



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

Report Nos. 50-369/90-18 and 50-370/90-18

Licensee: Duke Power Company
 P.O. Box 1007
 Charlotte, NC 28201-1007

Facility Name: McGuire Nuclear Station 1 and 2

Docket Nos.: 50-369 and 50-370 License Nos.: NPF-9 and NPF-17

Inspection Conducted: August 29, 1990 - October 17, 1990

Inspectors:	<u>W. H. Miller, Jr.</u>	<u>11-20-90</u>
	P. K. Van Doorn, Senior Resident Inspector	Date Signed
	<u>W. H. Miller, Jr.</u>	<u>11-20-90</u>
	T. A. Cooper, Resident Inspector	Date Signed
	<u>W. H. Miller, Jr.</u>	<u>11-20-90</u>
	S. J. Vias, Resident Inspector	Date Signed

Approved by:	<u>M. B. Shymrock</u>	<u>20 NOV 90</u>
	M. B. Shymrock, Section Chief	Date Signed
	Division of Reactor Projects	

SUMMARY

Scope: This routine, resident inspection was conducted on site inspecting in the areas of plant operations safety verification, surveillance testing, maintenance activities, facility modifications, system and component engineering, self assessment capability, followup-on previous inspection findings, and followup of event reports.

Results: In the areas inspected, one fire protection program violation was identified involving inadequate procedures and a failure to follow a procedure (paragraph 6). Weaknesses were identified regarding communications of operators (paragraph 2.c) and implementation of the System Expert Program and component engineering (paragraph 8).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *G. Addis, Superintendent of Station Services
- D. Baxter, Support Operations Manager
- *J. Boyle, Superintendent of Integrated Scheduling
- D. Bumgardner, Unit 1 Operations Manager
- *R. Broome, Manager Project Services
- J. Foster, Station Health Physicist
- C. Franks, QA Verification Manager
- G. Gilbert, Superintendent of Technical Services
- *T. Geer, Design Engineer
- C. Hendrix, Maintenance Engineering Services Manager
- *B. Hamilton, Superintendent of Technical Services
- *J. Jenkins, Operations Coordinator
- *T. Mathews, Site Design Engineering Manager
- *T. McConnell, Plant Manager
- *R. McIntyre, Safety Specialist
- R. Michael, Station Chemist
- *D. Motes, Engineering Supervisor - MES
- D. Murdock, McGuire Design Engineering Division Manager
- *J. Oldham, Design Engineer
- R. Pierce, IAE Engineer
- W. Reeside, Operations Engineer
- R. Rider, Mechanical Maintenance Engineer
- *M. Sample, Superintendent of Maintenance
- *R. Sharpe, Compliance Manager
- J. Snyder, Performance Engineer
- J. Silver, Unit 2 Operations Manager
- A. Sipe, McGuire Safety Review Group Chairman
- *B. Travis, Superintendent of Operations

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

*Attended exit interview

2. 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 reviewed. 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 (TS). The inspectors also reviewed Problem Investigation Reports to determine whether the licensee was appropriately documenting problems and implementing corrective actions.

Plant tours taken during the reporting period included, but were not limited to, the turbine buildings, the auxiliary building, electrical equipment rooms, cable spreading rooms, and the station yard zone inside the protected area.

During the plant tours, ongoing activities, housekeeping, fire protection, security, equipment status and radiation control practices were observed.

The inspector visually verified the completion of modifications NSM MG-12138 and MG 22138, which revised Safety Parameter Display System (SPDS) logic to monitor containment isolation status for various valves and established analog input points for various Residual Heat Removal system and radiation monitor parameters. The inspector verified the completion of the Control Room Review/HED Modifications. The final phase of implementation was completed by the end of the last Unit 1 refueling outage. The completed commitments involved the control room annunciator system, the engineered safety features panel, and the heating, ventilation and air conditioning panel.

a. Unit 1 Operations

The unit began the inspection period at 100% power and maintained that level until August 29, 1990, when the unit reduced power to repair the 1B generator breaker. The unit remained at various reduced power levels to perform maintenance on feedwater heaters until September 2, 1990, when full power operation resumed.

Full power operation continued until September 5, 1990, when power was reduced to approximately 62% due to steam leaks on the high pressure turbine. Increases and decreases in reactor power continued, due to turbine leaks until September 15, 1990, when full power operation resumed.

The unit continued operation at full power until October 13, 1990, when the unit tripped during testing of the Solid State Protection System (SSPS). A failed component in the mode switch prevented the SSPS from recognizing that the system was in "Test" and caused the trip.

During the subsequent recovery, a resonance vibration developed in the "C" low pressure turbine, at approximately 95% of rated power. Attempts to dampen the vibration were unsuccessful and the unit was shutdown on October 16, 1990, for repairs to the intercept valve, which was suspected to be the cause of the vibration. The licensee subsequently discovered a blown gasket between the inner and outer cylinders and a damaged thermal shield in the "C" low pressure turbine.

b. Unit 2 Operations

The unit began the inspection period in a coastdown, approaching End-of-Cycle. On August 31, 1990, shutdown commenced for the scheduled refueling outage. The unit was shutdown, all rods inserted, on September 1, 1990.

The 2B Chemical and Volume Control (NV) pump head curve test was being performed on September 7, 1990, when the suction relief valve opened. PT/2/A/4209/12B, NV Pump 2B Head Curve Verification, states that Residual Heat Removal (ND) 2A pressure should be less than 200 psig prior to cross-tying the ND system to the NV pump suction. The suction relief valve setpoint on the NV system is 220 psig. At the time the cross-tie valve was opened, the computer indicated that ND 2A pressure was 214 psig and the control room gauges indicated that the ND pressure was 205 - 210 psig.

The Performance Engineer and the Control Room operator conducting the test were aware that they were operating outside the procedural restrictions, but they were of the opinion that there was enough margin to the relief valve setpoint to continue safely. Subsequently, the relief valve opened, lower than the anticipated setpoint, at approximately 205 psig. The valve relieved approximately 260 gallons of coolant to the Pressurizer Relief Tank.

This event is indicative of procedural adherence problems at the station, in several departments, which are being dealt with by multiple outstanding violations.

During the removal of the reactor vessel internals on September 17, 1990, the licensee failed to notice that a control rod was caught on the internals as they were lifted above the core. The rod dislodged and fell onto the top of the core. The licensee retrieved the damaged control rod and is storing it in the Spent Fuel Pool. No significant damage occurred to the core.

The core was completely unloaded on September 19, 1990, and "No Mode" operation begun. Reload was completed on October 16, 1990.

No violations or deviations were identified.

c. Control Room Observation

While making a control room observation, the inspector witnessed what at first appeared to be a loss of the bus 2SLXA. The inspector observed the communications between the various operations personnel involved in the event.

Approximately 20 minutes after the event, when the situation had calmed down, the inspector questioned several operations personnel about the incident. The Unit 2 Reactor Operator (RO) informed the inspector that 2SLXA had not tripped, but had given an indication of a trip. The Unit 1 RO informed the inspector that SLXA had tripped and was surprised to learn that the bus involved had been 2SLXA. The Control Room Senior Reactor Operator (SRO) stated that 2SLXA had tripped. When the inspector mentioned the disparity in the statements being received, the Control Room SRO talked to the staff SRO that had handled the event and found that 2SLXA had not tripped, but some blown fuses had given the indication that it had, causing the load center to switch the loads from that bus to the alternate supply. Only the Unit 2 RO was aware of what had happened. Neither the Unit 1 RO nor the Control Room SRO had received adequate communications to be aware of what had really occurred.

During the event, one of the shift SROs had contacted the Unit 1 RO via radio and instructed him to remove the "C" Containment Cooling Pump from service. The RO did so without asking for a reason. When the other RO on shift asked him the reason for removing it, he replied, "Because the SRO told me to". The second RO then contacted the SRO and asked for a reason. However, by then the pump had already been removed from service. Communications between the SRO and the RO was insufficient to supply a reason for removing the pump from service, but the RO stopped the pump regardless.

On September 18, 1990, at approximately 3:00 pm, the Containment Closure Coordinator determined that valve 2NC-56 was open, contrary to PT/2/A/4200/02C, Containment Integrity Verification During Core Alterations. The status of valves upstream of 2NC-56 were checked and verified to be closed, satisfying containment integrity requirements.

A member of the Unit 2 Operations Staff was contacted. The Unit Supervisor was notified and Control Room operators were requested to close 2NC-56. At that time, it was discovered that 2NC-56 would not close and stay closed. It was determined that the data sheet for PT/2/A/4200/02C would have to be changed to document the change in containment integrity boundary configuration.

Although containment integrity was never actually lost, documentation in the licensee procedure did not exist to reflect 2NC-56 being open. When 2NC-56 was discovered open, Technical Specification 3.9.4 should have been consulted and core alterations halted until the alternate

valves were verified and documentation was corrected. When the problem with 2NC-56 was detected, one staff SRO was notified and the Control Room operators were notified, but the situation was not brought to the attention of the Control Room SRO, the person in charge of the Control Room activities.

These two examples demonstrate a weakness in Control Room communications, within the shift operations crew and between the shift operations crew and other groups. Poor communications is considered a weakness and will be Inspector Followup Item (IFI) 369, 370/90-18-01: Weak Communications Practices Involving the Control Room Operations Personnel.

The licensee had identified weaknesses in communications previously and has developed a training program to instruct the operators on proper and efficient communication's practices. In addition, a task force of operators has been established to address professionalism concerns, including communication standards. The IFI will be used to track the development, implementation, and effectiveness of these programs.

d. Generic Letter 88-17

The inspector verified that the licensee was in compliance with Generic Letter 88-17, Loss of Decay Heat Removal, prior to the start of the Unit 2 Refueling Outage. The licensee has reviewed their controls and administrative procedures governing mid-loop operation, revising them as necessary, and has issued Standing Orders to assure full compliance with the Generic Letter requirements.

Containment Closure procedures have been developed and successfully implemented during the last several Refueling Outages. Shutdown operations procedures ensure that two independent, continuous indications are present for Reactor Coolant System temperature and level. Precautions have been included in the procedures utilized to operate in the mid-loop configuration, in order to minimize Reactor Coolant perturbations. Operations procedures prohibit the installation of nozzle dams in all of the Reactor Coolant Hot Legs unless a vent path is established to prevent pressurization of the vessel upper plenum. Adequate contingency plans are in effect to repower emergency busses from an alternate source if the primary source is lost.

All requirements of the Generic Letter are being implemented, by either licensee procedures or by Operations Standing Orders.

e. RHR Pump Removal

On September 2, 1990, the 2A Residual Heat Removal pump 2A was placed in service to provide shutdown cooling for the Unit 2 refueling outage. At that time, the pump bearing temperature began increasing and finally stabilized at an elevated, alarmed point.

Investigations revealed that the problem was caused by plexiglass splash guards which had been installed in the pump to contain seal leaks. Heat contained in the leaking seal water was being contained by the splash guards, instead of dissipating, as it would have if the guards were not present. The elevated temperature is only a concern if there is seal leakage and no other ventilation path exists.

Examinations by the inspectors revealed that these splash guards had been installed on both unit's Residual Heat Removal pumps and Containment Spray pumps. These guards were installed on the pumps using Work Requests. No modification package, Temporary or Permanent, was written and no evaluation of the impact of the installation was performed. The licensee identified this problem on PIR 2-M90-0258, dated September 24, 1990. On October 12, 1990 the inspector requested the licensee to evaluate operability of all pumps. Design Engineering is presently evaluating the impact of the installation. The licensee established vent paths for the other pumps on October 17, 1990. The inspector is concerned with past operability of pumps and timeliness of addressing the problem on all of the pumps. Resolution of this item is pending the completion of the DE evaluation and will be Unresolved Item 369, 370/90-18-02: Evaluation of Effect of Splash Guards on Safety Related Pumps.

3. 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 were calibrated, that test prerequisites were met, that system restorations were completed and acceptance criteria were met.

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

<u>PROCEDURE</u>	<u>EQUIPMENT/TEST</u>
PT/2/A/4209/03A	NV Train A Stroke Timing Shutdown.
PT/0/B/4350/33B	125 Volt Auxiliary Battery, Quarterly Inspection
PT/0/A/4350/28B	125 Volt Vital Battery, Quarterly Inspection
PT/2/A/4209/03B	NV Train B Valve Stroke Timing Shutdown
PT/2/A/4550/01	Preparation For Refueling
PT/2/A/4201/02B	FW Train B Valve Stroke Timing - Quarterly
PT/2/A/4207/02B	NM Train B Valve Stroke Timing - Quarterly
PT/1 and 2/A/4350/09	Unit 1 and 2 Emergency Lighting Annual Test (violation described in paragraph 6.a.)

While reviewing recent licensee LERs, the inspector noted that the number of missed Technical Specification surveillances had increased during the year. During the last two years, there have been 11 missed surveillances, with the bulk occurring in 1990.

The licensee has been aware of this trend. McGuire Safety Review Group performed an in-plant review of some of the missed surveillances, in the chemistry area. No corrective action plan was included in the review. This increase in missed surveillances was also identified to the Nuclear Safety Review Board during the latest meeting.

Generic corrective actions have not been formulated or implemented. Licensee management is meeting with the personnel involved in the missed surveillances and is attempting to determine if any common mode of failure is present. The resident inspectors will continue to monitor both the number of missed surveillances and any corrective actions taken.

4. Maintenance Observations (62703)

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 ascertain that, where applicable, current written approved procedures were available and in use, that prerequisites were met, that equipment restoration were completed and maintenance results were adequate.

<u>ACTIVITY</u>	<u>WORK REQUEST/PROCEDURE</u>
Auxiliary Feedwater Pump 2A Preventive Maintenance	5158 PM
Auxiliary Feedwater Pump 2A Impeller Replacement	Proc. MP/O/A/7200/02
Unit 1 RHR Heat Exchanger Outlet Flow Instrument Cal.	08426B PT
Rod Out Tubes of KC2B Heat Exchanger	08539A
Perform PM to Replace Valve Diaphragm and Set Travel Stops	04334B
Perform PM on Reactor Makeup Water Control Valve 2NV252A	05292B
IAE to Calibrate, Functionally Verify 2RN89A Valve Controls	97745
Perform PM to Take Cell Readings, Voltage and Specific Gravity and Clean CXA Battery	02865C
Perform PM to Replace Valve Diaphragm and Set Travel Stops at KC Pump 2A2 (2KC23)	04331B
Perform PM to Replace Valve Diaphragm and Set Travel Stops at KC Pump 2A2 (2KC24)	04330B
Perform PM/PT on Cell Readings, Voltage and Specific Gravity and Clean EVCB Battery	03285C
Perform PM on Diesel Engine Intercooler Water Pump	08967B PM
Perform PM on D/G B Lube Oil Header Temperature Instrument	08427B PM

Perform Oil Analysis on Intake and Exhaust Reservoirs on 1B D/G Turbo Charger 02399C PM

Perform PM/PT on D/G B Fuel Oil Day Tank Level Loop 1MFD505 Instruments 02304C PT

Rod Out Tubes of KC 2B Heat Exchanger 08539A PM

Install NSM MG-2-2129 953531

During the observance of WR 02304C, the inspector noted the absence of the required QC notification prior to starting the work. Since the technicians were about to physically start the work, the inspector asked if the notification had been made. The technicians immediately notified QC. No work had been accomplished; however, the inspector did caution the licensee not to become complacent in the adherence to the notification requirements.

No violations or deviations were identified.

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

The below listed Licensee Event Reports (LER) were reviewed to determine if the information provided met NRC requirements. The determination included: adequacy of description, verification of compliance with Technical Specifications and regulatory requirements, corrective action taken, existence of potential generic problems, reporting requirements satisfied, and the relative safety significance of each event. Additional inplant reviews and discussion with plant personnel, as appropriate, were conducted for those reports indicated by an (*). The following LERs are closed:

- | | |
|-------------------|--|
| 369/90-03 | A Technical Specification Required Surveillance on the Unit 1 Ventilation Unit Condensate Drain Tank was Missed Because of an Inappropriate Action. |
| 369/89-10, Rev.1 | Main Feedwater and Auxiliary Feedwater Isolation Valves Were Potentially Inoperable Because of a Manufacturing Deficiency |
| *369/90-17, Rev.1 | Both Emergency Diesel Generators Were Inoperable Due to Equipment Failure Caused by Inadequate Work Control Involving Painting (Violation issued in Report 369, 370/90-14) |
| *369/90-20 | Both Trains of the Control Room Ventilation System Were Inoperable (See Report 369,370/90-17) |

- 369/90-23 Both Trains of the Control Room Ventilation System were Inoperable because of an Equipment Failure
- *369/90-25 Unit 1 Shutdown because of Unidentified Reactor Coolant System Leakage Greater Than Technical Specification Limits

6. Followup on Previous Inspection Findings (92701, 92702)

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

(Closed) Non-Cited Violation 369,370/89-05-03: Inadequate Design Control Measures Affecting Diesel Generator Starting Air System. This item involved plant design which allowed the Diesel Generator (D/G) Starting Air System (VG) to also supply air to a blackout header allowing control of certain air operated valves during a loss of normal instrument air. This design was never adequately tested or analyzed. Adequate controls have been implemented to maintain the interfacing VG valves closed thereby assuring D/G operability. However, an alternate supply of air to the blackout header is yet to be established. Therefore, this item is closed and a new item established to followup the licensee's fix regarding the blackout header. This is Inspector Followup Item 369,370/90-18-03: Followup of Alternate Air Supply for Blackout Header.

(Closed) NCV 370/89-32-03: Failure to Accomplish Retest of Charging Pump. The inspector verified that the corrective actions were completed, as stated in the LER issued on the incident.

(Closed) Inspector Followup Item 369, 370/90-03-01: Valve Stroke Time Program Weaknesses. The inspector verified that the licensee has adopted new practices with regard to stroking valves off of the backseat, when the valve has been backseated as part of corrective maintenance. The licensee reviewed evidence that this practice has been being implemented and found no discrepancies.

(Closed) Violation 369, 370/90-09-02: Failure to Follow Procedure for the Documentation of a PIR Corrective Action. The inspector verified that all required retraining of the involved personnel was completed.

(Closed) Unresolved Item 369,370/90-04-01: Evaluation of Apparent Fire Protection Discrepancies. This item involved possible discrepancies regarding fire protection requirements identified in Report Nos. 369,370/90-04 and 90-09. The licensee adequately addressed several issues raised. A leaking valve at a hose station was repaired. Hoses are now being rolled in lieu of hanging on pins. Licensee testing has shown this to be an improved method. An evaluation of an extra hose and wye connection at a hose station showed that the licensee was aware of the

situation and had preapproved the situation as allowed. Licensee evaluation showed that dry chemical fire extinguishers are not required to be shaken and the licensee has had no problems with this equipment. A fire hydrant nozzle which had not apparently been used was determined to not be required. A wall penetration between 1A and 1B D/G rooms was shown to be acceptable.

Two previously identified issues and a third issue identified during a surveillance review this period appear to violate TS 6.8.1 which states that written procedures shall be established, implemented and maintained covering the fire protection program. Selected Licensee Commitments, Section 16.9-5 requires all fire barrier penetrations separating safety-related fire areas to be operable. Contrary to this requirement several reach rod floor penetrations between Auxiliary Building elevations 733' and 750' were found unsealed. The applicable procedure (PT/0/A/4250/04) failed to identify these penetrations as fire barriers. The licensee's Fire Protection Review, pages 68-69 requires valves in the fire protection system which are not electrically supervised to be locked or sealed in the normal position. Procedure OP/1/A/6400/02A was inadequate in that valve no. IRF803 was not required to be locked or sealed and was found unlocked. The Fire Protection Review, page 53 requires 8-hour battery powered lights in areas required to be manned when bringing the unit to a safe shutdown condition, and in access and egress routes to selected locations. Licensee procedures PT/1 and 2/B/4350/09 is used to conduct the surveillance of these lights. On September 5, 1990 the inspector discovered that on February 28, 1990 these procedures were signed off improperly. The procedures were signed off with a note stating that the procedure could not be implemented since the test switches had been removed. A modification had removed the switches. The licensee verbally informed the inspector that testing had been done as part of the modification. These issues are considered three examples of a violation 369,370/90-18-04: Inadequate Procedures and Failure to Follow Procedure Regarding the Fire Protection Program.

(Closed) Non-Cited Violation 369/90-09-01: Failure to Follow Procedure Regarding a Step Signoff. Further review has disclosed that the individuals involved had contacted supervision which was the appropriate method of approval for procedure deviation at the time of the event. Therefore, this item is deleted.

(Closed) Violation 369/90-11-06: Failure to Follow Maintenance Procedure. The licensee responded to this item in a letter dated August 22, 1990. It is noted that this item was mistakenly listed as 90-11-07. Corrective actions included upgrading of the maintenance procedure and incorporating the upgrade in the training program. The inspector verified the procedure change was implemented.

(Closed) 369,370/T2515/94: Inspection for Verification of Licensee Changes Made to Comply With PWR Moderator Dilution Requirements. The McGuire Safety Evaluation Report, Supplement 1, Section 15.2.1 contains a description of licensee commitments for prevention of dilution events. These include isolation of dilution paths during refueling, a source range high flux alarm set at 5 times background and procedures to preclude dilution after a trip until the neutron flux level is below the level of the source range high flux level alarm. The inspector verified that these controls were implemented via TSs and procedures. The specific event described in the Temporary Instruction involving injection of Sodium Hydroxide cannot occur at McGuire due to the plant design.

One violation was identified as described above.

7. Evaluation of Licensee Self-Assessment Capability (40500)

The inspector reviewed the licensee's various programs for self assessment. This paragraph also serves to document previous reviews in this area.

The licensee is not committed to an onsite review committee, however, a McGuire Safety Review Group (MSRG) is established. This group functions to observe plant activities through independent surveillances, investigate events and develop Licensee Event Reports including corrective actions. A corporate Nuclear Safety Review Board (NSRB) is also established. This group provides independent review and audit of various activities. Activities of this group are described in Technical Specification 6.5.2 Both groups are made up of at least five dedicated individuals with various technical backgrounds.

The MSRG and NSRB report to the Manager, Nuclear Safety Assurance (NSA). Also reporting to the Manager NSA is Operational Nuclear Safety. This group coordinates the Operating Event Program (followup of industry events, NRC Notices, etc), performance indicator reporting, Nuclear Plant Reliability Data System, trending (incident reports, NRC findings, operating experience, etc.), component failure monitoring, and INPO information and this group also reviews event safety analysis.

The Quality Assurance Department conducts corporate audits of plant activities as well as numerous surveillances with the onsite surveillance group.

The licensee has a site performance indicator program which includes goals for Station Generation, Radiation Exposure, Outstanding Work Requests, Maximum Outage Days, Control Room Indication Problems (CRIPS) and Quality of Operation (includes reactor trips, uncontaminated floor space, personnel contaminations, waste generation, equipment time to repair, catch containments, accident frequency, procedure compliance problems and thermal performance).

Through September goals were not being met for station generation, maximum outage days, CRIPS, equipment time to repair, catch containments and procedure compliance problems. A good steady decline in the number of outstanding WRs greater than three months old was noted until the goal of 400 was reached in July. These remained at 400 in September. Total CRIPS has remained high throughout the year with a steady increase in the running weekly average of non-outage CRIPS. This weekly average was at 47 in September with a goal of 40. Procedure compliance problems remained high at 25 with a goal of less or equal to 7.

The maintenance group also has additional internal goals. These include NRC violations, procedure compliance incidents, past due PIRs or open items, personnel radiation exposure, outstanding WRs greater or equal to one year old, non-outage corrective WR, and CRIPS completed within 30 days. The last three goals were not being met as of September. Outstanding WR were 115 versus a goal of less or equal to 80. Non-outage WR were 50% versus a goal of greater or equal to 65% of total identified. CRIPS completed was 54% versus a goal of greater or equal to 75% of total identified.

The licensee also has implemented a problem investigation process via Station Directive 2.8.1. Problem Investigation Reports (PIRs) are issued to document problems and assure adequate specific and preventive corrective actions are implemented.

The inspector attended the entire yearly NSRB meeting at the site to evaluate the depth of their reviews. The board was thoroughly briefed by plant personnel in multiple areas, in order to provide independent review and audit of designated activities. The inspector noted that the members of the board were receiving technical input and were asking technically sound questions and making valid observations on the issues. Feedback was offered to plant management personnel. Whenever an issue could not be resolved at the meeting, action items were being issued.

The board was briefed concerning raw water problems, a TS change regarding Reactor Coolant System temperature - pressure limits, site and corporate QA activities, significant regulatory issues, ventilation problems, MSRG activities, INPO evaluation results and operator requalification exams. The members also spent time in the plant interfacing with control room personnel, maintenance work control personnel and raw water task force personnel.

The board also reviewed minutes of previous meetings and dealt with items that remained open and with questions posed by various members of the board.

The board was not afraid to ask probing open ended questions of personnel, including management. The inspector noted that the board probed into several areas of recent interest to NRC also. These were adequacy of operator aids in the control room, consistency among and efforts to

communicate with other Duke plants, implementation of the system expert program, and missed TS surveillances.

The licensee has recently formed an Integrated Safety Assessment Group (ISAG). This group will conduct an assessment every six months of the previous 30 months. Inputs to the assessment will include Nuclear Plant Reliability Data System, INPO performance indicators, Safety system performance indicators, SRG perspectives, QA perspectives, NRC perspectives, PIRs, LERs, precursors, INPO perspective, NRC performance indicators and Significant Operating Event Report performance. The first review is scheduled for October, 1990. Results will be reported to executive management. It appears that this process could provide a broader perspective of performance relative to the rest of the industry than has been performed to date.

The inspectors have routinely reviewed all PIRs, LERs, MSRSG surveillance reports, performance indicators, INPO results and QA surveillance summaries. One QA audit of operations was previously reviewed (see Report 369,370/90-03). Recent QA audits will be reviewed at a later date. A Quality Assurance Performance Assessment was also previously reviewed (see Report 369,370/90-04). Additional MSRSG surveillance reports were reviewed during this inspection period. These included report nos. 90-03, 90-05, 90-06, 90-09, 90-11, 90-14, 90-15, 90-19, 90-21, 90-22, 90-23 and 90-26. The surveillances generally appeared to be thorough, however, only three recommendations were noted. The licensee indicated that commitments are sometimes made during the review which are documented in the body of the reports and not listed as recommendations. A total of 18 in plant surveillances had been done in 1990 resulting in 10 recommendations or commitments. Historically MSRSG has been tracking recommendations and no one has been tracking commitments. The licensee recently has decided that the Compliance group will track recommendations and commitments since they are the group who track all other action items.

One report (90-03) noted a backlog in McGuire Exempt Change Variation Notices (MEVNs). The report stated "Manpower availability is limited for completing modifications in the Station because the work load always seems to exceed the available workers. Another problem which stems from not having enough resources, is the fact that DE personnel do not meet the goal of clearing 70 percent of all MEVNs in 60 days. In February only 50 percent of MEVNs were cleared." No recommendations were made, however. The licensee is considering a revision to this report based on the inspectors comments.

No weaknesses were identified regarding root cause analysis and adequacy of corrective actions relative to LERs. Also the licensee appears to have improved relative to identifying repetitive problems on LERs. One weakness has been noted regarding incomplete safety evaluations on LERs (See Report 369,370/90-13). The licensee has begun a pilot Human Performance Evaluation System program with a full time person assigned. This program should further strengthen root cause analysis relative to human performance issues.

The threshold for identifying PIRs is generally acceptable, however, two examples of failure to document problems on a PIR were previously identified (see Report Nos. 369,370/89-32 and 89-42). A violation was previously issued for signing for completion of an incomplete corrective action on a PIR (see Report 369,370/90-09). It was noted that the number of outstanding PIRs has remained relatively constant over the past year. However, the number of PIRs greater than 6 months old has steadily increased from 213 in September, 1989 to 258 in September, 1990. The licensee has not determined the root cause as yet but indicated that a large portion of the increase may be associated with the backlog of station modifications. (See Report 369,370/90-20 for a discussion of modifications).

The licensee has also implemented a partial System Expert program and has assigned maintenance engineers as component experts. Duties of these personnel include assessment and tracking of problems. See paragraph 9 below for a discussion of these engineering functions.

Generally the licensee appears to have a broad based program for self assessment which is aggressive. Corrective actions sometimes take a long time to be implemented or to be affected in results and proactive efforts could be improved in some areas (see paragraph 9). All goals have not been met, however management stresses meeting goals and performance.

8. Special Engineering Support Inspection (40500,62703)

This special inspection was conducted to evaluate engineering support as provided via the licensee System Expert Program (SEP) and component expert engineers. The inspector interviewed nine system experts and three component engineers as well as management associated with these functions. The inspector also reviewed procedures, guidelines and periodic reports for the SEP.

The SEP was implemented in 1988 under Station Directive 2.0.13. This procedure defines the organization, training and qualification requirements, general program functions and the McGuire Specific SE functions. The station has chosen to implement a partial SEP relative to the general guidelines. Some functions such as radiation exposure control, spare parts control and scheduling are typically not done by the SE. Some monitoring functions are deferred to other groups and the depth of involvement in some areas such as modifications varies which is allowed by the station specific guidelines. The licensee initially made 40 assignments in the SEP and now has 28. These include 3 components, 9 programs and 16 systems. Systems assignments are Auxiliary Feedwater, Reactor Protection, Engineered Safeguards, Turbine Control, Ice Condenser, Instrument Air, Main Turbine and Feedwater Turbine, Feedwater, Emergency Core Cooling, Fuel Handling, Condensate, Nuclear Service Water, Diesel Generators, Reactor Core, Ventilation, and Fire Protection. Many systems

are not covered. Examples are Reactor Coolant (although pumps are covered as a component), Containment Spray, Component Cooling Water, nonsafety-related ventilation systems and radwaste systems. The Auxiliary Feedwater System does not presently have an assigned person. Some assignments are very broad in nature, e.g. Ventilation and Emergency Core Cooling. A number of component assignments, such as five valve assignments, included in the original 40 were deleted. These component engineering functions were deferred to the Maintenance Engineering Services (MES) group. The specific SE assignments are scattered throughout the plant organization with primary authority given to the specific section manager.

Assignments under the SEP and components has apparently been beneficial in establishing more specialized knowledge and a contact point in specific areas. Also some modifications for improvement, improved testing and improved monitoring has resulted from these assignments.

The inspector found no formalized program in MES for component experts although specific components are assigned to specific engineers. These engineers are typically aware of all Work Requests (WRs) on their components and are often personally involved with trouble shooting. Some failure trending is done; e.g. a once a year analysis of equipment WRs for a five year period which serves to highlight corrective to preventive WR ratio and identify components with three or more corrective WRs, monthly test and measuring equipment trends, and pump vibration and oil analysis. The licensee has a long term goal of improved computer data bases to more affectively and proactively evaluate equipment trends. A relief valve data base and partial valve packing data base have been established. The licensee is also evaluating the WR program to determine how it should be modified to better suit input to computer data bases. Also the licensee is developing a maintenance top ten priority list.

Presently, the engineers memory is relied on heavily for ongoing failure trending. Failed surveillances are analyzed under procedural guidance; MMP 3.5, Failed Surveillance Analysis. An optional procedure is provided for root cause analysis for abnormal situations; MMP 3.6, Root Cause Failure Analysis. Root cause failure analysis for valve motors is incorporated into the applicable procedures.

The SEP reports varied widely in quality and quantity. One SE had only issued two one page reports; another had not issued any in 1990.

All of the individuals interviewed appeared to be conscientious and attempting to do all that was reasonably possible regarding their assigned duties. However, almost all of the SE individuals indicated that they were unable to do everything needed regarding their SE responsibilities. Some only covered selected portions of their systems. Hindrances included additional work load and broadness of assignment. System walkdowns were typically not being performed on a regular basis. Material condition

problems were often not being pursued. Component engineers indicated that routine workload such as WR review and field support prevents aggressive proactive efforts. These SE and component assignments were apparently made with little reduction in additional workload. Some SEs indicated that there was little incentive to be an SE; it was added work with little reward.

Sensitivity to and use of the SEs appears to vary. Several felt that they were not informed of all issues regarding their systems; e.g. Station Problem Reports, completed modifications and PIRs. Observations indicated that SEs are not automatically involved by Station management. One SE was only invited to a significant meeting regarding his system at the last minute after he asked about it. The inspector observed the licensee considering a compensatory action without considering the SE until the inspector suggested it. During this review, one upper manager was unaware who the SE was for the system involved. The SEs did indicate that management adequately supported their suggestions for modifications or other changes.

The inspector discussed the apparent weaknesses described above with licensee management. The licensee indicated that they had concurrently recognized the need for improvements. A task force has been formed to evaluate the SEP program. The review will include work distribution, resources and organization. MES is also reviewing similar issues relative to component engineers.

The inspector observed one meeting of the SEP task force. Personnel appeared to be thoroughly and objectively evaluating the program.

The licensee has supplemented their engineering efforts with ad hoc task forces to review areas where significant problems have been identified. A task force has been formed for raw water, ventilation and diesel generators.

During the review the inspector was informed of other possible problems relative to engineering resources. Since a company reorganization in 1988 and a reduction of barriers to interdepartment transfers, a number of experienced engineers have transferred to non-nuclear departments or left the company. Examples are all three of the experienced valve engineers in the corporate design organization and five experienced engineers in the site instrument and electrical (IAE) group. Engineers have also left the performance and mechanical engineering groups. The inspector was informed that a common reason cited for leaving was the additional burdens involved with work on a nuclear station with no additional financial incentive. The inspector was also informed that the 1988 reorganization added a number of non-engineering personnel with a disproportionate addition of engineering additions. An example cited was the IAE group. In this area craft personnel went from 60 to 120 and engineering personnel went from 15 to 18.

In summary the SEP has been beneficial in establishing a contact point when problems arise and improvements have resulted through modifications, additional monitoring and improved testing. Weaknesses include inconsistent and incomplete application of SE functions thereby limiting the effectiveness of the SEP. This may be a result of scattered authority/responsibility and inadequate resources. Component engineers also appear to be limited in their proactive efforts due to resource problems, i.e. the number of engineers or workload distribution.

The inspector will conduct further review of maintenance engineering and of licensee efforts to address the weaknesses described above.

No violations or deviations were identified.

9. Installation and Testing of Modifications (37828)

The inspector observed and reviewed Nuclear Station Modification (NSM) 22243 to determine the adequacy of the safety evaluations performed to meet 10 CFR 50.59 requirements; to ensure the work was being performed by qualified workers; the modifications were installed in accordance with approved instructions, procedures, and drawings, contained in the work packages; and the installation test requirements were specified and adequately performed.

The design objective of this NSM was to replace valves 2RN89A and 2RN190B due to an inability of the valves to provide adequate isolation for allowing maintenance activities to be performed on the Component Cooling (KC) heat exchangers. They also have not been capable of providing a smooth and constant valve stroke under flowing conditions. The existing valves rely on volume tanks to provide dedicated air to the actuators for moving the valves to their fail-safe position (open) and holding them in this position for an extended period of time. The system has proven to be complicated and unreliable in allowing the valves to perform their "active" fail-safe function. Also, the valve bodies and portions of the adjacent piping, which were made of carbon steel, will be replaced by components made of stainless steel to reduce erosion/corrosion damage in the future. The valves had to be relocated to accommodate the larger operators which did not fit at the original location.

Installation of the valves and piping required implementation of WRs 97743, 97744, 97745. The WRs were reviewed by the inspector to verify that specific QA controls were included in the work plans to implement all quality requirements of the NSM. The quality and technical control of the information contained and referenced in the NSM documentation package reviewed was good. The inspector verified that relief from hydrostatic test requirements for the isolation valves was granted and documented by NRC letter dated June 29, 1989.

The safety evaluations were adequately addressed and detailed and stated that: "The RN system is designed to meet its safety function with a loss of all instrumentation air; control of the replacement valves will not change; the reliability of the valves to operate as designed is not degraded; the RN system is not an accident initiator; the probability of failure due to valve and piping erosion is reduced; and the pipe stress around the valve has been reanalyzed and the stresses are within acceptable limits. Since the sizing of the new valves improves the controllability during normal flow conditions and the valves are still large enough to pass the KC heat exchanger required flow during all modes of operation, the replacement valves will operate without a change in function. These modifications will not affect operation of the KC heat exchanger nor introduce any new failure modes in the KC system. Therefore, there will be no increase in the consequences of an accident or malfunction of equipment important to safety previously evaluated in the SAR. There will be no change to any TS sections and the margin of safety as defined in the bases in the TS was determined to have not been reduced."

No violations or deviations were identified.

10. Facility Modifications (37701)

The inspector review modification NSM MG 22238, Delete Residual Heat Removal Autoclosure Interlock, which required a Technical Specification change prior to implementation.

During the review, the inspector noted some discrepancies with the 10 CFR 50.59 evaluation performance.

The Design Engineering Department 10 CFR 50.59 Evaluation Manual text does not provide clear instructions for the completion of the evaluation if a Technical Specification change is required for the modification, other than to state that if there are parts of the modification not covered by the Technical Specification change, a separate evaluation must be performed for each of the unaffected parts.

Figure 9-1, the flowchart for the 10 CFR 50.59 evaluation process, implies that if a Technical Specification change is required, the USQ Evaluation Applicability section is not performed on the modification part which is affected by the Technical Specification change.

For NSM MG 22238, the preparer checked that a Technical Specification change would be needed and then completed the USQ Evaluation Applicability section, for the part of the modification affected by the Technical Specification change. The preparer answered both of the screening question "yes". The evaluation manual, section 9.4, USQ Evaluation Applicability, states, in part, "Answer both of these questions to make

the determination. If the answer to either or both questions is 'yes' a USQ Evaluation is applicable. . . If a USQ Evaluation is applicable, it must be performed and documented as described in the following section [9.5] . . ." The preparer did not perform a USQ Evaluation. The USQ Evaluation Applicability section should not have been performed. Completion of this section, when it is not required, demonstrates lack of familiarity with the evaluation process on both the part of the preparer and the subsequent reviewer. The lack of safety significance, in this instance, mitigates the impact. The inspector will continue to review 10 CFR 50.59 evaluations for examples of a lack of familiarity with the process. The licensee was informed of the above problem.

Further review of NSM MG 22238 will be completed in upcoming inspections.

No violations or deviations were identified.

11. Evaluation of Licensee Quality Assurance Program Implementation - (35502)

A mid-SALP review has conducted during the September 18, 1990, QPPR meeting. Each SALP category was evaluated by reviewing inspection reports, LER's past SALP findings, the OIL, licensee corrective actions to NRC findings, and the input from the resident inspectors.

No significant trends were identified in any of the SALP categories that would require a change in the NRC inspection program.

12. Exit Interview (30703)

The inspection scope and findings identified below were summarized on October 17, 1990, with those persons indicated in paragraph 1 above. The following items were discussed in detail:

Inspector Followup Item 369,370/90-18-01: Weak Communications Practices Involving the Control Room Operations Personnel (paragraph 2.c.)

Unresolved Item 369,370/90-18-02: Evaluation of Effect of Splash Guards on Safety Related Pumps (paragraph 2.e.).

Inspector Followup Item 369,370/90-18-03: Followup of Alternate Air Supply for Blackout Header (paragraph 6.)

Violation 369,370/90-18-04: Inadequate Procedures and Failure to Follow Procedure Regarding the Fire Protection Program (paragraph 6.)

Weaknesses regarding the System Expert Program and Component Engineering (paragraph 8).

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.