U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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Report No:	50-369/97-04, 50-370/97-04
Licensee:	Duke Power Company
Facility:	McGuire Generating Station, Units 1 & 2
Location:	12700 Hagers Ferry Rd. Huntersville, NC 28078
Dates:	February 23, 1997 - April 5, 1997
Inspectors:	S. Shaeffer, Senior Resident Inspector M. Sykes, Resident Inspector N. Economos, Regional Inspector D. Forbes, Regional Inspector S. Rudisail, Regional Inspector
Approved by:	C. Casto, Chief, Projects Branch 1 Division of Reactor Projects

Enclosure 2

Report Details

Summary of Plant Status

At the beginning of the inspection period, Unit 1 was being prepared to be defueled in day 10 of the planned 90 day 1EOC11 steam generator replacement/refueling outage. At the end of the inspection period, Unit 1 was defueled and conducting SGRP activities. Specific SGRP reviews were documented in IR 369/97-03 and 97-05. Based on the outage progress at the end of the inspection period, the licensee had reevaluated their SGRP outage completion schedule for a proposed 86 day outage. On February 25, the licensee identified that two of the four main feedwater isolation valves did not close as expected during preparation for maintenance activities on the valves. Details of this problem are discussed later in the report.

Unit 2 began the inspection period at approximately 100 percent power. On March 10, a power reduction to approximately 88 percent was necessary due a turbine generator exciter cooler leak. After repairs were completed, the unit returned to 100 percent power the next day. On March 13, Unit 2 reduced power to approximately 23 percent to allow for inspection and testing of the Unit 2 main feedwater isolation valves based on a problem identified on Unit 1. The unit remained at reduced power (approximately 28 percent) until March 22 when the root cause identification and appropriate repairs were completed to correct the problems. The unit then operated at approximately 100 percent power for the remainder of the inspection period.

Review of UFSAR Commitments

While performing inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that were related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures, and/or parameters.

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; specific events and noteworthy observations are detailed in the sections below. The defueling of Unit 1 for the refueling/steam generator replacement outage was conducted in a good manner. Management oversight of the core off-load evolutions was evident. In addition to the issues discussed in this report, other concurrent steam generator replacement outage inspections are detailed in NRC Inspection Report 369/97-05.

O2 Operational Status of Facilities and Equipment (71707)

O2.1 50.72 Notifications

a. Inspection Scope

During the inspection period, the licensee made the following notifications to the NRC as required or for information purposes. The inspectors reviewed the events for impact on the operational status of the facility and equipment.

b. Observations and Findings

1. On March 5, 1997, the licensee made a report in accordance with 10 CFR 50.72 due to an evacuation of the McGuire site environmental lab following discovery of a container of picric acid which may have been unstable. The City of Charlotte HAZMAT Team and the State of North Carolina were informed. The lab is located inside the licensee's owner controlled area; however, outside the facilities protected area. Specialized personnel were consulted to evaluate the container and determine the best method for disposal. The container was opened under controlled conditions and diluted to minimize any potential problem. The inspectors overviewed the licensee's response to the event and considered that all actions taken were conservative.

2. On March 13, 1997, based on NRC questioning, the licensee made a report in accordance with 10 CFR 50.72 due to two of the Unit 1 feedwater isolation valves for the B and D steam generators failing to actuate as expected. On February 25, the subject valves were identified by the licensee to not have closed as expected during pre-outage valve testing. Unit 1 was shutdown and defueled at the time of discovery. The valves are containment isolation/feedwater isolation valves and were determined to be past inoperable. The cause of the subject valves and similar Unit 2 valves failing to actuate as expected is further discussed in section M2.1 of the report.

The inspectors determined that between the period of February 25 until March 13, the licensee's engineering personnel reviewing the problem had determined that the two valves had been inoperable. However, appropriate licensee personnel did not recognize the event was reportable per 10 CFR 50.72 four-hour report criteria (b)(2)(i) which states, in part, that "any event found while the reactor is shutdown, that had it been found while the reactor was in operation would have resulted in the nuclear plant, including its principle safety barriers, being seriously degraded or being in an unanalyzed condition that significantly compromises plant safety. Once brought to the licensee's attention by the NRC, the

appropriate 10 CFR 50.72 report(s) were made. The problem was also reported under the requirements of four hour report 10 CFR 50.72 (b)(iii)(D). The failure to make the subject 10 CFR 50.72 report(s) in a timely manner will be identified as Violation 369/97-04-01, Failure to report a condition required by 50.72 in a timely manner.

3. On March 14, 1997, the licensee made a report in accordance with 10 CFR 50.72 due to the discovery that two of the Unit 2 containment/feedwater isolation valves did not actuate as expected during testing. Based on a Unit 1 problem, Unit 2 power had been reduced from 100% to approximately 28% power to facilitate testing of the subject valves. During this testing, feedwater isolation valves 2CF-28 and 2CF-30 failed to meet required stoke times. The valves were placed in the TS required closed positions until repairs could be completed. This event and the licensee's corrective action activities are further discussed in section M2.1 of the report. The licensee plans on submitting an LER on this event.

4. On March 18, 1997, the licensee made a report in accordance with 10 CFR 50.72 concerning a past operability concern for the Unit 1 feedwater/containment isolation valve 1CF-26. The licensee identified that on November 27, 1996, the subject valve had been declared inoperable; however, was not logged under TS 3.6.3 as a containment isolation valve. During the time, the valve remained open for extended periods of time in excess of the ACTION statement requirements for the TS. The licensee identified this problem as part of corrective actions for previously identified problems associated with both units feedwater isolation valves and their applicability to TS 3.6.3. The licensee plans to submit an LER on this event. Other associated events are discussed in sections O2.1.b.2 and O2.1.b.3.

5. On March 20, 1997, the licensee made a report in accordance with 10 CFR 50.72 due to their determination that the TS for maximum power level setpoint for postulated inoperable main steam line safety valves (MSSVs) was in error. Specifically, the percent of rated thermal power listed in TS table 3.7-1, was found to be non-conservative when applied to postulated three inoperable main steam safety valves on the same loop. The subject TS allows for continued operation in this condition provided rated thermal power is limited to 43%. However, licensee calculations associated with an associated TS amendment request identified that the unit should be shutdown if three MSSVs were inoperable on the same loop to prevent overpressurization of the main steam system. Corrective actions for the apparent TS inadequacy include the development of a TS revision to correct the problem and interim guidance to operators to clarify appropriate actions to take in the postulated event of three inoperable MSSVs on the same loop.

The inspectors concluded that the licensee's identification of the potential problem was good and the proposed corrective actions were determined to be acceptable.

6. On March 26, 1997, the licensee made a report in accordance with 10 CFR 50.72 concerning both trains of the control room ventilation system being inoperable for approximately two minutes. TS 3.0.3 was entered due to all four intakes to the system being closed simultaneously. The event occurred when two of the four intakes were closed for maintenance activities and the other two intakes were closed by operators in response to a spurious actuation of radiation monitor 1EMF-43A. Investigation immediately determined that the actuation was not valid and the intakes were reopened. The licensee plans to submit an LER regarding the event.

c. Conclusions

The inspector concluded that the licensee reported the above events in accordance with the requirements of 10 CFR 50.72 with the exception of example 2, which was identified as a violation.

02.2 Main Generator Exciter Cooler Leakage

a. Inspection Scope and Observations

On March 10, during routine operator rounds, an operator recognized leakage from a gasket on the main generator exciter cooling system. The gasket was located in a portion of piping that supplies cooling water to one of four exciter cooling units. As a result, the licensee reduced power to approximately 90 percent power to complete repairs. Since the system design incorporated a parallel heat exchanger, the licensee was able to isolate and drain the leaking cooler and complete repairs on-line. The failed gasket was replaced and functionally verified. The unit was then returned to 100 percent power.

b. Conclusions

The inspectors recognized good operator attention to detail in identifying the degraded condition and prompt engineering and maintenance response to correct the equipment failure. The licensee has also proposed to perform a root cause investigation to identify the cause for the gasket problem in efforts to preclude future premature failures.

04 Operator Knowledge and Performance (71707)

04.1 Review of Shift Turnover Processes

a. Inspection Scope

During the current and previous inspection periods, the inspectors observed operator shift turnovers to assess the adequacy of the process.

b. Observations and Findings

The McGuire shift turnover process is controlled and described, in part, by the following procedures:

- OMP 5-7, Unit Supervisor Turnover, Revision 0, dated 2/23/94
- OMP Control Room SRO Turnover, Revision 3, dated 2/3/97
- OMP 5-14, Work Control SRO Turnover, Revision 0, dated 3/25/97

The listed procedures promoted continuity of the shift turnover and incorporate descriptions of expectations prior to assuming operational duties. The inspectors reviewed the procedures and concluded that they provided good guidance to the various levels of the operational staff to effectively accomplish shift turnover. The procedures aided operations management in focusing oncoming shift crews on emergent issues including special attention to conditional surveillances. This area has exhibited previous problems. The procedures included turnover checklists required to be completed as part of the turnover process.

Routine shift turnovers were observed by the inspectors in the control room on a random basis. Periods reviewed included off-hours inspections as well as turnovers conducted during high activity levels. The inspectors noted that the process appeared to be detailed and conducted with a high degree of professionalism which reflected good operations ownership of the plant. An example noted by the inspectors was the delay in the shift briefing due to a phone interruption of one of the unit ROs. The process was stopped until the RO's business was concluded. The process also appeared to be consistently implemented by the different shifts.

c. Conclusions

The inspectors concluded that the controlling processes for conducting shift turnovers were adequate. Implementation of shift turnovers was good and consistently implemented by the various shifts. Operations Shift Managers control and support of the process was evident.

07 Quality Assurance in Operations (40500)

07.1 Identification of Problem Investigation Reports

a. Inspection Scope

Assessment of the licensee's ability to identify adverse conditions for correction.

b. Observations and Findings

The inspectors reviewed the licensee's 1996 and current year-to-date information regarding the number of Problem Investigation Process (PIP) forms. In 1996, the licensee identified in excess of 3,800 PIPs. By the end of the inspection period, the current year-to-date identifications exceeded 1,500 PIPs. Based on this rate, the licensee expected to exceed 5,000 PIPs for 1997. The inspectors discussed the identification process with a number of line management and concluded that the threshold for identification of PIPs was very low and management at all levels were actively supporting use of the process to identify, evaluate, and correct non-conformance, safety, and improvement issues. The inspectors also discussed with the licensee recent changes in the categorization of less important PIPs to allow for continued focus on the most important, safety-related and personnel safety issues. The new process should help the licensee in properly maintaining focus in appropriate areas.

c. Conclusions

The inspectors concluded that the licensee's threshold for identifying PIPs in accordance with their corrective action program was established at a low level. The PIP process was being utilized by personnel at all levels and efforts were being implemented to allow for continued focus on the most significant issues.

07.2 Review of PORC Meeting for On-line Maintenance of Valve 2CA-61

The inspector observed the PORC review of on-line maintenance repair planned for valve 2CA-61. Valve 2CA-61 is the "A" CA pump discharge check valve. Piping temperature alarms indicated leakage past the check valve that was resulting in pipe temperatures of 220 degrees F. Temperatures of 225 degrees F would require the leakage source to be isolated and result in the CF train being declared inoperable.

The inspector observed the PORC deliberations to be thorough with appropriate focus on plant and personnel safety. The execution plan for the repair work was discussed and the PORC questions were adequately resolved. Contingency plans were well developed.

07.3 Block Tagout Program Revisions

a. Inspection Scope

The inspectors performed inspections to evaluate the effectiveness of recent changes to the station Block Tagout program.

b. Observations and Findings

The inspectors evaluated the results of the licensee's efforts to improve the Block Tagout (BTO) Program. A Quality Improvement Team (QIT) had been established to develop an improved process to 1) better control block tagouts during an outage; 2) formalize the documentation to capture the BTO process; and 3) establish training requirements to ensure personnel who will interface with this process were properly trained. The BTO program provides protection for personnel and control of plant components and systems during maintenance, outages, and modification activities. A BTO is defined as isolating and tagging a predefined portion of the plant. This allows multiple work groups to perform work within the BTO boundary minimizing redundant tagging and expediting outage activities by considering the scope of all planned work activities on a particular system or partial system.

As a result of the QIT, McGuire Site Directive (MSD) 587, Block Tagout, was issued. The directive described the development, implementation, and clearing of BTOs as well as the process for controlling BTOs. The inspectors reviewed the MSD and reviewed BTO activities throughout the period. The inspectors noted that the program included detailed procedures to provide for the verification of the removal and restoration of plant equipment and provided adequate documentation for good control over BTO process.

c. Conclusions

The inspectors concluded that the licensee's revisions to the program were appropriate. The inspector also noted that correct administration and implementation of the program to maintain the status and integrity of plant components and systems should be effective in further reducing the probability of tagout related incidents. However, isolated tagout problems have been occurring, indicating a need for management focus in this area.

08 Miscellaneous Operations Issues (92700)

08.1 (CLOSED) URI 50-369/97-01-01: Root Cause of RCS Letdown Filter Leak. This URI was identified to further evaluate the root cause and extent of condition for an RCS 14 gpm leak which occurred on one of the Unit 1 letdown filter housings. Details of the event were previously described in IR 97-01. The licensee completed a root cause investigation of the event and documented the results in PIP 1-M97-0531. The root cause of

the problem were leaking letdown filter isolation valves caused by malfunctioning or misadjusted travel stop through remote operators. Several previous WRs were identified regarding the potential misadjustment of the filter housing inlet isolation valves; however, one was deleted and one was combined with another WR for subsequent review. The event occurred when the leaking isolations allowed the filter housing to pressurize and blow out the filter housing gasket during cover removal. However, the magnitude of the leak was significantly increased due to a vent cap being installed on the filter housing vent. This vent was presumed to be open during performance of the filter changeout procedure; therefore, with no functional vent established, the leaking isolation valves pressurized the filter housing and caused the gasket to dislodge. A similar vent cap was found installed on the Unit 2 letdown filter vent.

The inspectors reviewed the procedure used to perform filter changeout and concluded that the procedure was inadequate, in that, no guidance was provided to ensure proper venting of the housing was accomplished prior to opening the housing. A flow device had been installed in the filter housing configuration which could have been used to verify the proper venting and draining of the filter housing. Corrective actions for the letdown filter vent configuration problem included modification to the filter changeout procedure to eliminate the use of the vent line during the future filter changeouts.

The inspector concluded that the licensee's root cause investigation of the event was adequate. The review also identified other system filter vents which could have been susceptible to an over-pressurization event due to the unproceduralized installation of vent caps. These systems included: seal water heat exchanger, recycle evaporator feed filter, recycle demineralizer effluent filter, and the spent fuel pool cooling filter vents. The inspector concluded that the corrective actions for the event were thorough and identified and corrected other potential problems. The inspectors reviewed the regulatory significance of the configuration problems and determined that procedures associated with the letdown filter and other systems filter assemblies were inadequate, in that, they did not identify or control the installed pipe caps or provide adequate steps to ensure associated filter housing were adequately vented. This issue will be identified as a Non-Cited Violation (NCV), 50-369,370/97-04-02, Inadequate Filter Housing Vent Procedures. This violation was treated as a NCV consistent with Section VII.B.1 of the NRC Enforcement Policy.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments (61726 and 62707)

The inspectors witnessed selected surveillance tests to verify that approved procedures were available and in use, test equipment in use was calibrated, test prerequisites were met, system restoration was completed, and acceptance criteria were met. In addition, resident inspectors reviewed and/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.

M1.2 Ice Condenser Ice Basket Maintenance

a. Inspection Scope

This inspection was performed for the purpose of inspecting the ice condenser baskets and to review results of maintenance activities relative to screws used to secure the coupling rings to the basket.

b. Observations and Findings

Through the use of the Problem Investigation Process (PIP), the licensee reported that in the conduct of routine maintenance activities, i.e., empty and replenish ice condenser baskets, performed during refueling outage 1E0C11, in March 1997 technicians discovered that although basket 5-3-9 had been replenished, its weight was not indicative of a full basket. The basket was subsequently emptied and a visual inspection revealed that it was partly separated at a point approximately 27 feet below the top at the coupling ring. The inspection also revealed that only two of the 12 required screws were present. Through document review and discussions with the responsible technician and the lead engineer, the inspector attained the following background information.

During refueling outage 1E0C9 in October 1994, a routine inspection revealed that the aforementioned basket was damaged and would require repair. The repair, which required the replacement of several basket sections, was started on the morning shift of September 15, 1994, and was completed on the night shift of the same day.

The basket was apparently replenished with ice and placed in service until the present outage (1E0C11). The screws were discovered missing when the basket failed to pass a weight test during maintenance. Through discussions with cognizant personnel the inspectors ascertained that through an apparent lack of communications between shifts, technicians failed to install the screws used to attach the basket section to the coupling ring as required by the applicable procedure MP/0/A/7150/098. The missing coupling screws were subsequently installed under Work Order 96064989-01 and Procedure SM/0/A/8510/07. The basket was tested and returned to service.

Through discussions with the lead engineer, the inspectors ascertained that a search of the ice condenser floor produced no evidence of broken or whole screws that could be associated with the loose basket. In addition the lead engineer stated that of the 2663 baskets that have been serviced at McGuire since 1990, this was the only basket found with coupling ring screws missing. The lead engineer also stated that technicians have never found loose or broken coupling ring screws on the floor of the ice condenser since the plant went into commercial service. This licensee identified and corrected problem was determined to be a violation of 10 CFR 50, Appendix B, Criterion V, and was evaluated as a Non-Cited Violation (NCV) 50-369,370/97-04-03, Failure to Follow Procedures. This violation was treated as a NCV consistent with Section VII.B.1 of the NRC Enforcement Policy.

The inspectors selected a sample of ice condenser baskets for observation. The emphasis of the inspection was the bottom ends of the baskets for evidence of damage and for loose or broken screws on the floor of the ice condenser. The inspectors also checked the top ends for missing screws or basket damage and noted that all the baskets inspected appeared to be in good condition and found no evidence of missing screws on the floor of the ice condenser.

As a followup to this work effort, the inspectors reviewed quality records pertaining to the subject screws. By this review and through discussions with technicians and the lead engineer, the inspectors ascertained that all ice condenser basket coupling ring screws used at McGuire and Catawba have been purchased from Westinghouse (W).

The present inventory was procured on purchase order C19846-M3 in July 1992. The screws were identified as Ice Basket sheet Metal Screws No. 10x32x1/2 inch long, W part No. 1880E55H05. The screws were produced from AISI 1022 carbon steel material that was heat treated to a minimum tensile strength of 140KSI which is consistent with McGuire's FSAR paragraph 6.2.2 requirements.

Use of Improper Replacement Screws

In addition to the above mentioned information, the inspectors ascertained that on May 30, 1990, the licensee issued Licensee Event Report (LER) 369/90-7 to notify the NRC that previously authorized replacement screws used during maintenance of certain ice condenser baskets in McGuire Units 1 and 2, were made from improper stainless steel type material. Following this discovery, Design Engineering reviewed the shear and binding forces applied to the basket couplings during seismic and design basis events. Results of this review concluded that the use of 10-16, type 410 stainless steel screws was unacceptable for the application. On April 17, 1990, the licensee issued a Problem Investigation Report (PIP) 1-M90-0107 to address this concern. The problem was resolved by replacing all 410 type stainless steel screws, in the bottom and or intermediate coupling rings on 10

Unit 1 baskets with W 10-32, AISI 1022 carbon steel screws. Following W recommendations based on analysis, the licensee used stainless steel cables to secure ice basket (7-6-10) in Unit 2 until the screws in question could be replaced with the original material. This was scheduled for the upcoming refueling outage.

By telephone the inspectors discussed the subject screws with the Catawba cognizant engineer. Through this discussion the inspectors ascertained that Catawba used the same maintenance procedure to perform maintenance and tracking. Catawba also uses the same carbon steel 1022 material screws provided by W on their coupling ring application. In addition, the engineer indicated that loose or broken ice basket screws have never been found on the floor of the ice condenser since the plant began commercial operation. As in McGuire, screws made of stainless steel material were used on the non-load bearing stiffener rings for the purpose of securing them to the baskets. The inspectors reviewed the following information/documents for technical content and are provided for reference purposes:

1. PIP 1-M90-0107 Operability Evaluation, Ice Condenser, Ice Basket Coupling Screws, Unit 1.

2. SM/0/A/8510/007 Rev. 3 Ice Basket Corrective Maintenance and Tracking

3. 6.2.2 Ice Condenser System, McGuire Final Safety Analysis Report

4. 3/4.6.5 McGuire Technical Specification

5. SECL 90-283 Ice Condenser Lower Strength Evaluation, Unit 1

6. PIP 1-M9-0107 Rev. 2 Operability Evaluation Ice Condenser, Ice Basket Coupling Screws, Unit 2

c. Conclusions

The ice condenser maintenance program at McGuire appears to be consistent with Technical Specification requirements and FSAR commitments. Procedures and quality records reviewed for technical content, completeness and accuracy were satisfactory. Supervisors and technicians were very knowledgeable and dedicated to the task of maintaining the ice condenser, and therefore able to perform its design functions. One Non-Cited Violation (NCV) was identified.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Unit 1 and 2 Feedwater Isolation Valves Not Actuating as Expected

a. Inspection Scope

During the inspection period, the inspector reviewed problems associated with the failure of Unit 1 and 2 feedwater/containment isolation valves to close and or actuate within required times.

b. Observations and Findings

On February 26, while performing preventative maintenance on the Unit 1 mainfeed (CF) isolation valves, the licensee identified the hydraulic actuators for 1-CF28 and 1-CF30 did not actuate as expected. Unit 1 was in no MODE. Specifically, deenergizing the train A or B safety solenoids did not cause the accumulator to discharge nitrogen pressure and close the valve.

The subject valves are Borg Warner, 16 inch hydraulically actuated valves with nitrogen close safety feature. There are two safety trained solenoids on each valve to provide redundant means of porting nitrogen to the valve actuator to close the valve within the required time. The safety solenoids are normally energized. The type of hydraulic oil used was Fyrquel 220 which has a recommended maximum operating temperature of 160 degrees F. The valves are located in the main steam valve vaults (MSSV) in the feedwater system flowpath to the steam generator main nozzles. The valves receive a signal to close on a Safety Injection, Low Tavg coincident with Reactor Trip, Hi-Hi MSSV water level, or HI-HI steam generator level.

Based on the identified Unit 1 concern, on March 14, Unit 2 was reduced to approximately 28% power for realignment of feedwater flow from the main feedwater nozzles to the upper feedwater (auxiliary feedwater) nozzle. This was done to allow testing of the Unit 2 MF isolation valve without adversely impacting the unit. The testing identified that 2CF28 and 2CF30 were also unable to close within the required stroke time. The unit remained at reduced power for 11 days to evaluate the problem and develop corrective actions as follows. The licensee made several 50.72 reports regarding the problems and a violation was identified concerning licensee activities in the area of reportability (see section 02.1).

The licensee's root cause investigation determined that the solenoid failures were attributed to hydraulic oil degradation which produced iron phosphate salts and gelling of the fluid within the solenoid. This interfered with the movement of critical close tolerance parts within the solenoid valve resulting in the valves not being able to go closed. The solenoids installed in the application are a wet type where hydraulic fluid can communicate directly with the plunger mechanism. As previously stated, the solenoids are normally energized, therefore the temperatures within the solenoid were found to exceed the manufactures recommended limit. The oil degradation occurs naturally over time; however, the degradation could be accelerated by either high moisture content within the oil and/or sustained oil temperatures greater than recommended levels. Stagnation of the oil also contributes to the problem. Normal operation of the solenoid, though infrequent, would not result in "flushing" of the critical portions of the solenoid assembly enough to prevent the problem.

Once the root cause of the problem was established, the licensee took extensive actions to ensure continued operability. Corrective actions for the oil salting problem included:

- Modification of the power supply to the safety solenoid valve coils to reduce terminal voltage at the coil and reduce operating temperature of the coil, plunger, and local hydraulic oil.

- Monitoring of the condition of the hydraulic fluid via the total acid number (TAN) which is indicative of oil breakdown.

- Installation of ventilation ports in the actuator enclosures to increase cooling to the solenoid coils.

- Installation of RTD's on the safety solenoid coil housing to allow for monitoring of coil temperature during operation.

- Revision of maintenance procedures for the actuators to incorporate more detailed cleaning methods of the safety coils.

- Increased PM and inspection of all solenoid and plunger mechanisms.

- Cleaning or replacement of all solenoid actuator components.

- Replacement of hydraulic fluid/dehydrated oil as required.

The inspectors reviewed industry experience data and determined that previous failures of hydraulically operated MF and MS isolation valves had been identified at other facilities with similar symptoms. The licensee incorporated this data during their root cause investigation.

Subsequent to the end of the inspection period, the licensee reduced Unit 2 power again on April 18 to implement additional modification to the CF isolation valve solenoid circuitry. This was accomplished to further ensure continued operation of the equipment within the manufacture's recommended operating temperature in the upcoming summer months. The modification further reduced the solenoids operating voltage by installing larger resistors in the circuitry. The addition of the resistors was shown not to adversely affect the solenoid drop out voltage which could lead to inadvertent valve actuation. Valve stroke timing tests, both before and after the modification were within required times. Once Unit 2 returned to 100 percent power, data indicated that the modification further reduced the solenoid operating temperature 10 to 15 degrees F. The licensee estimated that the current design should enable the solenoids to operate within the manufacturer's recommended temperature range throughout the hottest periods of the summer. The licensee will continue to monitor the temperatures on a periodic basis to ensure the conditions do not exist for continued hydraulic fluid salting. In addition, a special project has been

initiated within engineering to review the potential for a reliable alternate type actuator/valve to replace the existing hydraulic actuators in the upcoming EOC12 outages. This is being reviewed to eliminate this and other long term performance problems associated with these valves.

c. Conclusions

The inspectors concluded that the licensee's approach to identifying and correcting the root cause of the CF valve solenoid problems was detailed and aggressive. The use of root cause analysis techniques and incorporation of vendor technical expertise and available industry data to resolve the problem was good. The licensee plans to submit an LER regarding the past inoperability of the subject valves. The inspectors will review the safety significance of the inoperable CF isolation valves during LER closeout once the licensee's analysis of the event is complete.

The inspectors also concluded that PORC reviews associated with the second Unit 2 downpower to perform additional modification to the solenoids were conservative and thoroughly evaluated the potential risk to the unit. The decision to reduce power for the modification reflected licensee managements commitment to limit potential transients to the plant. Engineering proposals regarding the solenoids were well established and had valid technical basis.

M2.2 Reactor Trip Breaker Contact Resistance Concerns

a. Inspection Scope

The inspectors evaluated the licensee's findings and response to higher than expected resistance indications during testing of Solid State Protection System (SSPS) logic circuitry.

b. Observations and Findings

During the performance of PT/0/A/4601/08A, SSPS Train A Periodic Test, the licensee identified higher than expected resistances on a P-4 contact on DS-416 bypass reactor trip breaker, BYA. The licensee recognized that higher resistances could potentially prevent the function of the P-4 contact and not allow operator reset of the SI signal adversely impacting the ability of operators responding to certain emergency conditions. The licensee stopped the test procedure and restored the SSPS system to its normal alignment through the main reactor trip breaker, RTA. The licensee immediately initiated investigations to determine the cause for the higher resistance values. Although the measured values exceeded licensee expectations, the licensee confirmed breaker operability and subsequently confirmed that the Solid state Protection System (SSPS) was also operable.

The licensee identified and evaluated the possible failure modes and determined that the most probable cause for the higher resistance values was due to excessive amounts of vendor recommended graphite lubricant. Excessive amounts of the lubricant created additional resistivity and prevented good continuity between the fixed and movable contacts. The inspectors reviewed maintenance procedures and verified that the licensee procedures specified the vendor recommended lubricant, Westinghouse 53701AN. The lubricant was applied on current carrying surfaces during each scheduled refueling outage.

The licensee responded by revising the station procedures to thoroughly clean the contacts during periodic breaker maintenance and to replace the lubricant sparingly to minimize the potential for higher than expected resistance values. The licensee developed and implemented emergency work requests to clean and lubricate the auxiliary switch contacts on all installed reactor trip breakers in accordance with the revised procedures to provided added assurance of trip breaker performance. The licensee contacted Westinghouse for additional technical support to evaluate the significance of the higher resistance measurements. The licensee was informed that resistance values should be kept to a minimum to ensure proper operation of the SSPS circuitry.

The inspector verified that the licensee had revised SI/0/A/5100/002, Westinghouse DS-416 Air Circuit Breaker Inspection and Maintenance, to check contact resistance prior to and following maintenance. The licensee has also revised the procedure to include improved guidance on cleaning and applying auxiliary switch contact lubricant.

c. Conclusions

The inspectors concluded that the licensee's proactive response to the lubrication on breaker current carrying surfaces was good. The inspector also concluded that the licensee revision to the maintenance and inspection procedure should provide assistance in identifying adverse switch performance during maintenance. Detailed testing and followup by engineering and maintenance teams has enhanced the licensee's understanding of the DS-416 breaker and SSPS circuitry.

M2.3 Leakage through Unit 1 Refueling Cavity Seal

a. Inspection Scope

The inspectors reviewed licensee actions associated with leakage identified during use of a new design of reactor refueling cavity seal.

b. Observations and Findings

For the current Unit 1 SGRP/refueling outage, the licensee incorporated a new non-inflatable type seal at the reactor vessel flange to support refueling activities. During initial floodup for core off-load, operators received repetitive HI-HI alarms for the incore instrumentation area sump indicating potential refueling cavity seal

leakage. An estimated 17 gpm was identified and the operators responded to each alarm by starting the local sump pump. At full flood conditions, the leakage had trended down to approximately 7 gpm. PIP 1-M97-0665 was identified to track the issue. The inspector questioned the long term seal integrity and discussed the new seal design and leakage expectations with engineering and maintenance personnel. The new seal design incorporated a five piece solid T-type design which was held in place via 50 toggle bolt assemblies. The seal design had been changed to eliminate previous leakage problems associated with the old seal design and to eliminate the need for RTV sealant application to achieve acceptable or zero leakage.

The licensee evaluated the existing leakage prior to proceeding with core offload. Based on the seal design, it was concluded that the seal integrity was intact and a catastrophic seal failure was not possible. The licensee also evaluated the impact of repetitive sump pump cycling and developed operator guidance for use of the sump pump. Based on the inspectors review of the seal design, a catastrophic seal failure was not probable and the leakage was stable. Defueling activities were completed without any further problems and engineering monitoring of the existing leakage for adverse trend was considered good.

Prior to draindown, the licensee identified a suspect location for the leakage from beneath the vessel flange. After draindown, inspections revealed that some areas of the seal mating surfaces may not have been fully seated due to irregularities in the mating surfaces and/or seal. In addition, one weld area of the flange had some concavity which was identified as the most probable area for the identified leakage. To temporarily correct the problems for core reload, the licensee detensioned the affected areas and used approved RTV to provide adequate sealing. Long term corrective actions include mapping of the mating surfaces to identify any additional surface inconsistencies and use the information to specify improved seal dimensions. The licensee stated that their goal was to achieve a zero leakage seal with the improvements. Engineering guidance was developed to monitor any leakage during refueling canal fill and while at full flood conditions and also identified acceptable conditions for operator information.

c. Conclusions

The inspector concluded that the licensee took appropriate actions to identify and temporarily correct the previous reactor refueling cavity seal leakage. Attempts to identify the location of the seal leakage were performed in a timely manner. Adequate repairs were completed prior to reflood for refueling. Final evaluation of the repairs will be determined during reflood activities for core reload. Overall, the observed maintenance activities were performed in a good manner.

M4 Maintenance Staff Knowledge and Performance

M4.1 Unit 1 Main Turbine Oil Spill

a. Inspection Scope

On March 27, 1997, a substantial amount of main turbine oil was inadvertently spilled out of the turbine during maintenance activities. The inspectors monitored the licensee's response to the problem and evaluated the corrective actions/cleanup activities.

b. Observations and Findings

The problem occurred during planned turbine oil flushing operations and was documented via PIP 1-M97-1287. Two temporary covers made of plexiglass were installed near the shaft driven oil pump. One of the covers developed a crack which allowed approximately 1,000 gallons of turbine oil to spill from the system onto the turbine deck and below. The evolution was identified as a risk evolution and as such, had contingency measures established at the pre-job briefing to cope with this type of problem. Once aware of the leak, personnel reacted quickly (within 45 seconds) to isolate recirculation pumps to limit the total oil spill. No personal injuries occurred due to the leak and the event did not affect the operating unit.

Immediate corrective actions included timely efforts to contain the spill and to stop any activities involving cutting or grinding which could be a source of ignition for the oil. Turbine building sump pumps were quickly secured to prohibit evacuation of the oil to outside holdup ponds. At the end of the inspection period, some oil sheen was identified and collected on one of the external holdup ponds. No oil was known to be released to the river.

The licensee conducted significant cleanup efforts to identify the affected areas of oil intrusion. Focus areas included potential oil intrusion into electrical components, cable conduits, and secondary piping insulation. The oil spill primarily affected the area of the high pressure turbine and areas below. At the end of the inspection period, the licensee had manufactured new metal covers to continue the turbine flushing activities. Personnel familiar with the plexiglass covers had not experienced any previous problems with their use. The licensee informed the Catawba facility of the problem for information and was continuing to develop their root cause determination for the failure at the end of the inspection period.

c. Conclusion

The inspector concluded that the licensee initial response to the turbine oil spill was good. This was possible due to the pre-planned contingencies incorporated into the maintenance. The success of these

efforts were in-part due to good risk assessment planning during maintenance planning. Efforts to contain, identify, and clean affected components was considered adequate; however, any residual oil may present a challenge during the Unit 1 restart if not completely removed.

M7 Quality Assurance in Maintenance Activities

M7.1 Foreign Material Exclusion (FME) Controls

a. Inspection Scope

The inspectors evaluated recent FME issues to evaluate the effectiveness of the licensee's FME controls. Three recent instances of foreign material identified in safety systems were reviewed.

b. Observations and Findings

The inspectors reviewed station drawings and system operating procedures in an effort to develop an understanding of the potential foreign material entry pathways. The inspectors also held detailed discussions and reviewed licensee documentation to validate the licensee's assumption of the material origin and intrusion date.

The material (metallic shavings and powdery substance) was identified during disassembly of ND heat exchanger discharge side drain and accumulator 1A discharge check valve. The material appeared to be similar and potentially from the same origin. The licensee speculated that the material was introduced into the system during modifications to the ND system during the 1993 1EOC8 outage. The modification included wet tap drilling to install an additional flow loop to correct potential weak pump-strong pump concerns during small break LOCA scenarios.

c. Conclusion

The inspectors reviewed the licensee current foreign material control procedure and policy and concluded that the licensee has established adequate controls to currently prevent material intrusion into plant systems. The inspector also noted that the small quantity and physical properties of the foreign material had not resulted in noticeable damage to equipment. A review of operational data found no indications of fuel cladding damage due to debris induced fretting. The licensee performed inspections of attached piping and valves to identify and remove any remaining material. The licensee's response to the identification of the debris was good. Review of specific examples indicated that, once identified, licensee root cause assessment of FME events was good.

M7.2 Review of Unit 1 Major Overhaul of Diesel Generators

a. Inspection Scope (62707)

The inspector reviewed activities associated with the Unit 1 emergency diesel generators (EDG) overhaul.

b. Observations and Findings

The diesel engines at McGuire have been in service for approximately 25 years. Although the number of run hours are approximately 8,000 with 1,000 starts, due to the fast starting consideration, EPRI guidelines would equate to approximately 16,000 run hours. The diesel manufacturer recommends a 10,000 hour tear down inspection. The SGRP outage represented an opportunity to perform a major overhaul of the diesel engines to satisfy this recommendation.

In preparation for the diesel generator overhaul, the licensee compiled a Maintenance Activity Planning Package (MAPP). This package included the scope of work, key personnel involved in the work and support of work activities, listing of parts and materials needed for the overhaul, tools, a comprehensive listing of maintenance procedures needed for the diesel work, key personnel contact listing, and a schedule. The MAPP also included a listing of goals and expectations for the diesel overhauls project with an emphasis on safety. The inspector reviewed this package and found it to be useful in understanding the scope of work, identifying personnel involved in the project, and the overhaul schedule.

The scope of work for the diesel overhaul included replacement of all cylinder liners, replacement of heads with rebuilt heads, replacement of fuel injectors, and rebuilding of rocker boxes. Additionally, inspections were performed on connecting rod bearings, main bearings, cam bearings, crankshaft thrust bearings, and camshaft thrust bearings. Bearings were inspected and if necessary, replaced. The 1B EDG overhaul was completed during this inspection period. Overall, the material condition of this diesel was determined by the licensee to be better than expected. The licensee attributed the good as-found condition of the EDGs, in part, to the use of synthetic oil.

After, the completion of the overhaul work, a series of break-in runs are completed on the diesels. These break-in runs are completed utilizing procedure MP/0/A/7400/065, Nordberg Diesel Generator break-in runs. These break-in runs are a series of seven runs at increasing power level for varying lengths of time.

The EDG runs on the 1B EDG went very well with few problems encountered. Minor problems encountered during the break-in runs included small leaks which were corrected by tightening connections. One leak in a fuel line resulted in suspending the diesel run. A small leak occurred in a 90

degree fitting on a fuel injector that requires hand tightening. After the fitting was tightened the diesel runs continued with no additional leaks encountered. The leaks were anticipated due to the large amount of work performed during the overhaul. The inspector observed portions of the break-in runs and noted that they were in accordance with procedures. Additionally, the inspector noted strong engineering involvement and support.

c. Conclusions

Maintenance activities associated with the major overhaul of the Unit 1 EDGs during the EOC 11 outage were conducted in accordance with procedures, coordinated well and maintenance personnel were knowledgeable of the work to be performed. Strong engineering support was noted. The overall condition of the 1B EDG was found better than expected. A fuel line leak encountered during a post maintenance run was corrected and determined to be unrelated to previous fuel line failures associated with improper crimping.

III. Engineering

E1 Conduct of Engineering

E1.1 Review of Operator Aid Computer Replacement

a. Inspection Scope (37551)

The inspector reviewed the Operator Aid Computer (OAC) replacement modification to determine the scope of the project, adequacy of design controls, adequacy of compensatory measures for control room integrity and compensation for loss of parameters during the no-mode phase of the project.

b. Observations and Findings

Nuclear Station Modification NSM MG-12412/00, McGuire Unit 1 OAC Replacement, was implemented during the 1EOC11 outage. The original computer was a early 1970s vintage Honeywell 4400 process monitoring system. This system had become increasingly difficult to maintain due to spare parts availability, had limited input/output and processing capacity and limited graphics capability. The vendor for the replacement OAC will be Science Application International Corporation (SAIC). In addition to providing an SAIC system OAC, the vendor also provided field support and training prior to and during the replacement project.

In addition to replacing the OAC, additional systems will be replaced and integrated into the OAC to provide plant monitoring functions. These included the Plant Events Recorder, the ESF Bypass Status Indication System, the Transient Monitoring System, the Unit Interface Controller and Diesel Generator Diagnostic Engine Monitoring Systems.

The inspector reviewed various portions of the OAC installation. Walkdowns of the work areas for the OAC project were performed periodically. The inspector reviewed compensatory measures that were established for cable routing through control room penetrations related to the OAC replacement modification. McGuire establishes compensatory measures for penetration breaches in procedure MP/0/A/7650/064, Initial Penetration and Penetration Repairs.

Prior to the penetration breaches, personnel briefings were conducted. The inspector attended the briefings and found them thorough. All key personnel were in attendance and a detailed review of the procedures was performed. The inspector observed the cable pulling process and found the implementation of the compensatory measures well executed with adequate support from Operations personnel.

Additionally, the inspector observed portions of the OAC enhancements after installation. During post overhaul runs of the EDGs the inspector observed personnel using the Diesel Generator Diagnostic Engine Monitoring Systems. The inspector observed this enhancement to the diesel monitoring capability to be a useful addition to EDG operators.

The inspector reviewed the variation notices (VN) that had been issued for the OAC replacement modification. Approximately 30 VN had been issued during this inspection period. The inspector concluded that this number of VN was not high due to the scope of the OAC replacement modification. The inspector reviewed the VN that were written and determined most to be minor variations that would normally be encountered in this type of project.

The inspector observed the OAC replacement project to be effectively implemented. Engineering support to the OAC project was excellent. The significantly low number of problems encountered during the project implementation indicated effective planning and engineering during all phases of the project.

c. Conclusion

Engineering activities associated with the OAC replacement project were determined to have appropriate design controls with good overall engineering performance. Compensatory measures established for cable pulling through control room penetrations were observed to be conservative and properly implemented.

E2 Engineering Support of Facilities and Equipment

E2.1 125V Vital DC Power System Battery Seismic Qualification

a. Inspection Scope

The inspectors reviewed the licensee's response to potential operability concerns identified following identification of poor quality welds on batteries shipped back to the manufacturer.

b. Observations and Findings

Testing was per direction of the Nuclear Utility Users Council and included old and new AT&T lineage 2000 round cell batteries to determine the cause of premature battery capacity loss (see IR 96-10 for details). During testing, a single cell immediately dropped voltage indicating a direct short. The manufacturer conducted additional inspections of the battery. The cell was removed and shipped along with one other test cell to the manufacturers facility for further analysis. The manufacturer determined that the positive plate circuit of the failed cell had opened at the four welds that connect the positive post harness to the first positive plate. The depth of the weld penetrations were approximately half of the minimum manufacturing specification requirement. Because the poor weld quality could potentially have affected seismic qualification and current carrying capability of the battery, the vendor, Lucent Technologies, filed a Report of Discovery on March 3 and began investigations in accordance with 10 CFR Part 21.

A subsequent teleconference between Region II and the licensee was held requesting expeditious completion of an operability determination. The licensee evaluated battery operability using worst case Design Basis Seismic Event assumptions. The licensee determined that the battery seismic qualification test accelerations exceeded the McGuire floor spectra accelerations at the battery location when reduced to account for smaller positive plate welds. The licensee also stated that previous battery service test had proven the current carrying capability of each cell currently installed at McGuire had not been significantly affected.

The licensee had previously notified the inspectors of the their intent to replace all Lineage 2000 round cell batteries by December 1997 with standard rectangular lead acid batteries due to the unrelated premature capacity loss problems.

c. Conclusions

The licensee's response to potential vital battery seismic operability concerns was appropriate. However, the inspectors requested additional review by the NRC Staff to validate the licensee's conclusions. The inspectors concluded that the licensee's response to the vendor notification was appropriate.

E4 Engineering Staff Knowledge and Performance

E4.1 Review of Response to Nuclear Service Advisory Letter Regarding Incore Thermocouples

a. Inspection Scope (37551)

The inspector reviewed the licensee response to Nuclear Service Advisory Letter # NSAL-95-006 to ensure the concern for moisture intrusion for the incore thermocouples identified by NSAL was adequately addressed.

b. Observations and Findings

NSAL-95-006 was issued by Westinghouse in August 1995 to alert nuclear plants of a potential problem with incore thermocouples manufactured by CKB Industries. Incore thermocouples manufactured by this vendor have a potential for moisture intrusion. The concern identified by Westinghouse was that moisture which had intruded into the thermocouple sheath would flash to steam in a post accident environment and rupture the thermocouple sheath.

McGuire was not identified in the original listing of plants with this vendor's type thermocouple. McGuire was added later after it was identified that two Unit 2 thermocouples had been manufactured by CKB Industries. McGuire initiated PIP 0-M95-1641 to address this concern.

The inspector reviewed the licensee actions to address the moisture intrusion concern and held discussion to understand the scope of the corrective actions and the results of the licensee review.

The licensee initiated insulation resistance testing of the incore thermocouple insulation. This testing was done in conjunction with the other incore thermocouple PMs as part of IP/0/A/3000/19, Inadequate Core Cooling Monitor ICCM-86 Maintenance and Calibration Procedure. The results of the Unit 2 testing in the previous 2EOC10 outage did not identify any resistance values which might have been indicative of moisture intrusion.

During the Unit 1 outage 1EOC11, the insulation resistance testing resulted in the identification of numerous thermocouples with low insulation resistance values. Subsequent testing of the thermocouples at the reactor head confirmed nine safety related thermocouples with IR and capacitance values which indicated moisture intrusion. PIP 1-M97-0261 was initiated to document the Unit 1 thermocouple discrepancies.

As a result of the Unit 1 findings, the licensee performed a Fault Tree Analysis to determine if moisture could lead to any viable failure mechanisms that could affect thermocouple operability. The failure mechanism for post accident failure was the thermocouple sheath bursting due to moisture intrusion flashing to steam. Limited testing by Westinghouse indicated that, even with a ruptured sheath, the leads were not damaged on the tested thermocouples and they continued to indicate accurate temperatures. Also, review of the reactor vessel head internals drawings indicate substantial support and shielding to protect the thermocouples. The results of the Fault Tree Analysis indicate that all post accident failures mechanisms associated with moisture intrusion were not viable. The inspector reviewed the Fault Tree Analysis results and discussed them with the licensee. The inspector agreed with conclusion drawn from the analysis.

The licensee still has a concern on the long term affect of moisture intrusion on thermocouple operation. The licensee will continue monitoring and trending of the thermocouple insulation resistance integrity. Additionally, the licensee is pursuing Westinghouse owner's Group involvement for long term resolution of the thermocouple issue.

c. Conclusions

The inspector concluded that the licensee actions to address the concern identified in the NSAL were adequate. Review of licensee engineering response and possible affect of thermocouple failure were strong with conservative operability determinations.

E8 Miscellaneous Engineering Issues (92902)

E8.1 (CLOSED) URI 50-369,370/96-10-01: Failure to Ensure Installation of Correct Heaters in FWST Enclosure. During the previous inspection, (see inspection report 96-10, heater elements installed for freeze protection in the Unit 1 and Unit 2 Refueling water Storage Tank (FWST) safety-related level transmitter enclosures were found to be of a higher capacity than described on engineering design drawings and documents. Specifically, two 250 watt heater elements were installed in each enclosure, whereas the applicable design documents specified one 50 watt element per enclosure. The URI was identified to determine the safety significance of the problem and evaluate other relative information. The inspectors reviewed the most recent information regarding the subject URI. The inspectors concluded that if the thermostats were to fail to deenergize the heaters, the high enclosure temperatures could significantly degrade the safety related transmitters. This could potentially have adversely affected the plant's ability to ensure automatic ECCS swapover. Based on the potential for the adverse effects of excessive temperatures on the safety-related level and temperature transmitters, the inspectors determined that failure to incorporate the correct wattage heater element into the subject enclosures was a Violation of 10 CFR 50 Appendix B, Criterion V. This Violation will be

identified as VIO 369, 370/97-04-04, Failure to ensure installation of correct heaters in FWST enclosures. The significance of the violation was heightened based on the NRC's identification of the problem and a lack of engineering attention to detail during corrective actions for other FWST freeze protection related issues.

The licensee has installed the correct wattage heaters in the subject enclosures and incorporated a high temperature alarm to alert control room operators of a failed thermostat. At the end of the inspection period, the licensee was continuing to develop additional corrective actions to address design challenges associated with the FWST transmitter enclosures. This URI is closed.

IV. Plant Support

R7 Quality Assurance in Radiation Protection Activities

R7.1 Foreign Material Identified in Spent Fuel Pool Cooling System

a. Inspection Scope (83750)

The inspectors reviewed licensee self assessment activities for followup to an unplanned high radiation area event that occurred on February 23, 1997, to determine the adequacy of the licensee's radiological controls as required by 10 Code of Federal Regulations (CFR) 20.1601.

b. Observations and Findings

At approximately 0230 hours on February 23, 1997, the licensee began a planned alignment of the Refueling Water System for purposes of filtration and cleanup of the system. At approximately 0530 hours an operator entered a refueling water pump room to verify proper pump operation. During the entry, the operator's alarming dosimetry alarmed in the dose rate mode indicating radiation levels of 245 millirem/hour at approximately 3 feet from the pump. The operator left the room, exited the radiological control area (RCA) and notified radiation protection of his dosimetry alarm. Radiation protection personnel responded to the area and performed radiation surveys, posted and controlled the room as a Locked High Radiation Area, and surveyed additional areas and components to determine the extent of the problem. Surveys determined the source of the highest radiation levels was a strainer in the refueling water cleanup system. Surveys determined radiation levels of 20 rem/hour on contact with the strainer housing and 5 rem/hour at 1 foot from the strainer housing. The strainer was removed and replaced on February 26 without difficulty and minimal exposure. Shreds of clear plastic were found in the strainer. Surveys determined dose rates on the old strainer were 80 rem/hour contact. The licensee placed the old strainer in a shielded container.

The inspectors reviewed the licensee's actions regarding the event and determined that the licensee, upon identification of the problem, exercised adequate radiological controls to minimize personnel radiation

exposure. The licensee initiated a Problem investigation Process (PIP) report to investigate potential causes and corrective actions for the event. The licensee informed the inspectors that clear plastic had not been authorized for use in the reactor building for approximately 5 years to prevent intrusion of plastic materials in plant systems. At the time of the inspection the source of the plastic material was unknown.

c. Conclusions

Based on a review of this event, the inspectors determined the licensee, upon identification of the high radiation area problem, exercised adequate radiological controls as required by 10 CFR 20.1601 for access controls of high radiation areas.

S4 Security and Safeguards Staff Knowledge and Performance

S4.1 Foreign Object Identified in Replacement Piping During Protected Area Access Search

a. Inspection Scope

The inspector reviewed the discovery of a foreign object identified by security personnel during PA access search.

b. Observations and Findings

On March 24, 1997, a security access inspection of a CF pipe for installation on one of the new steam generators was performed. After FME covers were removed, security personnel identified a metal rod (17" long, 3/8" diameter) inside the pipe. The rod was removed and the issue was documented via PIP 1-M97-1222 for review. The subject pipe ends had a plywood cover to protect the ends, a FME endcap, and was banded prior to the security inspection. The CF pipe had been prefabricated for SG installation (pipe number 1D-004-CC, project 19420) approximately two months before.

An investigation was conducted by site security and other personnel. Based on the available information, the origin of the rod could not be determined. It should be noted that the licensee's QA process would also have inspected the piping via video prior to installation, allowing for additional opportunities for discovery. Although the origin of the foreign material was not determined, the licensee planned additional measures to heighten security officer awareness for such matters, including what actions should be taken in the event of additional incidents.

c. Conclusions

The inspectors concluded the identification of the foreign object within the pipe was indicative of good security performance. The inspectors also concluded that other opportunities would have ensured identification of the object had security not found the rod. Security

response to the event and followup investigation was considered aggressive. Lessons learned from the incident were being planned to improve future security involvement in similar matters.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on April 9, 1997. The licensee acknowledged the findings presented.

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

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Barron, B., Vice President, McGuire Nuclear Station
Boyle, J., Civil/Electrical Systems Engineering
Byrum, W., Manager, Radiation Protection
Cline, T., Senior Technical Specialist, General Office Support
Cross, R., Regulatory Compliance
Davison, Valve Supervisor
Dolan, B., Manager, Safety Assurance
Geddie, E., Manager, McGuire Nuclear Station
Herran, P., Manager, Engineering
Jones, R., Superintendent, Operations
Michael, R., Chemistry Manager
Nazar, M., Superintendent, Maintenance
Sample, M., Manager, Steam Generator Maintenance Group
Cash, M., Manager, Regulatory Compliance
Thomas, K., Superintendent, Work Control
Travis, B., Manager, Mechanical/Nuclear Systems Engineering
Tuckman, M., Senior Vice President, Nuclear Duke Power Company
Welch, T., Engineering Supervisor

NRC

S. Shaeffer, Senior Resident Inspector, McGuire
M. Sykes, Resident Inspector, McGuire
N. Economos, Regional Inspector
S. Rudisail, Regional Inspector
D. Forbes, Regional Inspector

INSPECTION PROCEDURES USED

IP 71707:	Conduct of Operations
IP 61726:	Surveillance Observations
IP 40500:	Self Assessment
IP 37551:	Onsite Engineering
IP 83750:	Occupational Exposure
IP 62707:	Maintenance Observations
IP 92700:	Miscellaneous Operations Issues
IP 92902:	Miscellaneous Engineering Issues

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED

50-369/97-04-01	VIO	Failure to report a condition required by 50.72 in a timely manner (paragraph O2.1)
50-369,370/97-04-04	VIO	Failure to ensure installation of correct heaters in FWST enclosures (paragraph E8.1)

CLOSED

50-369,370/97-04-02	NCV	Inadequate Filter Housing Vent Procedures (paragraph O8.1)
50-369/97-04-03	NCV	Failure to Follow Procedure Guidelines for Service of Ice Condenser Baskets (paragraph M1.2B)

LIST OF ACRONYMS USED

BTO	-	Block Tagout
CA	-	Auxiliary Feedwater System
CF	-	Main Feedwater System
CFR	-	Code of Federal Regulations
EDG	-	Emergency Diesel Generator
EPRI	-	Electric Power Research Institute
ESF	-	Engineered Safety Feature
FME	-	Foreign Material Exclusion
FSAR	-	Final Safety Analysis Report
FWST	-	Refueling Water Storage Tank
GPD	-	Gallons Per Day
HAZMAT	-	Hazardess Material Response Team
IFI	-	Inspector Followup Item
LER	-	Licensee Event Report
LOCA	-	Loss of Coolant Accident
MF	-	Main Feed

MS	-	Main Steam
MSD	-	McGuire Site Directive
MSSV	-	Main Steam Line Safety Valve
NCV	-	Non-Cited Violation
NRC	-	Nuclear Regulatory Commission
NRR	-	NRC Office of Nuclear Reactor Regulation
OAC	-	Operator Aid Computer
OMP	-	Operations Management Procedure
PIP	-	Problem Investigation Process
PORC	-	Plant Operations Review Committee
QA	-	Quality Assurance
QIT	-	Quality Improvement Team
RCA	-	Radiological Control Area
RO	-	Reactor Operator
SGRP	-	Steam Generator Replacement Project
SRO	-	Senior Reactor Operator
TAN	-	Total Acid Number
TS	-	Technical Specifications
URI	-	Unresolved Item
VIO	-	Violation
VN	-	Variation Notice
W	-	Westinghouse
WO	-	Work Order
WR	-	Work Review