units 1 and 2 for the period of January 1 through December 31, 2002, to verify the accuracy of the PIs reported during that period. PI definition and guidance contained in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Indicator Guideline, Revision 2, were used while assessing the accuracy in reported data.

Cornerstone	Performance Indicator
Initiating Events	Unplanned Scram Rate
Initiating Events	Unplanned Power Changes >20% per 7,000 Critical Hours
Initiating Events	Scrams with Loss of Normal Heat Removal

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

b. Findings

No findings of significance were identified.

.2 Occupational Radiation Safety Performance Indicator Verification

a. Inspection Scope

The Occupational Exposure Control Effectiveness performance indicator (PI) results for the Occupational Radiation Safety Cornerstone were reviewed for the period April 1, 2002, through December 31, 2002. For the review period, the inspectors reviewed data reported to the NRC, and subsequently sampled and evaluated applicable CAP and selected Health Physics Program records. The reviewed records included selected health physics innage and outage activity logs, personnel contamination event records, and internal exposure evaluations. Reviewed documents are listed in Sections 2OS1 and 4OA1 of the Attachment to this report.

b. Findings

No findings of significance were identified.

.3 Public Radiation Safety Performance Indicator Verification

a. Inspection Scope

The inspectors reviewed and discussed the Radiological Control Effluent Release Occurrence PI indicator results for the Public Radiation Safety Cornerstone from April 01, 2002, through December 31, 2002. For the review period, the inspectors reviewed data reported to the NRC and evaluated selected radiological liquid and gaseous effluent release data, out-of-service process radiation monitor and compensatory sampling data, abnormal release results, and selected PIP records documented in the Sections 2PS1 and 4OA1 of the report Attachment.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Annual Sample Review

a. Inspection Scope

The inspectors performed in-depth reviews of selected PIPs to determine whether conditions adverse to quality were addressed in a manner that was commensurate with the safety significance of the issue. The inspectors reviewed the actions taken to determine if the licensee had adequately addressed the following attributes:

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

The following issues and associated corrective actions were reviewed:

- PIP M-03-352 which documented the loss of the automatic ECCS switchover to containment sump function when the sensing lines to the FWST level detectors froze during cold weather (see Section 1R01). Inadequate design and configuration control prevented the FWST Heat Trace Control System from protecting the sensing line from freezing. As a result of the inspection, the licensee initiated PIP M-03-1443 to document an identified error in the sequence events section in the approved root cause analysis.

- PIP M-02-4942 which documented high temperatures in the 1A ND motor upper thrust bearing following restart from the Fall 2002 refueling outage. Specifically, the inspectors reviewed the effectiveness of monitoring the elevated

temperatures and the qualification of motor oil and bearing for adverse high temperature effects over the required accident mission times. Long-term corrective actions including proposed design changes were also discussed with the licensee.

b. Findings

No findings of significance were identified, except as already addressed in Section 1R01.

.2 Cross - Reference to PI&R Findings

Section 1R15 describes a finding for failure to take adequate corrective actions associated with the venting of emergency core cooling systems following refueling outages.

4OA3 Event Followup

.1 Unit 2 Main Feedwater Pump Trip and Runback

On January 15, Unit 2 experienced a runback to approximately 50% power due to the 2A main feed pump tripping. The inspector responded to the control room and monitored operator response to the transient. The licensee determined that the trip was due to low control oil pressure caused by excessive seat leakage on both of the turbine trip solenoid valves. These valves are arranged in parallel and are designed to dump control oil from the steam supply stop valve during an electrical trip of the main feed pump.

.2 Unit 1 FWST Failed Level Indications Due to Freezing

On January 24, the sensing lines for the Unit 1 Refueling Water Storage Tank (FWST) level transmitters froze as indicated by the level indications failing high. The inspectors reviewed the licensee's compensatory measures used to thaw and maintain the sensing lines warm for the remainder of the expected cold weather period. This included increased periodic checks to ensure that the FWST Heat Trace Control System alignments were in accordance with the established compensatory measures. This event was previously discussed in detail in Section 1R01.

.3 Notice of Enforcement Discretion (NOED) to Repair 1CA42 Shaft Failure

On February 6, 2003, the NRC granted a Unit 1 NOED related to enforcing compliance with the requirements of TS 3.7.5, Auxiliary Feedwater (CA) system, and TS 3.6.3, Containment Isolation Valves. The details of the failure and the request is documented in a Letter dated February 7, 2003, from the licensee to the NRC. Valve 1CA-42B is the isolation valve for the CA supply from the 1B motor driven CA pump to the D steam generator. The valve was inoperable to complete a modification to the actuator. However, during post maintenance testing the stem failed and the condition warranted additional LCO time to complete the repair. The inspectors reviewed the applicable TS requirements, assessed the impact of the inoperable valve, and monitored for compliance with the compensatory measures established as conditions for granting of

the NOED. An unresolved item (URI) will be identified to review the root cause of the stem failure once completed by the licensee to determine if Enforcement Actions are warranted for the identified condition. It will be identified as URI 369/03-02-04: NOED for 1CA42 Stem Failure.

4OA6 Meetings

Exit Meeting

.1 The inspectors presented the inspection results to Mr. H. Sloan on March 26, 2003, and to Mr. T. Harrall, Station Manager, McGuire Nuclear Station, at the conclusion of the inspection on March 27, 2003. The licensee acknowledged the findings presented.

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

.2 Annual Assessment Meeting Summary

On April 4, 2003, the NRC's Chief of Reactor Project's Branch 1 and the Senior Resident Inspector assigned to the McGuire Nuclear Station met with Duke Energy Corporation to discuss the NRC's Reactor Oversight Process (ROP) and the McGuire annual assessment of safety performance for the period of January 1, 2002 - December 31, 2002. The major topics addressed were: the NRC's assessment program, the results of the McGuire assessment, and NRC security activities. Attendees included McGuire site management, members of site staff, and members of the local news media.

This meeting was open to the public. The presentation material used for the discussion is available from the NRC's document system (ADAMS) as accession number ML030980627. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

Bradshaw, S., Superintendent, Plant Operations
Bramblett J., Chemistry Manager
Brenton D., Shift Operations Manager
Bryant, J., Licensing Engineer
Dolan, B., Manager, Safety Assurance
Evans W., Security Manager
Geer, T., Manager, Mechanical and Civil Engineering (MCE)
Harrall, T., Station Manager, McGuire Nuclear Station
Houser, D., Reactor Electrical Systems (RES) - Freeze Protection Coordinator
Jamil, D., Site Vice President, McGuire Nuclear Station
Loucks L., Radiation Protection Manager
Patrick, M., Superintendent, Maintenance
Peele, J., Manager, Engineering
Simms N., Licensing Specialist
Thomas, J., Manager, Regulatory Compliance
Thomas, K., Manager, RES Engineering
Travis, B., Superintendent, Work Control
Williams, D., RES Supervisor

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

50-369/03-02-01	NCV	Failure to Follow Maintenance Procedure for FWST Level Instrument Freeze Protection System (Section 1R01)
50-369/03-02-02	NCV	Inadequate Corrective Action to prevent Gas Accumulation in the Residual Heat Removal System Following Refueling Outage (Section 1R15)
50-369/03-02-03	NCV	Failure to Follow Main Turbine Valve Movement Test Procedure (Section 1R22.1)
50-369,370/0003-02-04	NCV	Failure to conduct adequate surveys of the Unit 1 and Unit 2 Main Plant Vent Particulate Radionuclides (Section 2PS1)

Opened

50-369/03-02-04	URI	Root Cause Determination for 1CA42 stem failure requiring Notice of Enforcement Discretion (NOED) (Section 4OA3.3)

LIST OF DOCUMENTS REVIEWED

(Sections 1R02 and 1R17)

Evaluations

OP/1, 2/A/6100/003, Controlling Procedure for Unit Operation, Revisions 102 and 88 (Unit Coastdown)
OP/1, 2/A/6100/003, Controlling Procedure for Unit Operation, Revisions 101 and 84 (Unit Shutdown via Manual Trip from Less than 20% Power)
UFSAR Change for change to EP/1/A/5000/FR-Z.1 & EP/1/A/5000/ES-1.3, ND Swapover to Auxiliary Spray
TO/1/A/9600/127, Increased Aux Letdown Flow for Crud Burst, Rev. 0
NSM MG-12529/00, Atmospheric Dump Valves Deletion
MGMM-12974, Installation and Removal of Fuel Assembly Anchors

Screened Out Items

MGMM-12950, Unit 1 TD Auxiliary Feedwater Pump Speed Change, 10/11/2002
AP/1, 2/A/5500/04, Rapid Down Power, Revisions 11 and 13, 06/11/2002
MCTC-1573-KC.H001-001, Test Acceptance Criteria for KC Heat Exchanger, 10/02/2002
Technical Specification Basis 3.7.12 Change, Fuel Handling Ventilation Exhaust System, 01/23/2002
MGMM-13186, Change Unit 1 Component Cooling Setpoint Alarms, 04/30/2002
NSM MG-22522/P2, Vital Inverter Change Out, 06/06/2000
MGMM-12124, Replace Nuclear Service Water Valves 1RN-134A and 1RN-137A
UFSAR Change for Diesel Air to Instrument Air Cross Tie, 11/21/2002
SLC Change for Spent Fuel Pool Sub-Region Map, 09/15/2001
TT/2/A/9700/311, Controlling Procedure for Rack Saver Demonstration, Rev. 0
MGMM-13422, 10CFR50.59 Review of 19 Minor Modifications
NSM MG-22518/P1, Provide CA System Storage Tie-ins
NSM MG-22518/P2, CA Storage Tank Addition
CGD 2012.01-09-0001, MOV Long Life Grease
CGD 2012.02-15-0001, Transformer Oils
MGMM 11592, Offset RN Corrosion by Reinforcement Added to Tee
MGMM 12450, Modify 1C RCP Pipe Supports to Fit New Motor

Self-Assessment Documents

Self-Assessment No. GO-02-01 (NPA) (50.59) (ALL), 10CFR50.59 Process Evaluation
PIP M-97-01107, Evaluation of Operator Response Time to Align ND to Auxiliary Spray
PIP M-99-02048, Turbine Driven Auxiliary Feedwater Pump Vibration

PIP M–1-03270, UFSAR not Updated for Diesel Powered Instrument Air Compressors
PIP G-02-00054, Self-Assessment 10CFR50.59 Areas for Improvement
PIP M-02-00705, Individual not 50.59 Qualified
PIP M-02-00707, Individual Signed Applicability Determination without Required Training
PIP M-02-00708, Applicability Evaluation Incorrectly Exempted from 10CFR50.59 Process
PIP M-02-02353, Corrections Needed in FSAR for VG to VI Interface
PIP M-02-02876, Minor Modifications Self-Assessment Corrective Actions
PIP M-02-03318, Change Required to Minor Mod Affecting Manpower/Dose
PIP M-02-04780, Incorrect Relay Installed during Modification

(Section 2OS1)

Procedures, Guidance Documents, and Manuals

Health Physics Procedure (HP)/2/B/1006/009, Controls for Reactor Building Entry Under Power, Revision (Rev.) 0
HP/0/B/1006/012, Control for Radiological Status and Areas of Radiological Significance, Rev. 11
HP/0/B/1003/063, Radiological Status and Routine Surveillance, Rev. 9 through 11
HP/2/B/1006/024, Refueling Outage Controls and Surveillance, Rev. 02
Standard Health Physics Procedure (SH)/O/B/2001/003, Investigation of Skin and Clothing Contamination, Rev. 5
Temporary Health Physics Procedure (TH)/1/B/9500/028, 1 End-of-Cycle (EOC)15 Fuel Movement Radiological Controls, Rev. 01
McGuire Nuclear Site, Independent Spent Fuel Storage Installation, 10 CFR 72.212 Evaluation, Rev. 3
HP/2/B/1006/025, Radiation Protection Controls for Loading Spent Fuel Assemblies into TN-32A Dry Storage Casks, Rev. 000
SH/0/B/2000/009 Neutron Dose Tracking, Rev. 001

Radiation Work Permits (RWPs)

RWP-1214, Unit 1 (U 1), Reactor Building - Reactor Head Bare Metal Inspection - Reactor Head Team Activities, Rev. 0
RWP-1722, U1, Reactor Building - Reactor Head, Remove & Replace Shielding , Insulation & VR Ductwork, Rev. 1
RWP-1725, U1, Reactor Building - Reactor Head, Detention, Remove/Replace, & Tension Reactor Head Studs, Rev. 9
RWP-1739, Unit 1, Reactor Building - U1 Auxiliary/Reactor Building: B NCP Motor Work (Replace Motor), Rev. 10
RWP-1770, 1 EOC 15 Auxiliary Building, Installation and Removal of Temporary Shielding, Rev. 7,
RWP-1775, Unit 1, Reactor Building - Install and Remove “Direct Temporary Shielding, Rev. 7

Records and Data

HP/0/B/1006/026, Radiation Protection Field Operations Logbook, Rev. 2, Data Sheets from September 1, through October 31, 2002, including Enclosure 5.1, Radiation Protection (RP) Field Operations to Shift Turnover Sheets; Enclosure 5.2, Innage

Activities; Enclosure 5.3, Outage Activities; Enclosure 5.4, RP Field Operations Log - Comments

SH/0/B/2001/003, Investigation of Skin and Clothing Contaminations Rev. 5, data Sheets from September 1 through October 31, 2002, including Enclosure 5.1 Personnel Contamination Summary, Enclosure 5.2, Personnel Contamination Calculation, Enclosure 5.3, Personnel Contamination Dose Calculation, Enclosure 5.4, Personnel Contamination Survey, Enclosure 5.5, Supervisor Checklist for Personnel Contamination

Electronic Dosimeter (ED) Setpoint Change Documentation, October 1, 2002 through October 31, 2002.

Procedure Process Record for TH/1/B/9500/028, 1 EOC15 Fuel Movement Radiological Controls, Rev. 01, Conducted 09/20-22/2002 and 09/26-28/2002

Total Effective Dose Equivalent (TEDE) data January 1, through December 31, 2002

McGuire Nuclear Station (MNS) Survey Data Sheet, ISFSI Pad Surveys Conducted 02/04/02, 05/02/02, 05/28/02, 05/29/02, 08/20/02,12/09/02

Corrective Action Program (PIP Documents)

PIP M-02-04418, Worker Received ED Dose Alarm, Reactor Head Crew, 9/15/02

PIP M-02-04765, Worker Received ED Dose Alarm, Maintenance, 9/24/02

PIP M-02-04865, Valid Portal Monitor Alarm Received on a Worker That Had Not Been Working in the RCA, dated 9/26/02

PIP M-02-04905 Random Lanyard Survey Identified a Discrete Radioactive Particle, dated 9/27/02

PIP M-02-05239, Workers Received ED Dose Alarm, Decon Activities, 9/25/02

(Section 2OS3)

Procedures, Guidance Documents, and Manuals

Central Calibration Facility (CCF) Procedure 801, Radiation Protection Portable Instrument Data Management, Rev. 0

CCF Procedure 810, Setup and Calibration of Teletector Model 6112B Geiger Counter, Rev. 0,

CCF Procedure 812, Calibration of Eberline E-120, Rev. 0

Radiation Dosimetry and Records (RD) Procedure RD/0/B/7000/02, Calibration of the J. L. Shepherd Model 89 Shielded Calibration Range and Model 78-2M Dual Source Beam Calibrator Equipped with a Series 154 Attenuator System,

HP/0/B/1009/032, Sampling Containment Atmosphere Under Accident Conditions, Rev. 0

HP/0/B/1005/061, Operation of the Radiation Protection Portable Survey Instruments, Rev. 0

HP/0/B/1005/065, Operation of Portable Monitoring Instrument Models RO-2/2A/20/RO7 and Bicron RSO-5/50/500, Rev. 0

HP/0/B/1005/066, Response Checks of Personnel Monitoring Equipment, Rev. 11

SH/0/B/2003/001, Respiratory Protection, Rev. 2

HP/0/B/1008/006, Respiratory Protective Equipment Maintenance and Storage, Rev. 7

HP/0/B/1008/012, Operation of Bauer High Pressure Breathing Air Fill System, Rev. 1

PT/0/A/4457/010, Sampling of the Ingersoll-Rand SCBA Air Compressor for Grade D Quality Air, Change 0

License Amendments Numbers (Nos.) 199 to NPF-9 and No. 180 to NPF-17, Elimination of Post Accident Sampling Requirements, Issued September 17, 2001

Records and Data

Verification Data of the SCRAM program used for Calibration of the J. L. Shepherd Model 89 Shield Calibration Irradiator at the Central Calibration Facility; Serial Number (S/N) 9128, 10/22/02; and S/N 8129, 12/12/2002.
McGuire Nuclear Station, Instrument Usage Needs, Inage and Outage Activities, dated September 9, 2002
Instruments Ready for Shipment, Report, as of January 8, 2003,
Instrument Status Report - Central Calibration Facility (CCF) Laboratory, as of January 8, 2003,
CCF Instruments by Site Matrix Report, as of January 8, 2003
Calibration Required $\leq$ 45 Days Report, as of January 8, 2003
Area Radiation Monitor Calibrations Reviewed:
- 1EMF-5, Unit 1 Sample Room ARM, calibrated 06/13/2002 (3-year calibration cycle)
- 1EMF-11, Waste Drumming Area ARM, calibrated 10/04/2002 (3-year calibration cycle)
- 1EMF-48, Reactor Coolant Monitor, calibrated 03/09/2000, (3-year calibration cycle)
- 1EMF-51A, Reactor Building Lower Containment ARM, calibrated 09/18/2002 (18 month calibration cycle)
- 1EMF-51B, Reactor Building Lower Containment ARM, calibrated 09/18/2002 (18 month calibration cycle)

Portable Instruments Evaluated (calibration required every 6 months)
- Eberline RO-20, serial number (SN) 1365, calibrated 10/08/2002
- Eberline RO-20, SN 1377, calibrated 10/17/2002
- Teletector 6112B, SN 35793, calibrated 01/13/2003
- Bicron Micro Rem, SN B982Y, calibrated 08/12/2002
- REM-500 neutron survey instrument, SN 00103, calibrated 11/04/2002
- REM-500 neutron survey instrument, SN 00105, calibrated 12/06/2002

Whole-body Counter Library Standard and Medical Radionuclide Listings, as of January 27, 2003

PIPs

PIP M-02-03564, In-service RM-14 (frisker) Out of Calibration, 07/22/2002
PIP M-02-01294, Radiation Survey Instrument Failed to Indicate Actual Dose Rate on KF filter, 03/10/2002
PIP M-02-01076, Teledosimetry Used for Outage Coverage Is Performing Erratically, 03/05/2002
PIP M-02-01557, Response Checks on Portable Instruments Were Not Being Performed on All Scales as Required by ANSI-N323 (1997), 03/19/2002

(Section 2PS1)

Procedures, Guidance Documents, and Manuals

HP/0/B/1001/022, Calibration of the Gamma Spectroscopy System, Rev. 5
HP/0/B/1001/024, Quality Assurance for the Gamma Spectroscopy System, Rev. 6,
HP/0/B/1001/038, Quality Assurance of the Count Room Equipment, Rev. 6
HP/0/B/1003/008, Determination of Radiation Monitor Setpoints (EMFs), Rev 29
HP/0/B/1003/049, Waste Monitor Tank Release, Rev. 7
HP/0/B/1003/050, Waste Gas Decay Tank Sampling and Release, Rev. 8

HP/0/B/1003/070, Liquid and Gaseous Composite Preparation, Effluent Sampling, and Analysis Documentation, Rev. 8
Chemistry Procedure (CP)/0/B/8600/001, Radwaste Sampling, Rev. 25,WMT A
Operations Procedure (OP)/0/B/6200/107, Liquid Waste Release - WMT B with WMT Pump B, Rev. 10

Records and Data

Gamma Spectroscopy System Calibrations for Detectors Nos. 1, 2, 3, 4 conducted 03/17/02
Gamma Spectroscopy System Quality Assurance Data for Detectors Nos. 1, 2, 3, 4 conducted during January 1-27, 2003, and the weeks of 6/04/02, 9/07/2002, and 12/22/02
Counting Room Inter-Laboratory Cross-Check Results 1st through 3rd Quarter 2002
Waste Gase Decay Tank Analysis Records, 12/01/02 through - 01/29/03
Liquid Waste Release (LWR) Permit 2002189, Waste Monitor Tank "A", 10/11/02
LWR Permit 2002190, Waste Monitor Tank "B", 10/11/02
Gaseous Waste Release (GWR) Permit 2002043, Unit 1 Containment Air Release and Addition, 08/22/02,
GWR Permit 2002077, "D" Waste Gas Decay Tank, 11/21/02
GWR Permit 2002088, Unit 1 Vent, 12/01/02 through 01/01/03
GWR Permit 2002089, Unit 2 Vent, 12/01/02 through 01/01/03
2EMF34H, U2 Steam Generator Blowdown Monitor calibration records, conducted 8/13/02
1EMF35, U1 Plant Vent Particulate calibration records, conducted 12/12/02
1EMF36, U1 Plant Vent Gas, calibration records, conducted 12/11/02
1EMF37, U1 Plant Vent Iodine calibration records, conducted 10/08/01
0EMF49L, Liquid Effluent Monitor, conducted 11/30/01
0EMF50, Waste Gas Decay Tank Release Monitor calibration records, conducted 11/27-28/01

PIPs

M-02-05917, Valve 1 WG-246 (WGDT F Inlet) Leaked by during a Waste Gas Release, 11/21/02
M-02-05770, 1 EMF31 was Isolated and Inoperable on 11/13/02, 10:02 but not Declared in TSAIL until 11/14/02 04:47, 11/19/02
M-02-01895, IAE Found Significant Calibration Errors on 2 EMF6, 04/08/02
M-02-05896, Testing has Determined There is an Unaccounted for Beta Activity Contained Within the Waste Gas Decay Tanks, 12/02/02
M-02-02554, The Daily Quality Assurance Check Was Not Performed on (MMCHPS 27382) Automatic GM in the Specific Time Period, 5/18/02

Annual Reports

2000 Annual Liquid and Gaseous Effluent Report, March 22, 2001,
2001 Annual Radioactive Effluent Release Report, March 21, 2002

(Section 2PS3)

Procedures, Guidance Documents

Duke Power Company (DPC) Radiation Protection Policy Manual, Radiological Environmental Monitoring Program Policy IV-07, Rev. 1.
DPC Environmental Division, Radiological and Environmental Services (EnRad) 2, Operational Radiological Environmental Sample Collection Program for McGuire Nuclear Station, Rev. 9
EnRad Procedure 52, Preparation of Samples for Gamma Analysis, Rev. 2
EnRad Procedure 53, Preparation of Samples for Gross Alpha and Gross Beta Analysis, Rev. 13
EnRad Procedure 54, Preparation and Counting of Samples for Low Level Iodine - 131 Analysis, Rev. 7
EnRad Procedure 62, Preparation of Tritium Samples, Rev. 0
EnRad Procedure106, Calculation and Determination of Lower Limits of Detection for Radiological Laboratory Instrumentation, Rev. 2
EnRad Procedure 109, Initial and Final Review of Data Using the Lab Manager Laboratory Information Management System, Rev. 1
EnRad Procedure 111, Routine Quality Control Using the Count Room Analysis System (CAS), .
EnRad Procedure 112, Routine QC on the Tennelec Series 5 Low Background Counting Instruments Using Eclipse Software, Rev. 2,
EnRad Procedure113, Routine QC of the Packard 2550 Liquid Scintillation System, Rev. 0
EnRad Procedure 205, Calibration of the Gamma Spectroscopy System Using the CAS, Rev. 2
EnRad Procedure 206, Calibration of the Tennelec Series 5 Low Background Counting Instruments Using Eclipse Software, Rev. 2,
EnRad Procedure 315, Operation of the PACKARD 2550 Liquid Scintillation System, Rev. 3
PT/0/B/4600/064, Radiological Environmental Monitoring Program Quarterly Data Evaluation, Rev. 004
PT/0/4600/025, Cumulative Offsite Dose From Liquid & Gaseous Effluents, Rev. 007
PT/0/B/4600/020, 31 Day Offsite Dose Projection, Rev. 003
SH/0/B/2000/006, Removal of Items From RCA/RCZs and Use of Release/Radioactive Material Tags, Rev. 001
HP/0/B/1003/069, Land Use Census, Rev. 001
HP/0/B/1005/066, Response Checks of Personnel Monitoring Equipment, Rev. 011
HP/0/B/1005/053, Calibration of NE American CM7A Contamination Monitor , Rev. 003
HP/0/B/1005/052, Calibration of the NE American Small Articles Monitor (SAM), Rev. 003

Records

McGuire Nuclear Station, Air Sampler Run-time Reports, January 1, 2002 through December 31, 2002
Certificates of Calibration: 2 Inch Simulated Filter in Falcon Petri Dish, dated January 1, 2002, and 25 milliliter Ion-exchange Resin in Falcon Petri Filled to Top, dated January 1, 2003 Inter-laboratory Cross-Check Program Data, for the 1st 2nd and 3rd Quarters 2002
Quality Control (QC) data for the following DPC EnRad Laboratory Analytical Instrumentation:

- Gamma Spectroscopy Analysis System Detectors 2, 4, 8, January 1, 2002 through December 31, 2002, including background data, Full-Width Half Maximum, Peak Centroid, and selected performance check results
- Beta Counting System Number 4 QC data from 12/ 07/ 2002 through January 6, 2003 including alpha and beta efficiency and background checks
- Liquid Scintillation Counting System S/N 428 and S/N 404281 QC May1, 2002, through June 11, 2002, monthly tritium efficiency data and daily background check data and graphs

Beta Attenuation Report, and Supporting Documents, for Unit 4, 11/18/02
Gross Alpha/Beta Calibration Verification Worksheet, Unit 4, 11/18/2002
Memo to File: Regarding Problem Identification Process General Office (PIP-G) 03-00014, Need to Improve Guidance for Distillation in Preparation of Liquid Samples, 01/23/2003
Memo to File: Regarding PIP-G 03-00016, Geometry Calibration and Sample Analysis Discrepancies, 01/28/03
Memo to File: Regarding PIP-G 03-00017, Lower Limit of Detection (LLD) Verification for Oconee Broadleaf Vegetation, 01/15/3003,
Annual 2001 X/Q and D/Q Comparison to ODCM Values for EAB, file Number: NUC -0307; ENV-104 dated 3/8/02
IP/0/B/3260/003, Met One Series 21 Wind Speed Module Channel Calibration, Rev. 018
Tower Inspection Report, dated 9/10/02
IP/0/B/3260/023, Meteorological Monitoring (EEB) System Weekly Channel Verification, Rev. 023

Annual Reports

Annual Radiological Environmental Operating Report 2001
Annual Radiological Environmental Operating Report 2000

(Sections 4OA.2 and .3)

Procedures, Guidance Documents

SH/0/B/2001/002, Investigation of Unusual Dosimetry Occurrences or Possible Over-exposures, Rev. 2
Nuclear System Directive 208, Problem Investigative Process (PIP), Rev 24

Records

Unusual Dose Occurrence Logs, January 1, 2002, through December 31, 2002
Liquid Waste Release/Gaseous Waste Release Logs, January 1, 2002, through December 31, 2002
Cumulative Dose Commitment Data Sheets for Calender Year 2002, 01/21/03

LIST OF ACRONYMS

AHU	-	Air Handling Unit
ALARA	-	As Low As Reasonably Achievable
ANS	-	American Nuclear Standard
ANSI	-	American National Standards Institute
AP	-	Abnormal Procedure
ARM	-	Area Radiation Monitor
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing Materials
CA	-	Auxiliary Feedwater
CAP	-	Corrective Action Program
CCF	-	Central Calibration Facility
CF	-	Feedwater
CFR	-	Code of Federal Regulations
Co	-	Cobalt
CP	-	Chemistry Procedure
DPC	-	Duke Power Company
DRP	-	Discrete Radioactive Particle
ECCS	-	Emergency Core Cooling System
ED	-	Electronic Dosimeter
EDG	-	Emergency Diesel Generator
EMF	-	Effluent Monitoring
EnRad	-	Environmental Radiation
EOC	-	End-Of-Cycle
EP	-	Emergency Procedure
ESF	-	Engineered Safeguards Feature
ESFAS	-	Engineered Safety Feature Actuation System
EVCC	-	Vital Battery C
FWST	-	Refueling Water Storage Tank
GPM	-	Gallons Per Minute
GV	-	Governor Valve
GWR	-	Gaseous Waste Release
HP	-	Health Physics
HRA	-	High Radiation Area
HEPA	-	High Efficiency Particulate Air
INPO	-	Institute of Nuclear Power Operations
IR	-	Inspection Report
ISFSI	-	Independent Spent Fuel Storage Installation
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
LHRA	-	Locked High Radiation Area
LLD	-	Lower Limit of Detection
LOCA	-	Loss of Coolant Accident
LWR	-	Liquid Waste Release
MGTM	-	Temporary Modifications
MNS	-	McGuire Nuclear Station
KC	-	Cooling water
NCV	-	Non-Cited Violation
ND	-	Residual Heat Removal

NEI	-	Nuclear Energy Institute
NI	-	Safety Injection
NOED	-	Notice of Enforcement Discretion
NSD	-	Nuclear Site Directive
NV	-	Chemical and Volume Control
ODCM	-	Offsite Dose Calculation Manual
OS	-	Occupational Radiation Safety
PAGSS	-	Post-Accident Gas Sampling System
PI	-	Performance Indicator
PIP	-	Problem Investigation Process report
PMT	-	Post-Maintenance Testing
PS	-	Public Radiation Safety
PT	-	Performance Test
PWR	-	Pressurized Water Reactor
QC	-	Quality Control
RAB	-	Reactor Auxiliary Building
RAP	-	Regulated Air Pump
RCA	-	Radiologically Controlled Area
RCZ	-	Radiation Control Zone
RD	-	Radiation Dosimetry and Records Procedure
REMP	-	Radiological Environmental Monitoring Program
RF	-	Fire System
RG	-	Regulatory Guide
RN	-	Nuclear Service Water
ROATC	-	Reactor Operator at the Controls
RP	-	Radiation Protection
RTP	-	Rated Thermal Power
RWP	-	Radiation Work Permit
SAM	-	Small Article Monitor
SCBA	-	Self-contained Breathing Apparatus
SDP	-	Significance Determination Process
SEIT	-	Significant Event Investigation Team
SFP	-	Spent Fuel Pool
SH	-	Shared Health Physics Procedure
SLC	-	Selected Licensee Commitment
SSC	-	Structures, Systems, Components
SSF	-	Standby Shutdown Facility
SSPS	-	Solid State Protection System
TDCA	-	Turbine-Driven Auxiliary Feedwater
TEDE	-	Total Effective Dose Equivalent
TH	-	Temporary Health Physics Procedure
TI	-	Temporary Instruction
TLD	-	Thermoluminescent Dosimeter
TS	-	Technical Specifications
U2	-	Unit 2
UFSAR	-	Updated Final Safety Analysis Report
VCT	-	Volume Control Tank
WBC	-	Whole-body Count
WGDT	-	Waste Gas Decay Tank

WO	-	Work Order
YC	-	Chilled Water (control room)