U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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Licensee:	Duke Energy Corporation
Facility:	McGuire Nuclear Station, Units 1 and 2
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EXECUTIVE SUMMARY

McGuire Nuclear Station, Units 1 and 2
NRC Inspection Report 50-369/99-01, 50-370/99-01

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covered a six-week period of resident inspection and a separate regional inspection in the area of plant physical security.

Operations

- Operator response to an "urgent alarm" on a power supply for the Unit 2 rod control system and response to the loss of a non-safety water supply (upper surge tank) for the auxiliary feedwater pumps was excellent. Post-event follow-up including plant impact evaluation by operations personnel was thorough and comprehensive for the loss of the upper surge tank event. (Section O4.1)

- Management oversight and review of mispositioned component events continued to be strong and has resulted in a significant decrease in the number of reported problems for 1998. The licensee continued to evaluate other potential changes to existing configuration control processes in order to further reduce the number and significance of configuration control issues. (Section O7.1)

Maintenance

- Sampled routine maintenance and surveillance activities were adequately completed. (Section M1.1)

- Several maintenance preventable failures of the non-safety related standby shutdown facility (SSF) diesel generator rendered the SSF diesel generator inoperable during a eight day period. (Section M2.1)

- Plant configuration management was adequately maintained to maximize availability of emergency diesel generators and auxiliary feedwater system during the standby shutdown facility window of unavailability. Engineering support, preliminary root cause evaluation, and proposed corrective actions were prompt, comprehensive, and effective in improving system reliability. (Section M2.1)

- A review of recently implemented maintenance procedure group performance monitoring indicated that the licensee had established good tools for assessing the existing backlog inventory. The tools allowed for improved management oversight of maintenance procedure backlogs. Sampling of the existing backlog and review of performance measures and other audits indicated they were being well controlled and managed. (Section M3.1)

- Pre-outage staging of materials for the upcoming Unit 2 refueling outage was determined to have been performed in a safe manner. (Section M4.1)

Engineering

- An unresolved item was identified for potential clogging of Mark BW fuel assemblies with course or fine mesh plates following a postulated loss-of-coolant accident and resolution

of the difference between sump screen sizes for the Catawba and McGuire Nuclear Stations. (Section E3.1)

Plant Support

- Radiological postings and worker adherence to protective clothing requirements were considered adequate. Locked high radiation doors were properly controlled, high radiation and contamination areas were properly posted, and radiological survey maps were updated to accurately reflect radiological conditions. (Section R1.1)

- The alarm stations were appropriately equipped, manned, and operated in accordance to the Nuclear Security Plan commitments and regulatory requirements. (Section S1.2)

- The alarm stations were capable of maintaining continuous onsite and offsite communications according to the Nuclear Security Plan commitments and regulatory requirements. (Section S1.3)

- The conduct of security and safeguards activities in protected area access control of personnel, packages and material, and vehicles met regulatory requirements and Nuclear Security Plan commitments. (Section S1.4)

- The testing and maintenance program for security equipment was effective and was considered a program strength. (Section S2.1)

- The protected area intrusion detection systems were functional, effective, and met the Nuclear Security Plan commitments and regulatory requirements. (Section S2.2)

- The assessment aids were functional, well maintained, and effective for both covert and overt penetration attempts after an intrusion detection alarm and met the licensee's commitments and regulatory requirements. (Section S2.3)

- The performances of the personnel search equipment and the proficiency of security personnel were security program strengths. (Section S2.4)

- The vehicle barrier system was functional, well-maintained and met Nuclear Security Plan commitments and regulatory requirements. (Section S2.5)

- Actions to implement NRC Information Notice 98-35, "Threat Assessments and Consideration of Heightened Physical Protection Measures," dated September 4, 1998, were adequate. (Section S4.2)

- A non-cited violation was identified for failure to follow security procedures and willfully supplying inaccurate vehicle checklist documentation associated with protected area activities. (Section S8.1)

Report Details

Summary of Plant Status

Units 1 and 2

Units 1 operated at approximately 100 percent of licensed thermal power throughout the inspection period.

Unit 2 operated at approximately 100 percent of licensed thermal power for the majority of the inspection period. On February 13, 1999, the unit reduced power to 95 percent as part of a planned coastdown in power for the Unit 2 Cycle 12 refueling outage.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious. Operations shift turnovers observed by the inspectors were considered to have been improving overall communication of plant status and interaction between all levels of shift personnel. Increased involvement of the non-licensed operators in the meetings was particularly noteworthy. Specific events and other observations are detailed in the sections which follow.

O1.2 10 CFR 50.72 and Other Required Notifications

a. Inspection Scope (71707)

During the inspection period, the licensee made the following notification to the NRC as required by 10 CFR 50.72 or for other information purposes. The inspectors reviewed the event for impact on the operational status of the facility and equipment.

b. Observations and Findings

On February 2, 1999, the licensee reported to the NRC that the control room emergency notification system (ENS) phone line in the control room was not functional. The ENS line was repaired and established a short time later. This problem and other recent similar failures were determined to have originated offsite. The backup line (commercial) was available.

c. Conclusions

The inspectors concluded that the licensee reported the above event in accordance with the requirements of 10 CFR 50.72.

O4 Operator Knowledge and Performance

O4.1 Operator Performance and Response to Plant Conditions

a. Inspection Scope (71707)

The inspectors reviewed operator response to two events involving a rod control system alarm condition and the loss of a non-safety related source of auxiliary feedwater (AFW). Operator actions, operator logs, plant computer data, annunciator response procedures, and proposed corrective actions were reviewed and discussed with operations staff.

b. Observations and Findings

The first event occurred on January 6, 1999, during control rod movement, when control room operators received an "urgent alarm" for a rod control power supply. Operators immediately entering AP-14, Rod Control Malfunction. While in the control room the inspectors verified that the rod control system was placed in the manual control mode to prevent the potential design basis consequences for a rod drop type event. Investigation by engineering and maintenance could not identify the root cause of the problem. The urgent alarm was not repeatable during a subsequent rod movement test. The rod control system received increased plant monitoring in accordance with the maintenance rule 10 CFR 50.65 because of a failure that caused a Unit 1 multiple rod drop event on February 9, 1998.

The second event occurred on February 5, 1999, at approximately 9:24 p.m., when operators received a high level alarm for condenser hotwell level immediately followed by a low level alarm in the upper surge tanks (UST). This event occurred when flow control valve 2CM124, which regulates UST inventory, went full open and dumped most of the 85,000 gallons of water in the UST to the hotwell. Operators referenced the annunciator response procedure (ARP) and plant piping/instrumentation drawings. An operator was quickly dispatched to close manual valve 2CM125. Diagnosis, closure of 2CM125, and the start of restoration of UST level occurred in less than 20 minutes. The problem with valve 2CM124 was attributed to a clogged positioner for the air operated valve, which was cleaned and restored to service following the event. Post-event followup involved a thorough evaluation of potentially affected secondary plant equipment, instrumentation, and control air quality. Training enhancements to simulator modeling and review of ARPs based on actions in the emergency operating procedures AFW monitoring page were under review at the end of the inspection period for future enhancements.

c. Conclusions

Operator response to an "urgent alarm" on a power supply for the Unit 2 rod control system and response to the loss of a non-safety water supply (UST) for the AFW pumps was excellent. Post-event follow-up including plant impact evaluation by operations personnel was thorough and comprehensive for the loss of UST event.

O7 Quality Assurance in Operations

O7.1 Review of Mispositioned Component Trend Data

a. Inspection Scope (71707, 40500)

The inspectors assessed the licensee's evaluation of plant component mispositioning events and trending of available performance measures.

b. Observations and Findings

On January 8, 1999, the inspectors attended a monthly component mispositioning review meeting conducted by McGuire site management. The purpose of the meeting was to evaluate recent specific problems involving potential mispositioned components and also review available trend information to determine if additional measures were necessary to address the current type and numbers of mispositioned components. The licensee's review process maintains records of the various mispositioned components in a data base which identifies a description of the problem, component type, responsible group, type of activity being performed, and a potential or determined root cause assessment. The licensee also suggested corrections to preclude recurrence of the problems identified.

Operations, maintenance, engineering, and chemistry management also provided insight on actions taken to date and proposed additional steps being implemented to address specific areas identified for improvement. These included increased personnel awareness of configuration control, focus on the use of self-checking training aides, verifying procedural adequacy and implementing preoperational valve lineups. Other areas for improvement were also discussed which included improving troubleshooting work practices and continued clarification of the use of configuration control cards. Efforts to improve component labeling were also discussed.

The inspectors reviewed the results of available year-end mispositioned component information. Historical data of previous years and efforts taken to address previous adverse trends were discussed in detail with responsible personnel. The data indicated that the number of reported mispositions decreased from 89 in 1997 to 29 in 1998. The inspectors concluded that site focus on configuration control had resulted in a substantial reduction in the number of identified problems. The inspectors noted that the threshold for identifying these types of problems has appeared to have remained low for 1997 and 1998. The inspectors also recognized that 1997 contained significantly more outage related activities, which tended to challenge existing configuration control measures. The inspectors considered that this area was continuing to receive a high level of site management oversight.

c. Conclusions

Management oversight and review of mispositioned component events continued to be strong and has resulted in a significant decrease in the number of reported problems for 1998. The licensee continued to evaluate other potential changes to existing configuration control processes in order to further reduce the number and significance of configuration control issues.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (61726 ,62707)

The inspectors reviewed a variety of maintenance and/or surveillance activities during the inspection period, including the following specific items:

- PT/2/A/4350/002, 2B DG [Diesel Generator] Operability
- WO 98103205, MM-10060, Install Doghouse Level Protective Device
- WO 98113174, 750-9.1-3, Inspect/Repair Fire Barrier
- PT/1/A/4208/001B, 1B NS [Containment Spray] Pump Test
- PM -2RNNHX0015-Clean 2B1 Motor Cooler
- MP/0/A/7650/143, Receipt, Inspection, and Storage of New Framatome Cogema Fuels (FCF) New Fuel
- WO 98128168, SSF DG Meggar Test

b. Observations and Findings

The inspectors witnessed selected surveillance tests to verify that approved procedures were available and in use; test equipment was calibrated; test prerequisites were met; system restoration was completed; and acceptance criteria were met. In addition, the inspectors reviewed or witnessed routine maintenance activities to verify, where applicable, that approved procedures were available and in use, prerequisites were met, equipment restoration was completed, and maintenance results were adequate.

c. Conclusions

The inspectors concluded that the sampled routine maintenance and surveillance activities were adequately completed.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Standby Shutdown Facility (SSF) DG Failures

a. Inspection Scope (62707, 40500)

The inspectors reviewed documentation, which included proposed corrective actions, observed troubleshooting activities, and had discussions with applicable plant personnel concerning failures associated with the SSF DG. PIP 0-M99-0366 documented these problems. The SSF at McGuire is not safety-related; however, the SSF diesel does

provide an independent and alternate means of providing alternating current (AC) power to safe shutdown equipment necessary to maintain hot shutdown conditions during events such as postulated plant fires, station blackout, or other non-design basis events.

b. Observations and Findings

On January 28, 1999, during a surveillance run of the SSF DG, electrical output breaker (1SLXG-5B) opened due to overcurrent 50DGT relay pickup. This relay provides overcurrent protection of the SSF DG while the diesel is run in the test mode, paralleled to the grid. The diesel was approximately two hours and twenty minutes into the run when the overcurrent relay picked up. The overcurrent relay is a protective device that is used during SSF DG testing. In the emergency operation mode, the over-current relay is bypassed. The licensee implemented a failure investigation process (FIP) team with vendor support. Numerous potential failure modes were identified. Generator protective relays and voltage regulator sub-components were tested and evaluated with replacement of suspect sub-components in the voltage regulator.

During testing of the diesel, a diode in the generator failed causing zero voltage output. This diode (original equipment) was replaced. No previous diode failures had occurred on this generator at McGuire. Routine, periodic maintenance had not been performed on the generator, voltage regulator, and other electrical sub-components. A subsequent run resulted in insulation breakdown of the generator's exciter armature windings. This resulted in smoke in the diesel room from the armature and failure of the generator. The licensee attributed this failure to the previously blown diode stressing some of the windings combined with age related degradation of insulation (nearly 20 years old). The armature was shipped offsite to a vendor shop for a rebuild and was completed within 48 hours.

Following refurbishment of the exciter armature, the diesel was run and the generator diagnostics indicated good generator performance. Several subsequent runs were performed; however, when operators attempted to close in the output breaker, the overcurrent relay picked up within a few cycles causing the breaker to open. This problem was intermittently repeatable during additional attempts to close the breaker. No fault conditions or relay problems were identified to cause the overcurrent trip. The corrective action for this condition was a planned installation of a time-delay overcurrent relay to allow for an approximately 0.1 second delay. A similar modification had been implemented at the Catawba Nuclear Station's SSF. In the interim, the licensee considered the SSF DG operable since the overcurrent relay is bypassed during emergency operation. The SSF was restored to operable status approximately eight days following the initial failure.

The inspectors observed significant plant management and engineering involvement during the troubleshooting and repairs. Proposed corrective actions including additional testing, and scheduling of periodic preventive maintenance. In addition, the licensee considered additional run time on the SSF DG appropriate to reveal potential infant mortality type failures for replaced parts. Operations configuration control of the plant to reduce plant risk was evident by conscientiously maintaining all four station EDGs and the AFW systems available during the eight day unavailability of the SSF. However, the inspectors noted that a missed opportunity had occurred when an independent assessment was performed on the safety-related EDGs in 1996. When questioned,

engineering personnel indicated that the SSF DG was not in the scope of the assessment. However, several of the recommendations made for the EDGs may have prevented the current SSF DG failures (such as preventive maintenance (PM) on the generator and voltage regulator).

A root cause analysis was in-progress at the end of the inspection period. At the end of the inspection period, the licensee stated their intention to submit a 30-day written report to the NRC since the SSF DG was inoperable for more than eight days.

c. Conclusions

Several maintenance preventable failures of the non-safety related SSF diesel generator rendered the SSF diesel generator inoperable during a eight day period. Plant configuration management was adequately maintained to maximize availability of EDGs and AFW during the SSF window of unavailability. Engineering support, preliminary root cause evaluation, and proposed corrective actions were prompt, comprehensive, and effective in improving system reliability.

M3 Maintenance Procedures and Documentation

M3.1 Review of Maintenance Procedure Backlog Control Processes

a. Inspection Scope (62707)

The inspectors reviewed recently implemented processes and controls established to monitor the maintenance related procedure backlog items. The inspectors reviewed available trend data and discussed the processes with maintenance procedure group supervisors. The existing backlog was also evaluated for age distribution, workflow history, and other inventory control measures.

b. Observations and Findings

Performance monitoring within the area of the maintenance procedure group was enhanced in September 1998 as a result of other overall site performance monitoring increased requirements. The enhancements were initiated to facilitate clearer management oversight of the maintenance procedure backlog. The tracking of the maintenance procedure backlog is accomplished via a database known as Plan, which separates the existing backlog in two main categories, being electrical and mechanical/civil procedures. The inspector discussed with the licensee the attributes of the data base for use as a tracking mechanism and considered it very user friendly and capable of producing key performance measure trending. These performance measures were being reviewed on a monthly basis by the maintenance procedure group with quarterly assessments being provided to upper management. Typical monthly performance measures reviewed by the site included: age distribution of the current inventory; workflow history; end of month inventory history; and average cycle time for both procedure revisions and newly developed procedures. Based on a review of the performance measure monitoring capability, the inspectors concluded that the licensee had developed good tools for monitoring existing maintenance procedure backlogs. The inspectors also reviewed the content of the existing backlog, focusing on the oldest items. Based on the sample reviewed, the inspectors considered that the backlog was

being well controlled and managed.

The inspectors also reviewed a maintenance procedure work input audit conducted for the last quarter of 1998. The purpose of the report was to review the sources of the incoming work to the maintenance procedure group in order to assess what changes may be warranted to improve quality and performance. The review provided good insight of where the existing resources were being spent and gave a number of recommendations to improve overall performance of the maintenance procedure group in supporting the site.

c. Conclusions

A review of recently implemented maintenance procedure group performance monitoring indicated that the licensee had established good tools for assessing the existing backlog inventory. The tools allowed for improved management oversight of maintenance procedure backlogs. Sampling of the existing backlog and review of performance measures and other audits indicated they were being well controlled and managed.

M4 Maintenance Staff Knowledge and Performance

M4.1 Equipment Staging For Unit 2 Refueling Outage

a. Inspection Scope (62707, 71707)

Throughout the inspection period, the inspectors conducted tours of the turbine and auxiliary buildings to identify any potential adverse operational impacts cause by the staging of equipment and supplies to support the upcoming Unit 2 refueling outage.

b. Observations and Findings

The inspectors identified and reviewed a variety of staged outage material and initial modification preparations such as scaffolding for adverse impact to the operating units. The inspectors reviewed applicable requirements for scaffolding, transient combustible materials, seismic restraints, and interferences with equipment necessary for safe operation and transient response of the units. In general, the inspectors concluded that the licensee was taking appropriate precautions to protect operating equipment from the pre-staging of Unit 2 outage materials. Equipment such as scaffolds and other rigging were installed in accordance with the applicable site directive and personnel performing the observed work activities were aware of the potential adverse impact. However, the inspectors identified one concern to management regarding the lifting of heavy valve components on the Unit 2 turbine deck over the operating moisture separator reheaters and low pressure turbine exhaust lines. Although the activities were conducted in accordance with heavy load lift procedures, the inspectors questioned whether the lifting of these components was evaluated as an unnecessary risk evolution given that the turbine was in operation and the subject component could have been easily transported after the unit was shutdown. The licensee indicated that the activity was determined to be acceptable via the performance of a low level risk review; however, the full scope/risk of the evolution was not well documented or understood. Based on the inspectors question, the licensee determined that this type of lifting evolution would be evaluated as

a reduced risk activity to be performed after the unit was shutdown in future outage preparation activities.

c. Conclusions

Pre-outage staging of materials for the upcoming Unit 2 refueling outage was determined to have been performed in a safe manner.

III. Engineering

E2 Status of Engineering Facilities and Equipment

E2.1 Hydrogen Line Routing Concerns (37551)

During the inspection period, the inspectors continued a review of hydrogen line routing through various plant areas. In IR 50-369,370/98-13, the inspectors identified several areas of hydrogen line interferences with other system piping. The licensee addressed this concern in PIP 2-M-99-0003 by developing specific corrective actions and identifying other problem areas. During the current inspection period, the inspectors questioned one additional hydrogen line routing which the licensee's review did not identify. This involved the routing of a hydrogen line in the Unit 2 lower turbine building in contact with a steam supplied space heater and through the heater fan intake screen. The licensee reviewed the identified hydrogen line configuration via PIP 0-M99-0491 and concluded that a piping re-route around the space heater should be performed. The licensee also performed additional reviews based on the inspectors finding and identified one additional hydrogen line routing concern in the Unit 1 turbine building. The inspectors concluded the licensee adequately addressed the identified concern and initiated additional reviews of existing hydrogen lines.

E3 Engineering Procedures and Documentation

E3.1 Potential Unreviewed Safety Question (USQ) for Reactor Fuel Assembly Design Change

a. Inspection Scope (37551, 40500)

The inspectors reviewed the 10 CFR 50.59 safety evaluations for Mark BW Coarse and Fine Mesh Fuel Assembly (Calculuation DPC-1553.26-00-093/MCC-1553.26-00-170) review that introduced a filter plate on the bottom of the assemblies. PIP 0-M98-3073 was also reviewed for potential non-conformance with the Updated Final Safety Analysis Report (UFSAR) and Regulatory Guide (RG) 1.82, Sumps for Emergency Core Cooling and Containment Spray Systems (1974).

b. Observations and Findings

During a large break loss of coolant accident (LOCA) scenario, the inspectors questioned whether the core may become blocked because of clogging of the mesh screen on the bottom of each fuel assembly. The inspectors were concerned that inadequate core cooling may occur; specifically during emergency core cooling system (ECCS) operation when the plant is in cold leg recirculation with ECCS aligned to the containment sump. During cold leg recirculation, water accumulated in the sump is

pumped into the reactor coolant system (RCS) through a heat exchanger to provide long-term core cooling. This water could contain particles (containment debris, paint chips, insulation, foreign material, etc.) because of the damage the LOCA may have on the interior of the containment.

At McGuire, the licensee introduced a fuel design change to feeder assemblies for the Cycle 11 core. According to the Updated Final Safety Analysis Report (UFSAR) and the subject 10 CFR 50.59 safety evaluation, the bottom area of the Mk BW assemblies contained small holes in a plate which minimize debris that can enter the assembly. This fuel assembly mesh plate was introduced to improve fuel reliability by preventing rod failures from the very limited amount of debris which can exist in the reactor coolant system during normal plant operations. Prior to Cycle 11, no mesh screen existed. Cycle 11 changed the fuel to a coarse mesh design followed by a fine mesh design for Cycle 12. Unit 1 Cycle 13 began July of 1998 and Unit 2 Cycle 12 began December of 1997. Currently, each McGuire unit's core comprises a mixed population of fuel assemblies with coarse or fine mesh plates.

Protection for the emergency core and containment cooling systems is provided by containment sump debris (trash) racks which remove large objects and fine screens that remove smaller particles. Both the coarse and fine mesh plates installed on the fuel assemblies have flow holes that are substantially smaller than the containment sump fine screens which are 0.204 inches. The regulatory basis for sizing containment sump screens was provided for in RG 1.82, and McGuire was committed to RG 1.82 (June 1974) via the UFSAR Chapters 1 and 6. RG 1.82 states, in part:

> *Size of openings in the fine screens [sump screens] should be determined by the physical restrictions, including spray nozzles, that may exist in the systems which are supplied with coolant for the emergency sump. As a minimum consideration should be given to building spray nozzles, coolant channel openings, and pump running clearances in sizing the fine screen [sump screens]. If the coolant channel openings in the core represent the smallest flow restriction, the minimum opening in the core channels which will allow design operation of the ECCS should be used in sizing the fine screen [sump screen] mesh size.*

According to PIP M98-3073, in 1998, an engineering supervisor responsible for safety analysis dismissed the issue of fuel clogging causing damage on the basis that sufficient cooling could be provided through alternate paths. The alternate path was postulated to fill the core by spilling over the baffles in lieu of entering the reactor vessel down comer to the lower plenum. The inspectors were concerned that an engineering analysis was not performed with approved analytical codes or methodologies to demonstrate that the plant would be within the design basis limits as identified in the UFSAR. As such, the inspectors questioned the adequacy of the subject 50.59 evaluation for the addition of the fuel mesh filters. Based on the inspectors questions, the licensee re-examined the issue and requested an analysis be performed by FCF to support the subject 50.59 evaluation. At the end of the inspection period, an analysis was performed and the licensee intended to redact the original 10 CFR 50.59, which did not address this issue, with the vendor analysis to support a position of no increased accident consequences from the design change.

Regulation 10 CFR 50.59 requires that a licensee must seek prior Commission approval if the proposed change to the facility involves a USQ. A proposed change to the facility shall be deemed to involve a USQ, in part, if the consequences of an accident evaluated in the safety analysis report may be increased. Based on a review of the previously documented 10 CFR 50.59 evaluation for suitability of the mesh plate fuel design, debris clogging did not appear to have been adequately addressed nor did the licensee receive NRC approval for the change. The potential for increased fuel damage during a LOCA was not identified and evaluated for this proposed change.

In addition to the above issue, the inspectors identified another concern. By letter dated May 19, 1982, Westinghouse informed the licensee that the Westinghouse requirement for ECCS recirculation sump screen mesh size is that passage of particles larger than 1/8 inch in diameter be precluded. This was based on the limiting core dimensions for their 17x17 fuel assembly matrix (no mesh plate) and a Westinghouse nuclear safety position paper from April of 1977. This was in reference to recirculation sump screen sizing for Catawba. Therefore, Catawba designed and installed the sump screens to approximately 0.120 inches to preclude 1/8 inch particles from entering the RCS post-LOCA. The inspectors questioned the licensee where this was addressed for McGuire, in that, the containment sump was sized to approximately 0.204 inch. The licensee was investigating this at the end of the inspection period.

Pending further NRC review of the vendor's analysis and the sizing calculation for the containment sump screens, these issues will be identified as an unresolved item (URI), URI 50-369,370/99-01-01, Post-LOCA Clogging of Mark BW Fuel Assemblies with Course or Fine Mesh Plates).

c. Conclusions

An unresolved item was identified for potential clogging of Mark BW fuel assemblies with course or fine mesh plates following a postulated loss-of-coolant accident and resolution of the difference between sump screen sizes for the Catawba and McGuire Nuclear Stations.

E8 **Miscellaneous Engineering Issues** (92903)

E8.1 (Closed) Inspector Followup Item (IFI) 50-369, 370/97-08-04: Potential Air-binding of AFW pumps

This IFI documented the inspectors concerns regarding potential air-binding of AFW pumps from non-safety related supply tanks. The licensee performed an analysis and hydraulic calculations to demonstrate that the AFW system was operable; however, system reliability was determined to be marginal since numerous best-estimate assumptions were used. During recent management meetings between the NRC and the licensee, senior utility officials indicated that large volume non-safety condensate storage tanks will be installed to improve system reliability. The licensee indicated that these tanks (one per unit) have been scheduled to be tied into existing plant piping at the end of each unit's operating Cycle 14. This item is closed.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments (71750)

The inspectors made frequent tours of the controlled access area and reviewed radiological postings. The inspectors observed that workers were adhering to protective clothing requirements. The inspectors also determined that locked high radiation doors were properly controlled, high radiation and contamination areas were properly posted, and radiological survey maps were updated to accurately reflect radiological conditions.

S1 Conduct of Security and Safeguards Activities

S1.2 Alarm Stations

a. Inspection Scope (81700)

The inspectors evaluated operation of the alarm stations against licensee commitments in Section 8.5 of the Duke Power Company Nuclear Security and Contingency Plan (NSP), Revision 8, applicable security procedures, and NRC regulatory requirements.

b. Observations and Findings

The inspectors observed operations of the central and secondary alarm stations and verified that the alarm stations were equipped with appropriate alarms, surveillance, and communications capabilities. Interviews with the alarm station operators found them knowledgeable of their duties and responsibilities. The inspectors also verified, through observations and interviews, that the alarm stations were continuously manned, independent, and diverse so that no single act could remove the plant's capability for detecting a threat or calling for assistance. In addition, the inspectors verified that alarm station personnel did not have any other activities that could interfere with their detection, assessment, and response functions. The alarm stations and other security systems had an uninterrupted power supply for emergencies.

c. Conclusions

The alarm stations were appropriately equipped, manned, and operated in accordance with the commitments and regulatory requirements.

S1.3 Communication

a. Inspection Scope (81700)

The inspectors evaluated the alarm station's communications capabilities against the licensee's commitments in Sections 9 and 10 of the NSP, applicable security procedures, and NRC regulatory requirements.

b. Observations and Findings

The inspectors verified, by document reviews, observation, and discussions with alarm station operators, that the alarm station personnel were capable of maintaining continuous intercommunications, communications with each security force member on duty, and were exercising communication methods with the local law enforcement agencies as committed to in the NSP.

c. Conclusions

The licensee's alarm stations were capable of maintaining continuous onsite and offsite communications according to the NSP commitments and regulatory requirements.

S1.4 Protected Area Access Controls - Packages, Personnel, and Vehicles

a. Inspection Scope (81700)

The inspectors evaluated the licensee's program for Protected Area (PA) access control of personnel, packages, and vehicles as committed to in Sections 5, 6, and 9 of the NSP and appropriate security procedures.

b. Observations and Findings

PA Access Control of Personnel

Personnel displayed their badges while within the PA. Visitors authorized escorted access to the PA were issued a badge that showed an escort was required, and were escorted by licensee-designated escorts while in the PA. The licensee used biometric hand geometry to ensure personal identification of individuals entering the PA.

PA Access Control of Packages and Material

The inspectors observed 13 individuals with hand carried items and vehicle cargo process through the PA access portal and PA vehicle access portal. Security personnel confirmed the authorization of, and identified packages and material at the access control portals before allowing them to enter the PA. The inspectors observed the employment of security force personnel, explosive detectors, and X-ray equipment to identify and confirm that prohibited materials were not entering the PA.

PA Access Control of Vehicles

The inspectors observed individuals controlling the access control hardware that allowed vehicle access to the PA in an approved enclosure. Also, observed were security officers searching vehicles and their contents entering the PA through the vehicle access portal.

c. Conclusions

The conduct of security and safeguards activities in protected area access control of personnel, packages and material, and vehicles was implemented according to regulatory requirements and NSP commitments.

S2 Status of Security Facilities and Equipment

S2.1 Testing and Maintenance

a. Inspection Scope (81700)

The inspectors evaluated the testing and maintenance program for security equipment against the commitments in Section 9 of the NSP, applicable security procedures and NRC regulatory requirements.

b. Observations and Findings

Quarterly, semiannual, and annual testing and maintenance records for security-related equipment verified that the licensee was maintaining and testing systems and equipment as committed to in the NSP and applicable security procedures. Fifteen security journals were reviewed to verify that daily and seven-day operational, performance, and functional tests were being performed. Work requests and repairs requiring compensatory measures were completed in a timely manner. The perimeter intrusion detection system nuisance and false alarm rates from January 1998 to January 1999 were reviewed. At no time did the ten-day nuisance and ten-day false alarm rate averages exceed the one alarm per zone per day requirement. The inspectors noted the maintenance program documentation was concise and thorough.

c. Conclusions

The testing and maintenance program for security equipment was effective and was considered a program strength.

S2.2 Protected Area Detection Aids

a. Inspection Scope (81700)

The inspectors evaluated the PA detection aids to verify that the intrusion detection systems were functional, effective, and met Sections 8 and 9 of the NSP commitments and regulatory requirements.

b. Observations and Findings

For each of the alarm stations, the inspectors monitored and observed PA perimeter alarm annunciations of intrusion detection devices. The system could detect attempts to penetrate through the intrusion detection zones. The licensee had established detailed procedures to test the security equipment. Inspector observations and review of testing documentation associated with the equipment repairs, indicated that repairs were made

in a timely manner, that the equipment was functional, and met the requirements of the NSP.

c. Conclusions

The protected area intrusion detection systems were functional, and met the NSP commitments and regulatory requirements.

S2.3 PA Assessment Aids.

a. Inspection Scope (81700)

The inspectors evaluated the licensee's assessment aids for both covert and overt penetration attempts after an intrusion detection alarm.

b. Observations and Findings

The inspectors evaluated the effectiveness of the PA assessment aids and the abilities of the alarm station operators to assess alarm annunciations received in the alarm stations. This was done by observation of the closed circuit television (CCTV) and video capture surveillance system and the performance of the alarm station operators upon receiving intrusion detection alarm annunciations. The CCTV system was tamper proof from the camera to the alarm station. The CCTV images were clear and of high quality.

c. Conclusions

The assessment aids were functional, well maintained, and effective for both covert and overt penetration attempts after an intrusion detection alarm and met the licensee's commitments and regulatory requirements. This area was considered a strength to the security program.

S2.4 Personnel Search Equipment

a. Inspection Scope (81700)

The inspectors evaluated the licensee's personnel search equipment to ensure that the criteria in Section 9 of the NSP and appropriate security procedures were met.

b. Observations and Findings

The inspectors verified that the walk-through and hand-held metal detectors, explosive detectors, and X-ray equipment in the Primary Access Portal (PAP) to the PA were functioning appropriately. The PAP also had hand geometry units and turnstiles for access control to the PA. The inspectors reviewed selected documentation of the licensee's testing and maintenance program of the personnel search equipment. Observation of equipment operation and the review of the testing documentation verified that the personnel search equipment performed according to the commitments of the NSP. The north vehicle access gate was equipped with a hand geometry unit. The layout of the PAP and the performance of the search equipment and security personnel operating the personnel search equipment was effective.

c. Conclusion

The performance of the personnel search equipment and the security personnel operating the equipment was a strength to the security program.

S2.5 Vehicle Barrier System

a. Inspection Scope (81700)

The inspectors evaluated the VBS to verify that it was in place and functioned according to Appendix 2 of the NSP and Security Plan Procedure EXAO 16, "Vehicle Barrier System," Revision 3.

b. Observations and Findings

The inspectors verified the placement of the anchored jersey barriers, cables, cable rods system, bollards, and the active and passive vehicle gates of the VBS. The inspectors evaluated the licensee's program for inspecting, testing, and maintenance of the VBS. The VBS quarterly inspection documentation verified that the licensee provided means for monitoring and maintaining the VBS.

c. Conclusion

The vehicle barrier system was functional, well maintained and met the NSP commitments and regulatory requirements.

S4 Security and Safeguards Staff Knowledge and Performance

S4.2 Response Capabilities

a. Inspection Scope (81700)

The inspectors evaluated the licensee's actions to implement NRC Information Notice (IN) 98-35, "Threat Assessments and Consideration of Heightened Physical Protection Measures," dated September 4, 1998.

b. Observations and Findings

The licensee had developed and implemented McGuire Nuclear Station Procedure EXAC - 14, "Security Conditions," Revision 12, dated February 4, 1999 to meet the guidelines of IN 98-35. This was to ensure a consistent approach to future NRC response communications.

c. Conclusions

The licensee's actions to implement NRC Information Notice 98-35, "Threat Assessments and Consideration of Heightened Physical Protection Measures," dated September 4, 1998, were adequate.

S8 Miscellaneous Security and Safeguards Issues (81700)

S8.1 (Closed) IFI 50-369,370/97-17-02: Potential Inaccurate Records Associated with Vehicle Searches

This item identified potential problems involving four security guards incorrectly performing and willfully providing incorrect documentation regarding PA vehicle accountability searches from March 28-31, 1998. The inspectors reviewed and assessed the incident details, licensee evaluation and subsequent corrective actions documented in PIP 0-M97-1403, dated December 16, 1998. The PIP documented the following procedural non-compliances of EXAO-14:

- Two temporary security officers involved were not certified to perform Patrol Task #500, Protected Area Patrol;
- A vehicle that departed the PA was not logged-out;
- On four separate occasions, security officers failed to conduct an adequate PA vehicle verification, and willfully and inaccurately documented in the protected area vehicle checklist that a vehicle was within the PA, when, in fact, it was not.

The inspectors identified these failures to follow security procedures as required by Technical Specification 6.8.1 and the willful failure to supply accurate checklist documentation as required by 10 CFR 50.9 as a violation.

Licensee corrective actions included immediately removing from service and subsequently terminating the four involved employees, replacing protected and vital area key cores, restricting temporary security officers in performing protected area patrols, and retraining all security officers on their responsibilities to log vehicles entering and exiting the protected area, procedure adherence, and error-free work environment.

The inspectors noted that although this violation was identified as willful, it was brought to the NRC's attention by the licensee, it involved isolated acts of low-level individuals, and it was addressed by appropriate corrective actions. Therefore, consistent with Appendix C and Section VII.B.1 of the NRC Enforcement Policy, this violation is being treated as a Non-Cited Violation (NCV) 50-369,370/99-01-02: Failure to Follow Security Procedures for Certifying Security Personnel, Logging-out a Vehicle and Willfully Supplying Inaccurate Vehicle Checklist Documentation Associated with PA Activities. As noted above, this violation is on the licensee's corrective action program as PIP 0-M97-1403.

V. Management Meetings

X1 Exit Meeting Summary

The resident inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on February 23, 1999. The licensee acknowledged the findings presented. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Barron, B., Vice President, McGuire Nuclear Station
Bhatnagar, A., Superintendent, Plant Operations
Boyle, J., Manager, Civil/Electrical/Nuclear Systems Engineering
Byrum, W., Manager, Radiation Protection
Cash, M., Manager, Regulatory Compliance
Dolan, B., Manager, Safety Assurance
Evans W., Security Manager
Geddie, E., Manager, McGuire Nuclear Station
Peele, J., Manager, Engineering
Loucks, L, Chemistry Manager
Thomas, K., Superintendent, Work Control
Travis, B., Manager, Mechanical Systems Engineering

INSPECTION PROCEDURES USED

IP 71707:	Conduct of Operations
IP 62707:	Maintenance Observations
IP 61726:	Surveillance Observations
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 37551:	Onsite Engineering
IP 71750:	Plant Support
IP 81700	Physical Security Program For Power Reactors
IP 90712:	Event Reports
IP 92901:	Follow-up-Operations
IP 92903:	Follow-up-Engineering

ITEMS OPENED AND CLOSED

OPENED

50-369,370/99-01-01	URI	Post-LOCA Clogging of Mark BW Fuel Assemblies with Course or Fine Mesh Plates. (Section E3.1)
50-369,370/99-01-02	NCV	Failure to Follow Security Procedures for Protected Area Vehicle Checks EA 99-028. (Section S8.3)

CLOSED

50-369,370/97-08-04	IFI	Potential Air-binding of AFW Pumps (Section E8.1)
50-369,370/97-17-02	IFI	Potential Inaccurate Records Associated with Vehicle Searches (Section S8.3)

LIST OF ACRONYMS USED

AC	-	Alternating Current
AFW	-	Auxiliary Feed Water
ARP	-	Annunciator Response Procedure
CFR	-	Code of Federal Regulations
CCTV	-	Close Circuit Television
DG	-	Diesel Generator
EA	-	Enforcement Action
ECCS	-	Emergency Core Cooling System
EDG	-	Emergency Diesel Generator
ENS	-	Emergency Notification System
FCF	-	Framatome Cogema Fuels
FIP	-	Failure Investigation Process
IFI	-	Inspector Follow-up Item
IR	-	Inspection Report
LOCA	-	Loss of Coolant Accident
NCV	-	Non-cited Violation
NRC	-	Nuclear Regulatory Commission
NRR	-	NRC Office of Nuclear Reactor Regulation
NS	-	Containment Spray
NSD	-	Nuclear Site Directive
NSP	-	Duke Power Company Nuclear Security and Contingency Plan
NSRB	-	Nuclear Safety Review Board
PA	-	Protected Area
PAP	-	Primary Access Portal
PDR	-	Public Document Room
PIP	-	Problem Investigation Process
PM	-	Preventive Maintenance
RCS	-	Reactor Coolant System
RG	-	Regulatory Guide
SSF	-	Standby Shutdown Facility
SPP	-	Security Plan Procedures
UFSAR	-	Updated Final Safety Analysis Report
URI	-	Unresolved Item
US	-	Unresolved Safety Question
UST	-	Upper Surge Tanks
VA	-	Vital Area
VBS	-	Vehicle Barrier System