

UNITED STATES NUCLEAR REGULATORY COMMISSION REGION II 101 MARIETTA ST., N.W. ATLANTA, GEORGIA 30323

Report Nos. 50-369/88-33 and 50-370/88-33

Licensee: Duke Power Company 422 South Church Street Charlotte, NC 28242

Facility Name: McGuire Nuclear Station 1 and 2

Docket Nos: 50-369 and 50-370

License Nos: NPF-9 and NPF-17

Inspection Conducted: November 22, 1988 - January 19, 1989

VanDoorn, Senior Resident Inspector Inspectors: Nelson, Resident Inspector R. Cróteau, Resident Anspector

Contributing Personnel: D. Hood, NRR Licensing Project Manager B. Desai, Reactor Engineer

Approved by:

M. B. Shymlock, Section Chief Division of Reactor Projects

## SUMMARY

Scope: This routine unannounced inspection involved the areas of operations safety verification, surveillance testing, maintenance activities, 10CFR Part 21 inspection, startup from refueling and follow-up on previous inspection findings.

Results: In the areas inspected, one weakness, four violations and four unresolved items were identified. The weakness involved needed improvements in tracking of commitments, 10CFR Part 21 actions and corrective actions required to be completed prior to specific modes of operation (see paragraph 7). Violations involved failure to follow diesel generator testing procedure (paragraph 3), failure to follow Technical Specifications (TS) for containment integrity with two examples (paragraph 8), failure to follow TS limits for heatup and cooldown (paragraph 7) and entering a mode of operation with auxiliary feedwater system being inoperable (paragraph 12). Unresolved items involved possible procedure violations resulting in losses of residual heat removal (paragraph 3), possible past inoperability of all four diesel

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generators (paragraph 9), control room door seal maintenance conducted rendering control room ventilation inoperable (paragraph 5) and an inadvertent dilution (paragraph 3).

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# REPORT DETAILS

## 1. Persons Contacted

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Licensee Employees

- \*J. Boyle, Superintendent of Integrated Scheduling
- B. Hamilton, Superintendent of Technical Services
- \*T. McConnell, Plant Manager
- \*W. Reeside, Operations Engineer
- M. Sample, Superintendent of Maintenance
- \*R. Sharp, Compliance Engineer
- \*J. Snyder, Performance Engineer
- \*B. Travis, Superintendent of Operations
- R. White, Instrument and Electrical Engineer

Other licensee employees contacted included construction craftsmen, technicians, operators, mechanics, security force members, and office personnel.

\*Attended exit interview

2. Unresolved Items

An unresolved item (UNR) is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation. There were 4 unresolved items identified in this report as described in paragraphs 3, 5, and 9.

3. Plant Operations (71707, 71710)

The inspection staff reviewed plant operations during the report period to verify conformance with applicable regulatory requirements. Control room logs, shift supervisors' logs, shift turnover records and equipment removal and restoration records were routinely perused. Interviews were conducted with plant operations, maintenance, chemistry, health physics, and performance personnel.

Activities within the control room were monitored during shifts and at shift changes. Actions and/or activities observed were conducted as prescribed in applicable station administrative directives. The complement of licensed personnel on each shift met or exceeded the minimum required by Technical Specifications.

Plant tours taken during the reporting period included, but were not limited to, the turbine buildings, the auxiliary building, Units 1 and 2 electrical equipment rooms, Units 1 and 2 cable spreading rooms, and the station yard zone inside the protected area. Unit 1 isolation valves were verified to be closed and locked on a sampling basis during a tour inside the containment. During the plant tours, ongoing activities, housekeeping, security, equipment status and radiation control practices were observed.

On December 6, 1988, during performance of PT/2/A/4350/02A, "Diesel Generator 2A Operability Test", personnel inadvertently started the 1A diesel generator. Personnel had a working copy of the 2A test procedure but performed the starting step on Unit 1 at the 1A Sequence Panel. The 1A diesel was secured and the test was subsequently run correctly on the 2A diesel. Miscommunications among operations personnel initiated this problem, however, failure to follow the procedure caused this inadvertent diesel start. The licensee subsequently changed the procedure to more clearly specify the proper unit and licensee event report 369/88-39 was issued. Planned actions include issuing a new section to the Operations Management Procedure on communications including use of "repeat back". This event is considered a viclation, 369,370/88-33-01, Failure to Follow Procedure for Diesel Generator Testing.

## a. Unit 1 Operations

Unit 1 began the reporting period shutdown in a refueling outage.

On November 23, 1988 the licensee experienced a loss of the residual heat removal (ND) system for approximately 40 minutes. Reactor Coolant (NC) temperature increased approximately 25 degrees F. The unit was in Mode 6, Refueling. The event occurred while valve stroke timing Containment Spray (NS) valve 1NS1B (NS pump 1B suction from containment sump). Apparently, ND pump 1B lost suction pressure due to inadequate system venting in the horizontal piping between valve 1NS-1B and valve 1NI-184 (reactor building sump to train 1B of ND and NS). Apparently the inrush of NS water into the voided containment sump piping forced air into the ND 1B pump suction and air bound the pump. The pump was tripped to avoid damage. Recovery consisted of cross-tying ND pump 1A to ND heat exchanger 1B, assuring fill and vent of the ND 1A sump and starting the 1A pump. Problems with venting the ND pump 1B casing delayed restart of 1B pump. The licensee checked both ND trains on both units and found significant amounts of air in some of the piping. The licensee is evaluating past ND operability for both units and is planning to add more controls on testing interfaces, to upgrade ND procedures and to evaluate the need for improved fill and vent practices and procedures. This problem will be unresolved pending further review of licensee evaluations and corrective actions. The loss of ND described above as well as those listed below are considered Unresolved Item 369,370/88-33-02: Losses of RHR Requiring Further Followup.

On November 29, 1988, while in cold shutdown, Unit 1 experienced a loss of ND when a train B blackout occurred. The blackout occurred when Operations closed the B train 6900 Volt Bus standby breaker which was in the test position for testing causing the normal breaker to open as designed. This action deenergized the B train including the operating ND pump and started the B train emergency diesel generator. Reactor coolant temperature increased 4 degrees F during the approximately seven minutes that the ND pump was not operating. LER 369/88-38 was submitted on this event.

The licensee assigned a cause of management deficiency to 'ne event since the unit supervisor did not provide adequate written and/or verbal instructions to the operator for testing the standby breaker. A defective procedure was assigned as a contributing cause since OP/1/A/6350/08, 'Operation of Station Breakers", did not contain precautions to alert operators of interlocks associated with the breakers to be tested. The licensee stated that a general precaution would be added to OP/1/A/6350/08 to review the effects of interlocks prior to testing breakers. Also a caution would be added for the 6900 volt breakers to prevent this from recurring. This is a second example of the unresolved item identified above.

On December 1, 1988, while in cold shutdown, ND was lost again when ND-1B (reactor coolant system loop 1C to ND system containment isolation) closed. Licensee personnel were deenergizing a circuit associated with the Resistance Temperature Detector (RTD) modification when ND-1B closed on a simulated high pressure signal securing ND flow. ND-1B closed at 12:06 a.m., the ND pump was secured at 12:07 a.m. and ND flow was restored at 12:17 a.m. Plant temperature increased approximately 5 degrees during this time. Personnel involved had misread the drawing and did not realize that ND-1B would close. This is the third example the Unresolved Item described above.

On December 2, 1988, while in cold shutdown, a fire occurred in rags used to insulate the 1D reactor coolant main flange bolts while heating for tensioning. The main flange had previously been found to be leaking slightly towards the end of the outage. The fire was extinguished after approximately five minutes using dry chemical. The licensee believes the flange bolt heaters caused the rags to ignite. The fire caused no major damage but cleanup of the dry chemical extended the outage by several days. The maintenance procedure used for the job was changed to stress fire protection and safety requirements.

During performance of NI check valve testing after entry into Mode 3, NI-94, Accumulator Discharge to 1D Cold leg, was found to be leaking past the seat excessively. The unit was cooled down and drained down to open NI-94 and also NI-160, NI Pump Discharge Check Valve to 1D Hot leg, which also leaked excessively past the seat. Upon opening NI-94 the retaining rings holding the pivot pin in place were found missing allowing the pivot pin to slide and the flapper to become cocked. NI-94 is a 10" Atwood Morrill check valve. Valves NI-60, NI-71, and NI-82, the A, B, and C Accumulator Discharge Check Valves, were opened and inspected since they are of the same design. The retaining rings on these three valves were either missing or showed

excessive wear. The retaining rings were replaced by drilling holes in the pivot pins and inserting holding pins. NI-160, a Walworth valve, was found to have a dent on the stellite seat which appeared to be caused by a hard metallic object being jammed into the seat by the disc. NI-160 was subsequently replaced. These problems extended the Unit 1 outage approximately two weeks and were discussed in an NRC Significant Events Briefing.

The unit was on line December 31, 1988 and achieved 100 percent power on January 11, 1989.

On January 10, 1989 at 12:50 p.m., with the unit at approximately 99% power, operators observed steam pressure increasing and turbine governor valve 4 closing unexpectedly. The operators quickly diagnosed that reactor power was actually increasing which caused temperature and therefore steam pressure to increase. Governor valve 4 was closing in response to the steam pressure increase in an attempt to maintain constant turbine load. The operators commenced borating which restored all parameters to their original values. The licensee determined that the cation bed demineralizer was placed in service approximately 30 minutes prior to the event. This demineralizer apparently was charged with demineralized (non-borated) When placed in service this resulted in an unexpected water. dilution of primary system coolant. This event is still under review by the licensee and inspectors and is identified as an unresolved item. UNR 369/88-33-07: Inadvertent Dilution.

### b. Unit 2 Operations

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Unit 2 operated at 100 percent power for most of the report period.

On November 26, 1988, power was reduced to approximately 88 percent when a cooling water valve for lower containment, 2RV-33, a containment isolation valve, was determined to be inoperable and power was reduced in accordance with the action statement. The valve would close on a containment isolation signal or by depressing the control room switch. An existing ground in the system would cause the valve to reopen once the signal was reset or the control room switch was released. A temporary modification was made removing the grounded portion of the circuit from the system. Compensatory measures were in place while the temporary modification was being implemented. The ground could not be corrected at the time since corrective actions would adversely affect other plant components due to the location of the ground. The unit was back at full power a short time later.

On December 17, 1988, power was reduced to approximately 81 percent to repair a flange leak on the water side of a main generator hydrogen cooler. The leak was repaired and power restored to 100 percent approximately 12 hours later. The unit ended the report period at 100 percent power. c. Chairman Zech Site Visit

On December 7, 1988, Chairman Lando W. Zech, Jr. visited the site to tour the facility and meet with licensee management and staff personnel. NRC Region II management visiting the site on December 7 included C. W. Hehl, Deputy Director, Division of Reactor Projects (DRP), and T. A. Peebles, Section Chief, DRP.

d. NRC/Licensee Interface Meeting

The Senior Resident Inspector/participated in a meeting with licensee and NRC management at the Oconee Nuclear Station on January 12, 1989 to discuss the licensee's Nuclear Safety Assurance group reorganization, mid-loop residual heat removal operations, operability determinations and other generic issues. A more detailed meeting summary will be published by NRC/NRR.

One violation was identified as described above.

4. Surveillance Testing (61726)

Selected surveillance tests were analyzed and/or witnessed by the inspector to ascertain procedural and performance adequacy and conformance with applicable Technical Specifications.

Selected tests were witnessed to ascertain that current written approved procedures were available and in use, that test equipment in use was calibrated, that test prerequisites were met, that system restoration was completed and test results were adequate.

Detailed below are selected tests which were either reviewed or witnessed:

#### PROCEDURE

#### EOUIPMENT/TEST

PT/2/A/4350/02A	Diesel Generator "2A" Operability Test
PT/2/A/4151/02	NC System Valve Stroke Timing Test
PT/1/A/4700/10	Shift Turnover Verification

No violations or deviations were identified.

### 5. Maintenance Observations (62703)

a. Routine maintenance activities were reviewed and/or witnessed by the resident inspection staff to ascertain procedural and performance adequacy and conformance with applicable Technical Specifications.

The selected activities witnessed were examined to determine that, where applicable, current written approved procedures were available and in use, that prerequisites were met, that equipment restoration was completed and maintenance results were adequate.

The inspectors held discussions with licensee personnel relative to b. planned maintenance activities on control room (CR) door seals. Technical Specification (TS) 3.7.6 requires two Control Area Ventilation Systems (VC) to be operable. The plant is designed with a common CR and two VC trains common to both units. A design criteria of VC is that it be able to maintain a differential pressure of + 1/8 inch water column in the CR with the doors closed. Preventive maintenance to inspect and replace as necessary the nine CR door seals would require leaving a door open for longer than normal ingress and egress and, therefore, bring in to question operability and TS compliance for the VC system. The NRC agreed that appropriate compensatory measures could be taken during the maintenance allowing VC to remain operable. The compensatory measures consisted of a person stationed at the door being worked with tape available to tape the door off if needed for an event; taping off each door as work was completed prior to testing; providing appropriate instructions and training for compensatory actions; and sequencing the work so a test would be run prior to working the last three doors (three doors minimum are needed for ingress and egress for normal and abnormal operations). While the NRC was in the final stages of reviewing the licensee's request for use of compensatory action the licensee inadvertently scheduled and performed maintenance on one of the doors without implementing the measures agreed to. This event occurred near the end of the report period and was not fully evaluated at the end of the inspection period. Therefore, pending further review, this is identified as Unresolved Item 369,370/88-33-03: Review of Control Room Door Seal Maintenance Affecting Operability of Control Room Ventilation.

No violations or deviations were identified.

6. Licensee Event Report (LER) Followup (90712, 92700)

The following LERs were reviewed to determine whether reporting requirements have been met, the cause appears accurate, the corrective actions appear appropriate, generic applicability has been considered, and whether the event is related to previous events. Selected LERs were chosen for more detailed followup in verifying the nature, impact, and cause of the event as well as corrective actions taken.

(Closed) LER 370/87-20 Reactor Coolant System and Pressurizer Exceeded Heatup and Cooldown allowed by T.S. (Violation issued, see paragraph 7).

(Closed) LER 369/88-39, DG 1A Mistakenly Started Instead of DG 2A. This event resulted in a violation described in paragraph 3 of this report. Corrective actions will be tracked in follow up to the Notice of Violation.

(Closed) LER 369/88-38, Train B Blackout and Loss of Residual Heat Removal. Corrective actions will be evaluated in followup to the unresolved item described in paragraph 3.

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(Closed) LER 369/88-34, Both Trains of Control Area Ventilation and Chilled Water System (VC/YC) Inoperable. The B train of VC/YC was inoperable for maintenance. When the travel stops were removed from 2RN-89A, Component Cooling System (KC) heat exchanger 2A Control Valve, to perform a flush of the heat exchanger A train of the nuclear service water system and, therefore, VC/YC were rendered inoperable. This situation (both trains of VC/YC inoperable) existed for two hours without the licensee identifying the plant should have been in TS 3.0.3. The licensee later identified that TS 3.0.3 should have been entered and attributed the cause to personnel error on the part of the senior reactor operator authorizing the work. A contributing cause was that a specific procedure for this flush did not exist. Corrective actions included writing and using a specific procedure. This event illustrates performance of work activities without using a procedure written for the specific job. This event was discussed in report 369,370/88-31 and corrective actions were appropriate for this specific incident, however. the corrective actions did not address the need for better preparation and planning through the use of procedures specifically prepared for the evolutions being performed.

(Closed) LER 369/88-32, Annulus Ventilation System was Inoperable due to Door Seal Failure (Violation issued in Report 369,370/88-30)

(Closed) LER 369/88-33, Multiple Unit 1 Diesel Generator Failures Caused by a Manufacturing Deficiency.

(Closed) LER 370/88-12, Unit Entered TS 3.0.3 when SSPS Train 2B was Declared Inoperable with the Control Room Area Ventilation and Chilled Water System Train A Inoperable.

7. Follow-up on Previous Inspection Findings (92702)

The following previously identified items were reviewed to ascertain that the licensee's responses, where applicable, and licensee actions were in compliance with regulatory requirements and corrective actions have been completed. Selective verification included record review, observations, and discussions with licensee personnel.

(Closed) Violation 369,370/88-12-03, Failure to Follow Procedures/ Inadequate Procedures With Four Examples. The inspector verified that the procedure for Auxiliary Feedwater Pump Number 1 Performance Test was revised and the horizontal vibration ranges specified were in agreement with those required by ASME Section XI and pump baseline data. The documentation associated with the discussion among plant personnel on operability determinations was also verified. In addition, the procedure for D/G 1B Load Sequence Test was also revised and found to be acceptable. This item is considered closed.

(Closed) Deviation 369,370/88-12-02, Failure to Obtain Concurrence of a Shift SRO in an Operability Determination. The licensee revised their response to Violation 87-04-01. The inspector also reviewed the Technical Specification Action Item Logbook (TSAIL) and verified that TSAIL entries

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are only made by a control room Senior Reactor Operator (SRO) who heids an active license. The response to the deviation stated that a revision to the previous violation response would be submitted by September 1, 1988. The licensee stated that the commitment was not met due to an oversite by Duke General Office (GO) personnel. Currently, NRC commitments for corrective actions are placed on a commitment tracking system at McGuire called the McGuire Action Directory (MAD). The MAD system is only used if action is required by a McGuire group. A MAD item is not opened for tracking if the item will be completed by another group such as the GO, Design, or QA personnel. Other commitment tracking programs exist for other groups. The inspectors, however, are concerned that the inability of the station to open a MAD item for an item assigned to another group will allow NRC commitments to be missed as in the case of this deviation response. Use of many tracking systems has proven inadequate to ensure commitments are met. The licensee stated that they are considering changing responsibility for issuing LER's and violation responses from the GO to the site. If this change occurs, MAD items will be opened for all corrective actions and this one commitment tracking system will be used. This change should prevent missing future commitments. This item is closed. While the above failure of the licensee to comply with this commitment is not significant, there does appear to be a weakness in licensee tracking programs (see paragraphs 10 and 11 for further examples). The licensee was requested to review this weakness and consider appropriate corrective action. This is Inspector Followup Item 369,370/88-33-04: Followup of Weaknesses in Control of Followup and Documentation of Commitments, Part 21 Reports, and PIR's Required for Specific Operational Modes.

(Closed) Violation 369,370/88-12-04, Inadequate Surveillance Test Program TDCA Pump. The inspector verified that instructions to drain steam supply lines were placed on the shift round sheets and one of the surveillance procedures was revised to prohibit draining of the steam line prior to performing the 18 month test. This item is closed.

(Closed) Violation 370/88-09-01, Failure to Follow Procedure For Pressurizer Code Safety Valve Testing and Inadequate Procedure for Slave Relay Testing. The appropriate changes to the procedures were made and were verified by the inspector. The documentation for the instruction given to the QA mechanical inspectors on correct application of the Safety Valve Setpoint Test Procedure was also verified. In addition, the "Remove/Restore Checklist" was developed and verified by the inspector. This item is considered closed.

(Closed) Unresolved Item 369,370/88-23-03, Review PIR Process Corrective Actions. This item involved the adequacy of the process for assuring appropriate corrective actions are accomplished for items identified on Problem Investigation Reports (PIR's). The specific PIR referenced had not been forwarded to the appropriate personnel for root cause determination and subsequent corrective action. While a violation was issued for the specific event, the licensee was requested to review the PIR process for improvements. The licensee has made personnel changes in order to improve the PIR process and in addition has changed Station Directive 2.8.1 to specifically require root cause review and documentation. In addition, the NRC inspectors continue to review every PIR to verify adequacy of the licensee corrective action program. This item is closed based upon the licensee's actions to improve the PIR program.

(Closed) Unresolved Item 369,370/88-31-02: Apparent Violation of Containment Integrity requirements during Core Alterations. (Violation issued, see paragraph 8.)

(Closed) Unresolved Item 369,370/88-31-05: Apparent Violation of TS Cooldown Requirements. The inspector verified licensee corrective actions which included procedure changes, training, and vendor analysis of the significance of the transients. The analysis appeared to use conservative assumptions and concluded that the structural integrity of the components was not affected. However, TSs 3.4.9.1 and 3.4.9.2 for heatup and cooldown rates of the Reactor Coolant System and Pressurizer respectively were violated. This item is therefore closed and identified as a Violation 369,370/88-33-05: Failure to Follow TS for Heatup and Cooldown.

(Closed) Inspector Followup Item 369,370/87-EP-01, Verify Audibility of Alarms in High Noise Areas. The inspector verified audibility of the site assembly alarms in high noise areas of the plant during weekly surveillance tests. This item is closed.

One violation was identified as described above.

8. Problems Associated with Containment Integrity

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Unit 1 completed a refueling outage during this reporting period. During the outage several breaches of containment integrity took place. These were previously identified as Unresolved Item UNR 369, 370/88-31-02.

TS 3.9.4 requires that containment integrity be established during refueling outages whenever core alterations or movement of irradiated fuel within the containment is in progress. Containment integrity is established when the following conditions are met:

- a. The equipment hatch is closed and held in place by a minimum of four bolts.
- b. A minimum of one door in each personnel airlock is closed, and
- c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere is either
  - (1) Closed by an isolation valve, blind flange, or manual valve, or
  - (2) Exhausting through OPERABLE Reactor Building Containment Purge Exhaust (VP) System HEPA filters and charcoal absorbers.

The licensee utilizes station procedure PT/1 or 2/A/4200/02C, "Containment Integrity Verification During Core Alterations", to manage the establishment and maintenance of containment integrity. This PT has provisions for verifying and documenting that each of the approximately 130 containment penetrations meets containment integrity requirements.

During the recent Unit 1 refueling cutage several problems arose associated with establishing and maintaining containment integrity:

a. On October 25 at 1:25 p.m. electrical penetration E-461 was reported to be inoperable and core alterations were suspended. The inoperability determination was based on the penetration failing a routine smoke test surveillance. This penetration is one of three large (12 to 20 inch diameter) temporary maintenance equipment penetrations that are flanged-off during plant operation. During outages, they are opened to allow routing of temporary services i.e. cables, hoses, etc. to support maintenance in the reactor building. After the temporary lines are run through the penetration, the remaining space between the lines is filled with foam to establish a boundary between the containment atmosphere and the outside atmosphere thereby satisfying containment integrity. The foam is subject to leakage if disturbed, therefore, periodic "smoke tests" for leaks are conducted.

At 3:38 p.m., the penetration was reported to be "ready" and core alterations were resumed. At 3:55 p.m., it was reported that E-461 and two other penetrations, M-260 and E-429, had failed smoke tests. Core alterations were again suspended. The licensee determined that E-461 had actually not passed a smoke test as previously implied at 3:38 p.m. This was mis-communicated between maintenance and control room personnel. Therefore, core alterations were resumed without establishing containment integrity. At the time of the mis-communications, control room personnel did not require the maintenance personnel to re-perform the containment integrity verification sign off in the PT since the PT does not specifically require that this be done. It is, however, common practice for the licensee to re-perform and sign-off repeated portions of procedures. At 5:23 p.m., the three penetrations had been refoamed and tested satisfactorily. Control room personnel at this time required that the maintenance personnel re-perform the signoffs in the PT to preclude any further mis-communication. Core alterations were then resumed.

The licensee initially determined that this incident was a violation of containment integrity and made a four hour NRC notification pursuant to 10CFR50.72. Further evaluation by the licensee resulted in the determination that containment integrity was not violated since the VP system was in operation at all times, therefore, the

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leaking penetrations were always "exhausting through OPERABLE VP System HEPA Filters and Charcoal Absorbers" in accordance with TS 3.9.4. It was later revealed, however, that since VP automatically isolates upon high radiation levels in containment, maintaining containment integrity by relying on VP operation may not be applicable for some postulated core alteration accidents. Therefore, containment integrity was violated as initially determined. This is one example of a violation of TS 3.9.4, Violation 369/88-33-08: Failure to Follow TS for Containment Integrity.

On November 13 while core alterations were in progress, the station b. Health Physicist observed that maintenance equipment penetration M-260 did not meet containment integrity requirements. Specifically, a four inch pipe penetrating M-260 as a separate conduit for temporary services contained no foam to separate the containment atmosphere from the outside. The licensee determined that the pipe was placed through M-260 at the start of the outage to provide a conduit for temporary services to be run when the remainder of M-260 was foamed. The empty pipe was originally capped to provide containment integrity. At some point subsequent to the initial establishment of containment integrity, the caps were removed and cables to support Steam Generator tube plugging were passed through the pipe with no foam being added. This work was accomplished by vendor personnel without a procedure or work request. The maintenance engineer in charge of the penetrations was to ensure that the pipes were foamed by Construction/Maintenance Department (CMD) personnel after running the cables, but this was not done. The licensee determined that penetration E-429 was in the same condition. Since no foam was contained in the pipe in either penetration it is obvious that no smoke test (retest) was performed for these pipes passing through the penetrations following the work. The licensee considered this to be a breach of containment integrity and again made a four hour NRC notification. The licensee stated that the pipes extended several feet from the faces of M-260 and E-429 which contributed to these openings not being detected during routine smoke test surveillances conducted every two days. This is a second example of a violation of TS 3.9.4 (Violation 369/88-33-08).

c. On November 14, while core alterations were in progress, Operations personnel discovered that Steam Generator Sample Valve NM-211 was open although the containment integrity PT had verified it being shut. At the time of discovery of the problem the valve control switch in the control room indicated that the valve was open but the switch had an information sticker indicating that it was a containment integrity valve, and, therefore, should be closed. It was previously documented as being shut in the PT prior to core alterations commencing. The licensee determined that the valve's

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position was initially verified by visual observation of the valve because, at the time, the valve's power was de-energized and control room indication was unavailable. The licensee concluded that the original position verification was in error and the valve was actually open the entire time it was supposed to be shut. Containment integrity was not breached, however, other isolation valves in the flowpath happened to be shut, therefore providing isolation from the outside atmosphere.

On approximately November 15, while core alterations were in d. progress, the inspector determined that the licensee was not considering temporary process lines e.g. Steam Generator Sludge Lance lines, to be penetrations that needed to be controlled with respect to containment integrity. These lines are routed through the maintenance equipment penetrations described above and once surrounded by foam, become separate penetrations unto themselves. The containment integrity PT did not include provisions for these "penetrations" and therefore containment integrity had not been fully verified. The inspector questioned the Unit Coordinator who stated he had not considered this problem, but agreed that these penetrations needed to be verified. He further stated that Operations has no control over these lines, as in the case of Sludge Lancing, which is controlled by Chemistry. Within several hours, the Superintendent of Operations reported to the inspector that all lines passing through the mechanical penetrations were inspected and no breaches of containment integrity were identified.

With regard to these containment integrity violations and mishaps, the following NRC concerns arise:

- a. The containment integrity verification procedure, PT/1/A/4200/02C, is not implemented nor written to be a "living document" - i.e. one that provides for changes in containment closures during the course of outage maintenance.
- b. The willingness of Operations Personnel to declare containment integrity operable based on verbal reports from the field instead of formal documentation - therefore, allowing mis-communication to occur
  - is contrary to the basic conduct of business with respect to nuclear station operations.
- c. There is insufficient control over the operation of the three maintenance equipment penetrations. A single work request is generated for all three that covers initial opening, routing of lines, foaming, and restoration at the end of the outage. The addition or deletion of lines passing through these penetrations is conducted without the control that the work request system provides. Therefore, Operations clearance and thus control over when these penetrations can be intentionally inoperable does not exist. Likewise, retests following changes are not guaranteed.

- d. The temporary process lines running through the mechanical equipment penetrations have not been considered separate penetrations. Because of this it is likely that containment integrity violations have gone undetected in the past.
- e. The addition of cabling through the four inch piping was conducted without procedural or work request control. The reliance on a maintenance engineer to remember to insure that specific maintenance steps are performed without procedural or work request control is inappropriate for work on safety related components.

Additional information of these events is available in Licensee Event Report (LER) 88-40. In the LER the licensee attributes the root causes of the containment integrity violations to be a combination of defective procedures, personnel errors, and a management deficiency in the control of vendor personnel. The root cause analysis is accurate in identifying that inadequate pipe sleeve spacing and excessive sleeve lengths contributed to leaking foam seals. The NRC disagrees, however, with the remaining root cause analysis. The licensee attributes personnel error to be the cause of the mis-communication event when the penetrations were declared operable prematurely and for the lack of foam being added to the two four inch pipes. The NRC considers the root cause of these errors to be a systemic lack of proper work controls. It is clear that the licensee has not considered the mechanical equipment penetrations to be individual safety related components deserving of complete procedure and work control practices. The NRC agrees that a management deficiency exists in the control of vendor personnel, but a properly administered work control system would greatly enhance the control of vendor activities. The inspectors consider that an inadequate root cause analysis is partially the cause for the planned corrective actions stated in the LER to also be inadequate.

The LER was written based on an Incident Investigation Report (IIR) written by the McGuire Safety Review Group (MSRG). The inspectors met with representatives of the MSRG to discuss NRC concerns with the root cause analysis and planned corrective actions contained in the LER. The MSRG Chairman stated that additional review will be conducted and the LER resubmitted if necessary.

One violation was identified as described above.

9. Diesel Generator Starting Air System Problems

The licensee identified a design deficiency during a self-initiated technical audit (SITA) conducted from April 1988 to October 1988 in which all four emergency diesel generators may not have been able to perform their intended function since initial operation of the units. The design deficiency involves the cross connecting of the blackout portion of the instrument air (VI) system and the diesel generator starting air (VG) system which supplies safety related air to start and run the diesel

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generators. This arrangement was not acceptable since the VI system is not seismically qualified, the VG to VI regulator setpoint or capacity was not set to limit flow below the capacity of the VG system, the check valve separating the VI blackout header from the rest of the VI system was not in the test program, and the air consumption of the VI blackout header is unknown.

The VI blackout header allows control of valves which fail to their safety position but control of the valves would be desirable, but not required by the accident analysis, in response to an event. If a blackout had occurred, VG may have bled down through VI causing the Diesel Generator (DG) fuel racks to be positioned to a fuel-off position causing the DG to stop.

Operations shut the manual isolation valves on May 20,1988 to maintain VG to VI separation removing current operability concerns. Tests were run on June 28, 1988 and November 15, 1988 with the plant defueled to determine past operability of the diesel generators. Testing was inadequate and unable to determine operability or inoperability since the tests did not simulate worst case or existing conditions. Initial test results indicate a possibility that historically the DG's were inoperable for an extended period of time. The licensee reported the above concerns in LER 369, 370/88-36. This issue was not reported earlier since the question of past DG operability was awaiting performance of testing. In addition, further testing is planned. This issue is identified as Unresolved Item 369, 370/88-33-06, Diesel Generator Inoperability due to Air Problems. A more detailed description of this deficiency can be found in LER 369, 370/88-36. A supplement to this LER is planned based on further test results.

No violations or deviations were identified.

# 10. 10 CFR Part 21 Inspection (36100)

The inspector reviewed the licensee's Problem Investigation Report (PIR) program defined by Station Directive 2.8.1 relative to 10CFR Part 21 requirements to verify that appropriate procedural requirements were in place to evaluate and report Part 21 problems. The inspector also reviewed several Part 21 problems to assure that the licensee was evaluating and reporting site identified problems and that reports received from offsite were forwarded to the appropriate personnel, corrective actions were initiated, and results were tracked. A recent problem associated with the Diesel Generators (see LER 369/88-33) was appropriately evaluated, corrected and reported. Also Limitorque Corporation issued two Part 21 reports to the licensee on November 3, 1988. One identified a problem with degradation of Melamine torque switches and the other identified that certain RH insulated DC motors may not develop full rated starting torque at elevated ambient temperatures. The licensee had forwarded the reports to appropriate maintenance personnel for evaluation and corrective action. RH insulated motors were not used at McGuire so no corrective action was necessary. PIR No.

O-M88-0287 was issued to inspect and replace as necessary the Melamine torque switches. The licensee's Compliance Group is the on-site group responsible for tracking of these types of items, however, Compliance was not aware of the status of these Limitorque issues when questioned by the inspector. Although appropriate corrective actions were being completed, this appears to be another example of a licensee weakness relative to tracking of various items which requires further followup. See paragraph 7 for Inspector Followup Item.

No violations or deviations were identified.

11. Plant Startup From Refueling (71711)

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The inspector reviewed evaluation and corrective actions for several problems identified during a recent Unit 1 outage. These problems were identified on Problem Investigation Report (PIR) Nos. 1-M88-264, 284 and 288. This inspection was conducted to assure that problems identified during refueling and required to be corrected prior to a higher mode of operation, were in fact evaluated and/or corrected prior to entering the higher mode. In the cases above appropriate evaluation/corrective action was implemented. Discussions with licensee Compliance personnel indicated that tracking of these types of PIR's was informal. The licensee agreed that a more formalized tracking system should be implemented. This is considered a third example of a licensee weakness in tracking various items and requires followup. See paragraph 7 for Inspector Followup Item.

No violations or deviations were identified.

12. Unit 1 Entry Into Mode 3 With Auxiliary Feedwater Valve Inoperable

Unit 1 entered Mode 3 at 10:49 a.m. on December 10, 1988 in preparation for restart following its refueling outage. Due to Safety Injection (NI) check valve problems (discussed in paragraph 3 of this report) the unit returned to Mode 4 at 3:09 p.m. on December 11 and ultimately cooled down to Mode 5.

Unit 1 again entered Mode 3 on December 25 at 6:32 p.m. in preparation for restart. On December 27 at 12:00 noon, it was determined that Auxiliary Feedwater (CA) valve 1CA-44, Flow control to SG-C from CA Motor Driven Pump B was inoperable in that its travel stops that limit the maximum open position had not been properly adjusted following maintenance during the outage. The entire CA system is required to be OPERABLE for entry into Mode 3 in accordance with TSs 3.7.1.2 and 3.0.4. The travel stops were mis-positioned such that CA-44 was fully open instead of being in a throttled position. This would result in flow from Motor Driven CA pump B to Steam Generators C and D to be unbalanced; D SG would have insufficient flow while C SG would have excessive flow. (Motor Driven CA pump A supplies flow to SG's A and B.) The four CA flow control valves to the four steam generators have control room valve position indicators. These indicate valve throttle position from zero to 100% open. When correctly positioned, the flow control valves indicate approximately 50% open. With the valve mispositioned, 1CA-44 indicated 100% open with the remaining three indicating approximately 50%

At the time of discovery of the problem, Operations personnel declared B train of CA to be inoperable. A work request was initiated to reset the travel stops on ICA-44 and B train was declared operable at 4:19 p.m. following the repair.

The licensee determined that 1CA-44 was left unadjusted intentionally since a CA flow balance was to be done which would likely re-position the travel stops on all four valves. The flow balance was originally scheduled to be performed during Mode 4. Based on this schedule, Performance personnel allowed the outstanding work request on the CA-44 maintenance to be cleared. This occurred prior to the Unit's first entry into Mode 3. The work request had been remaining outstanding since all work i.e. setting travel stops, had not been completed. Subsequent to the work request being cleared, the CA flow balance was rescheduled to be performed after entry into Mode 3. This resulted in the CA-44 work remaining incomplete at the time of entry into Mode 3 on December 10 and again on December 25 since no work request was outstanding to reveal the incompleted work. Contributing to the decision to clear the work request was that Station Directive 3.2.2, Identifying and Performing Plant Retesting, listed only a Valve Stroke Timing Test (VST) for retest of CA-44. Since a VST had been performed, Performance personnel reasoned that the valve could be declared operable.

On December 28 at approximately 7:45 a.m., the inspector observed that the "corrected" position of 1CA-44 was indicating approximately 34%. Remembering the pre-outage position to be approximately 50%, the inspector questioned Operations personnel on the difference. The Shift Supervisor on duty could not explain the difference but stated that he would investigate. Later in the day the inspector was informed that the 34% position was in fact incorrect, that wrong data had been used to reset the valve after the first problem. The B Train of CA was again declared inoperable at 11:15 a.m. and the travel stops were reset a second time to approximately 41%. Operations personnel produced a memo dated September 4, 1981 documenting the proper settings that contradicted the Performance Group's first setting of 34%. The memo data was subsequently corroborated by historical test procedure data. B Train CA was declared operable at 2:45 p.m. the same day.

Technical Specification LCO 3.7.1.2 requires in part that two motor driven CA pumps and associated flow paths be OPERABLE during Modes 1, 2, and 3. One train may be INOPERABLE for up to 72 hours as permitted by an Action Statement, however, TS 3.0.4 requires that entry into an OPERATIONAL MODE may not occur with reliance on an Action Statement. The Unit 1 entries into Mode 3 on December 10 and 25 with B Train of CA INOPERABLE constitute a violation of TS 3.0.4 with respect to TS 3.7.1.2. This is identified as Violation 369/88-33-09, Entry into Mode 3 with Auxiliary Feed System Inoperable.

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Technical Specification 4.0.4 requires that all surveillances associated with TS LCOs be up to date prior to entry into a Mode for which the TS LCO applies. With regard to TS LCO 3.7.1.2, Auxiliary Feed System, Surveillance 4.7.1.2 requires in part that all non-secured valves in the CA flow path be verified in their proper position every 31 days. This includes the flow control valves discussed above. Outage durations in excess of 31 days mandate that surveillances of this sort be accomplished just prior to restart. Operations accomplishes this surveillance by performing procedure PT/1 or 2/A/4700/10, Shift Turnover Verification, which includes valve position verification for various safety related systems, including CA. This procedure was performed prior to the Mode 3 entries on December 10 and 25, however, the mispositioned 1CA-44 was not detected. The required position in the procedure for these valves is "OPEN", and the indicated positions were in fact open but the NRC does not consider that the obvious differences in valve positions satisfied the surveillance requirements. In this case, with CA-44 indicating 100% open and the other three indicating approximately 50% open, operators had ample opportunity on two occasions to detect the problem with 1CA-44, and were ultimately responsible for the problem remaining undetected.

One violation was identified as described above.

13. Exit Interview (30703)

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The inspection findings identified below were summarized on January 19, 1989, with those persons indicated in paragraph 1 above. The following items were discussed in detail:

Violation 369,370/88-33-01: Failure to Follow Procedure for Diesel Generator Testing (paragraph 3).

Unresolved Item 369,370/88-33-02: Losses of RHR Requiring Further Followup (paragraph 3).

Unresolved Item 369,370/88-33-03: Review of Control Room Door Seal Maintenance Affecting Operability of Control Room Ventilation (paragraph 5).

Inspector Followup Item 369,370/88-33-04: Followup of Weaknesses in Control of Followup and Documentation of Commitments, Part 21 Reports and PIR's Required for Specific Operational Modes (paragraph 7).

Violation 369,370/88-33-05: Failure to Follow TS for Heatup and Cooldown (paragraph 7).

Unresolved Item 369,370/88-33-06: Diesel Generator Inoperability due to Air Problems (paragraph 9).

Unresolved Item 369/88-33-07: Followup of Dilution Event (paragraph 3).

Violation 369/88-33-08: Failure to Follow TS for Containment Integrity (paragraph 8).

Violation 369/88-33-09: Failure to Follow TS 3.0.4 and Entering Mode 3 with Auxiliary Feedwater System Inoperable (paragraph 12).

The licensee representatives present offered no dissenting comments, nor did they identify as proprietary any of the information reviewed by the inspectors during the course of their inspection.

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