ENCLOSURE

SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE
INSPECTION REPORT NUMBERS
50-369/87-29
50-370/87-29

DUKE POWER COMPANY
McGUIRE UNITS 1 & 2

MARCH 1, 1986 THROUGH JULY 31, 1987

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I. INTRODUCTION

A. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) program is an integrated NRC staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance based upon this information. The SALP program is supplemental to normal regulatory processes used to determine compliance with NRC rules and regulations. The SALP program is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to licensee management to promote quality and safety of plant construction and operation.

An NRC SALP Board, Composed of the staff members listed below, met on October 6, 1987, to review the collection of performance observations and data to assess licensee performance in accordance with guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's safety performance at McGuire Units 1 & 2 for the period March 1, 1986, through July 31, 1987.

B. SALP Board for McGuire Units 1 & 2

Board Chairman

L. A. Reyes, Director, Division of Reactor Projects (DRP), Region II (RII)

Board Members

A. R. Herdt, Chief, Engineering Branch, Division of Reactor Safety (DRS), RII
D. M. Collins, Chief, Emergency Preparedness and Radiological Protection Branch, Division of Radiation Safety and Safeguards, (DRSS), RII
G. C. Lainas, Assistant Director for Region II, Division of Reactor Projects, NRR
V. L. Brownlee, Chief, Reactor Project Branch 2, DRP, RII
D. Hood, Project Manager, Project Directorate II-3, DRP, NRR
W. T. Orders, Senior Resident Inspector, McGuire, DRP, RII

Other Attendees at SALP Board Meeting

T. A. Peebles, Chief, Reactor Project Branch 2A, DRP, RII
M. S. Lesser, Resident Inspector, Catawba, DRP, RII
K. D. Landis, Chief, Technical Support Staff (TSS, DRP, RII
B. R. Bonser, Project Engineer, RP2A, DRP, RII
B. B. Desai, Reactor Engineer, TSS, DRP, RII

II. CRITERIA

Licensee performance is assessed in selected functional areas depending on whether the facility has been in the construction, preoperational, or operating phase during the SALP review period. Each functional area represents an area which is normally significant to nuclear safety and the environment and which is a normal programmatic area. Some functional areas may not be assessed because of little or no licensee activity or lack of meaningful NRC observations. Special areas may be added to highlight significant observations.

One or more of the following evaluation criteria was used to assess each functional area; however, the SALP Board is not limited to these criteria and others may have been used where appropriate.

A. Management involvement in assuring quality
B. Approach to the resolution of technical issues from a safety standpoint
C. Responsiveness to NRC initiatives
D. Enforcement history
E. Operational and construction events (including response to, analysis of, and corrective actions for)
F. Staffing (including management)
G. Training and qualification effectiveness

Based upon the SALP Board assessment, each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety or construction quality is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and are concerned with nuclear safety; licensee resources are adequate and are reasonably effective such that satisfactory performance with respect to operational safety or construction quality is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear to be strained or not effectively used such that minimally satisfactory performance with respect to operational safety or construction quality is being achieved.

The functional area being evaluated may have some attributes that would place the evaluation in Category 1, and others that would place it in either Category 2 or 3. The final rating for each functional area is a composite of the attributes tempered with the judgement of NRC management as to the significance of individual items.

The SALP Board may also include an appraisal of the performance trend of a functional area. This performance trend will only be used when both a definite trend of performance within the evaluation period is discernible and the Board believes that continuation of the trend may result in a change of performance level. The trend, if used, is defined as:

Improving: Licensee performance was determined to be improving near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period.

III. SUMMARY OF RESULTS

A. Overall Facility Evaluation

McGuire is well staffed with qualified, dedicated individuals. Control room personnel demeanor is professional and their morale is good. Overall, the McGuire staff appears to be highly motivated, and in the pursuit of excellence. Management involvement in problem resolution and routine plant operations is apparant and has proven to be of significant benefit during the SALP period, as attested to by the improvement in the facility operating record.

There has been a significant improvement in overall plant operations over that of the previous SALP period, however, management attention must remain focused on attention to detail and regulatory compliance. Maintenance is improving as shown by the decrease in the number of outstanding work requests in the control room and the overall plant condition.

B. Facility Performance Summary

Functional Area	September 1, 1984 - February 28, 1986	March 1, 1986 - July 31, 1987
Plant Operations	3	2
Radiological Controls	2	2
Maintenance	2	2
Surveillance	2	2
Fire Protection	2	2
Emergency Preparedness	2	1
Security	1	2

Functional Area	September 1, 1984 - February 28, 1986	March 1, 1986 - July 31, 1987
Outages	1	2
Quality Programs and Administrative Controls Affecting Quality	2	2
Licensing Activities	2	2
Training	2	2
Engineering Support	Not Rated	2

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

During this assessment period, routine and special inspections of plant operations were performed by the resident and regional inspection staffs.

The quality of operations at McGuire has improved and is improving. Licensee upper management has been extensively involved in the establishment of corrective actions for violations and for other abnormal plant events. It has stressed the importance of following plant procedures and identifying deficiencies in those procedures. Senior plant management is involved in the day-to-day operation of the plant and tracks the daily status of known equipment operability deficiencies in management meetings. The more active management involvement in daily operations has had a positive effect on plant operations and personnel morale. The effect has been most evident in the marked decrease in the number of personnel errors which have historically resulted in unit trips and ESF actuations. The ability to operate the units for extended periods of time without significant problems or unplanned trips has also had a positive impact on personnel morale.

Facility operations reflected adequate preplanning and assignment of priorities. Facility operating procedures were adequate. Seven of the violations that were cited in the operations functional area, however, involved a failure to follow applicable plant operating procedures and policies. In an effort to improve in this area, the Station Manager has held "time-out" meetings with station personnel, and the Operations Superintendent regularly meets with the Operations Staff (monthly with Shift Supervisors) to promote procedural compliance. When deemed appropriate in cases of personnel error, corrective disciplinary action is administered. Yet, procedural compliance continues to be a weakness in the McGuire Operations Program.

An assessment of reactor trips during the SALP period shows a significant decrease in the number of unplanned reactor trips sustained by both units. The number of Unit 1 trips decreased from seven during the previous SALP period to four during the current period, while Unit 2's trips decreased from nineteen to five. The average reactor trips above 15% power per 1000 critical hours for the SALP period was 0.64 for Unit 1 and 0.40 for Unit 2. This reduction in unit trip frequency is attributed to increased personnel "maturity" and to a significant decrease in personnel errors. As discussed in the Reactor Trip Summary (paragraph V.I), only two of the nine combined trips were attributed to personnel error. The general improvement in plant operations is further evidenced by a decrease in the number of Engineered Safety Feature (ESF) actuations during the SALP period and a reduced forced outage rate.

The licensee's approach to the resolution of technical issues from a safety standpoint was sound. A better understanding of the safety issues was apparent, and conservatism was routinely exhibited when responding to safety-significant concerns. Two notable examples of conservative operating decisions made during the rating period involved the operability of Rotork valve actuators in late October 1986, and the operability of containment air return fans in January 1987.

- On October 28, 1986, the licensee determined, from motor operator valve testing conducted pursuant to IE Bulletin 85-03, that several Rotork valve actuators could be incapable of developing sufficient torque, at their existing switch settings, to actuate their associated valves under worst case differential pressure conditions. The valves in question were declared inoperable and placed in their safe positions while both units were removed from service and placed in cold shutdown. Both units remained shutdown (Unit 1 for four weeks and Unit 2 for three) until all safety-related motor operated valves with Rotork actuators were proven to be operable or deactivated in their safe position (see Inspection Reports 86-33 and 86-35).

- On January 30, 1987, the licensee determined that two sections of curbing that prevent excessive influx of containment spray water into the containment air return fan pits were missing from the refueling floors of both McGuire units. The licensee's initiative in detecting the problem, assessing its root causes and safety significance, and taking aggressive action to correct the deficiency were instrumental in the NRC's decision not to pursue escalated enforcement action for this violation of the plant's Technical Specifications (See the Outages Section).

The licensee has taken several initiatives during the SALP period in an effort to improve Technical Specification (TS) compliance. Operators have changed their previous attitude of complying with the literal interpretation of the TS to a more acceptable attitude of adherence to the intent of the TS.

- Management has repeatedly communicated a clear message to the Operations Shift Supervisors that nothing less than 100 percent TS compliance would be acceptable. TS violations are evaluated and discussed during Abnormal Plant Event (APE) meetings with station management.

- A new Station Directive was developed and implemented at all three Duke Power nuclear facilities to provide the Operations staff with more definitive guidance on making component/system operability determinations.

- During Segment 3 of the 1987 operator requalification program, the entire licensed staff was provided with Technical Specification application training. This training covered the newly implemented station directive on equipment operability, selected TS interpretations, and a review of recent incidents having significance with regard to TS operability.

- Design Engineering has completed an engineered safety features valve study to aid the licensed operators in making operability decisions. It provides the operators with a ready reference of design engineering analysis of the consequences of having particular ESF valves inoperable.

- Improvements are being made in the operating/surveillance/maintenance schedules to minimize making opposite train components inoperable for maintenance or testing on the same day. Additional plans have been made to assign a licensed senior reactor operator to the Planning/Integrated Scheduling staff on a rotating basis to assist in minimizing operability conflicts.

The operations staffing level during this assessment period continued to exceed the minimum required shift crew composition. Each operating shift consists of 4 or 5 senior operators (TS requires only 2) and 4 or 5 reactor operators (TS requires only 3).

A fourth Assistant Shift Supervisor (SS) has been added to three of the five operations shifts and are planned for the other shifts when additional senior operators are licensed. This

Assistant SS was added primarily to serve in an on-shift training capacity to implement the Employee Training and Qualification System (ETQS), which utilizes "qualification cards" to document and track operator training.

The plant operations staff consists of a total of approximately 155 employees. The low operations staff turnover rate, which decreased from 4.05 percent in 1985 to 1.27 percent in 1986, indicates that employee morale remains high.

Operating staff training, level of facility knowledge and attitude was good. Control room professionalism has been enhanced by the use of uniforms for reactor and senior reactor operators and shift engineers.

The control room has been upgraded by the incorporation of numerous human engineering modifications and cosmetic improvements (new carpet, chairs, paint). In March 1986, the control area was redefined to help minimize the amount of unnecessary personnel traffic that could interfere with control room operations.

The plant's material, preservation, and housekeeping status is adequate, but could be improved. A significant housekeeping and material deficiency identification program was undertaken. The resident inspectors, however, still find construction/maintenance debris and other material/housekeeping deficiencies on a routine basis during tours through the auxiliary building and other plant spaces.

The licensee has placed a significant effort into reducing the amount of contaminated area in the auxiliary building. Leaking valves have been identified and rigged with catchments to route contaminated water to appropriate floor drains. This has facilitated the decontamination of many areas of the plant, making them accessible in street clothing and enhancing efficient plant operation and operator morale.

Nine violations were identified during this evaluation period. The two Level III violations listed below were identified, discussed in greater detail and given consideration in the previous SALP evaluation but were issued during this SALP period.

a. Severity Level III violation for entering Modes 2 and 3 with both Unit 1 emergency core cooling subsystems inoperable during November 2-4, 1985 (86-04, Unit 1 only).

b. Severity Level III violation for failure: (1) of the service water system to provide specified flow rates to certain heat exchangers; (2) to properly preoperationally test the service water system and (3) to properly document and evaluate test results that indicated certain systems or components were not able to perform as intended (85-38/85-39).

c. Severity Level IV violation for failure to maintain operable pressurizer code safety valves as required by Technical Specification (TS) 3.4.2.2 (86-28, Unit 1 only).

d. Severity Level IV violation for failure to follow the residual heat removal procedure (86-30, Unit 1 only).

e. Severity Level IV violation for failure to follow the Operations Management Procedure (OMP) requiring redundant equipment operability (e.g. containment spray) (87-04, Unit 1 only).

f. Severity Level IV violation for failure to follow procedures regarding transient cycle documentation and reporting (87-14/87-14).

g. Severity Level IV violation for failure to follow plant startup procedures for securing the steam generator wet layup system (86-35, Unit 2 only).

h. Severity Level IV violation for failure to follow the reactivity balance calculation procedure and the OMP requiring redundant equipment operability (e.g. containment spray) (86-08, Unit 1 only).

i. Severity Level V violation for failure to notify the NRC Operations Center within four hours of an engineered safety features actuation and a deviation from the TS pursuant to 10 CFR 50.54(x) (86-28/86-28).

j. Severity Level V violation for failure to follow Removal and Restoration Procedures (CA valve misalignment) (87-12, Unit 1 only).

k. Severity Level V violation for failure to follow the OMP governing TS Action Item Log entries (87-14/87-14).

2. Conclusion

Category: 2

3. Board Recommendation

The Board noted a significant decrease in the number of unplanned reactor trips, however, issues subsequent to the SALP period relative to emergency diesel inoperability indicate the need for continued management attention.

B. Radiological Controls

1. Analysis

This area includes primary and secondary chemistry. During this assessment period, inspections were performed by the resident and regional inspection staffs. This included confirmatory measurements using the Region II mobile laboratory.

The licensee's health physics (HP) staffing level compared favorably with other utilities having a facility of similar size. In 1986, the licensee established a goal of eliminating all contract HP technicians for work during routine operations. To this end, additional junior technicians were obtained and enrolled in the HP technician training program. By November 15, 1986, the licensee had achieved its goal and all HP support for non-outage activities came from the licensee's own staff. For refueling outages, contract personnel are still used. Technical assistance from the corporate HP staff remains strong.

The licensee has developed HP and chemistry technician training programs, both of which have received accreditation from the Institute for Nuclear Power Operations. In addition the licensee has developed an Independent Radiation Worker (IRW) training program designed to increase the worker's responsibility for his own radiation protection. This program consists of one week of classroom training and three weeks of on-the-job training. A retraining program is under development for these workers.

Licensee management's support and involvement in the radiation protection program is strong. Budgetary support was instrumental in permitting acquisition of equipment to support a major upgrade in the contamination control program of the facility. As a result, the contaminated area of the Auxiliary Building decreased from approximately 40 percent in January 1986 (28,000 square feet) to seven percent (5,000 square feet) at the end of July, 1987. A twelve person decontamination crew is maintained onsite dedicated to facility decontamination. In addition, initiation of a contamination catch/ containment program in concert with a leak/valve repair program has been implemented to eliminate the source of contamination. The plant

manager provides oversight on the progress of this containment program which crosses departmental boundaries. Additionally, plant housekeeping has improved.

The licensee's approach to resolution of HP technical issues was adequate, as well as timely. In the June 29, 1986, event when irradiated fuel pellets were released from damaged rods, the licensee did an effective job of retrieval of the pellets and reviewing their radiation protection program to determine the impact of the loose and shattered pellets including air sampling, contamination control and 10 CFR 61 compliance.

The performance of the HP staff in support of routine and outage operations was good. HP controls established to cover refueling activities were well prepared and enforced. In particular the licensee's program for control of personnel exposures to "hot" particles has been effective. The licensee's dosimetry system is accredited by the National Voluntary Laboratory Accreditation Program.

The licensee's radiation work permit, respiratory protection and transportation of radioactive materials programs were found to be effective. The effectiveness of the aggressive contamination control program was observable in the number of personnel contaminations observed in 1986 and 1987. In 1986, 421 personnel contaminations were observed, compared to 89 personnel contaminations through July 1987.

During 1986, the licensee's cumulative dose was 507 person-rem per reactor unit as measured by thermoluminescent dosimeter which was above the national average of 397 person-rem per unit observed at PWR facilities. Over 70 percent of the collective dose was accrued during the approximately 200 days of refueling and maintenance outage. The major source of exposure was shotpeening the steam generators (S/G) of both Units 1 and 2. This was the first time that S/Gs had ever been shotpeened in a plant that had been operational. Experience was gained after completion of Unit 1 and consequently, Unit 2 exposures were improved. Improvement was observed in cumulative exposure for 1987 in that from January 1 to July 31, 1987, 222 person-rem per reactor had been expended.

The radiological effluent program was managed adequately. Effluent releases for 1984-1986 are summarized in the Supporting Data and Summaries, Section V.J. The licensee's calculated offsite doses for 1986 from radioactive liquid effluents were 0.28 mrem to the whole body. Estimated doses due to gaseous releases for 1986 were 0.76 mrem to the whole body and 2.00 mrem to the skin. The dose estimates place the licensee well within

the limits prescribed by 40 CFR 190.10, namely 25 mrem to the whole body over any 12 consecutive months. There were no significant trends noted in effluent releases during the SALP period.

During a confirmatory measurements inspection a violation was issued for failure to ensure that adequate procedures were maintained to conduct accurate Fe-55 analyses for liquid effluent release measurements. The violation was a result of previous licensee corrective actions failing to rectify the problem with analyses performed by a contractor laboratory. There was good agreement between the results obtained from the licensee counting systems and the NRC mobile van when measurement comparisons were made during the confirmatory measurements inspection at the licensee's site.

During a routine liquid and gaseous radwaste inspection, three violations were identified in the area of radioactive contamination in a non-radiological liquid effluent discharge system which had the potential for unmonitored releases to the environment through the waste treatment system. In one case from February 1982 through June 1986 the licensee failed to perform adequate tritium analyses of the Domestic Wastewater Treatment system effluents or the Wastewater Collection Basin liquid effluents prior to their release into the Catawba River. These systems became contaminated because the licensee failed to conduct a safety evaluation. This resulted in a second violation. A third violation was issued for failure to analyze turbine building sump samples prior to realignment from radiological to nonradiological effluent discharge pathways.

In the area of environmental monitoring the program has been adequately implemented with the exception of development of procedural guidance to ensure that environmental data is reviewed for anomalous measurements and the Annual Radiological Environmental Operating report has not included a comparison of the radiological environmental surveillance data for the reporting period with preoperational studies. The latter finding resulted in a violation of a Technical Specification.

In the areas of corrosion and plant chemistry, the licensee continued to maintain control of primary and secondary water chemistry in a manner that was better than the criteria recommended by the Steam Generator Owners Group. Considerable resources were being concentrated on upgrading the effectiveness of sampling systems, condensate polishers, and inline analytical instrumentation. The copper alloy tubes in the moisture separator had been replaced with stainless steel tubes; thereby, eliminating the only source of copper in the secondary water system and reducing the possibility of "denting" in the steam

generators. New low-pressure turbine rotors, with increased resistance to erosion/corrosion of blades and disks, have been installed. Steam generators have been shot-peened to reduce primary side stress corrosion cracking of steam generator tubes. The chemistry training program has been given additional personnel resources. The licensee had been prompt and thorough in addressing the pipe thinning issues described in NRC Notices and a Bulletin during 1987 (IEN 86-106 and supplements, IEB 87-01, and IEN 87-36).

During 1986, the licensee shipped 13,900 cubic feet per reactor of solid radioactive waste containing 335 curies to a land disposal facility. This value is above the national average of 7500 cubic feet of waste shipped by other PWR facilities and can be attributed to the large number of outage days at the facility. A large amount of the waste was compacted dry active waste. This was the result of extensive use of protective clothing and associated articles. Some of this waste was generated during the major decontamination of the Auxiliary Building. The licensee has ordered a trash segregating and sorting system to help reduce the volume of waste shipped each year. Through July 1987, the licensee shipped approximately 6400 cubic feet per reactor containing 142 curies for disposal.

Eight violations were identified during this evaluation period:

a. Severity Level IV violation for failure to adhere to procedural requirements for Radiation Work Permit revisions (86-15/86-15).

b. Severity Level IV violation for failure to ship Low Specific Activity waste in a strong, tight package or a Department of Transportation Specification 7A Type A container (86-31/86-31).

c. Severity Level IV violation for failure to adhere to procedural requirements for frequency of air sampler calibration (86-31/86-31).

d. Severity Level IV for failure to conduct accurate Fe-55 analyses for liquid effluent measurements (87-01/87-01).

e. Severity Level IV for inadequate radiological surveys of potentially contaminated liquid effluents through the Domestic Wastewater Treatment System (86-32/86-32).

f. Severity Level IV for failure to complete a 10 CFR 50.59 Safety evaluation when the auxiliary building laboratory was used for processing and disposal of radioactive liquid samples. (86-32/86-32).

g. Severity Level V for inadequate radiological environmental monitoring reports (86-32/86-32).

h. Severity Level V for failure to follow station operating procedures for radiological sample analyses prior to realignment from radiological to nonradiological effluent discharge pathways (86-32/86-32).

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommend.

C. Maintenance

1. Analysis

During the evaluation period, routine inspections were performed by the resident and regional inspection staffs.

The maintenance staff consists of approximately 300 personnel assigned to the Nuclear Production Department, with an additional 300 maintenance personnel assigned to the Construction and Maintenance Division (CMD). Approximately 600 construction personnel are also available from CMD when required.

The maintenance staff is well qualified and trained. McGuire's maintenance training program achieved INPO accreditation in March 1987. As a further enhancement, the licensee has budgeted to begin construction on an advanced maintenance training facility in 1988. The facility will feature a mock-up area for steam generators, reactor coolant pumps, control rod drive mechanisms and the reactor head, and mechanical and instrument and electrical maintenance areas.

The maintenance program is well organized with decisions being made at management levels to assure appropriate supervisory involvement. Licensee resolutions to maintenance related technical issues indicated clear, thorough understanding of the issues and were usually conservative and viable. This was demonstrated during the dual unit Rotork valve maintenance outages of November 1986. The licensee determined that the torque switch settings on numerous safety-related motor operated valves may have been nonconservative, and appropriate action was taken to place the units in a safe condition until the questionable valves could be tested and adjusted. The licensee

is implementing a valve improvement program to monitor critical valve parameters and resolve generic technical issues. This program has succeeded in reducing valve rework from 15 percent to less than 4 percent.

The licensee is also implementing a system performance monitoring program to improve station reliability. The program, which is scheduled for full implementation by 1988, includes vibration monitoring, system and component parameter trending, valve losses, energy balances, and performance walkdowns.

During the previous evaluation period, a disproportionate number of the unplanned reactor trips were either directly or indirectly related to maintenance activities. During this evaluation period a significant decrease in both the total number of unplanned trips and in the proportion of those trips attributable to maintenance activity was observed. Improvement in the quality of maintenance activity was also evident by the virtually trouble-free operation of Unit 2 following the 1987 refueling outage.

The licensee has undertaken a program to upgrade existing maintenance procedures to INPO standards in an effort to further reduce human performance errors. The program scope includes approximately 6000 procedures with an estimated expenditure of up to 40 man-hours per procedure.

The licensee has a detailed program for completed maintenance record review, which is very thorough in identifying and correcting deficiencies. The use of procedures in accomplishing maintenance activities was adequate. The licensee's program for removal and restoration of equipment was adequate.

During the evaluation period, inspections were performed in the electrical area. One was a team inspection of Environmental Qualification (EQ) of Electrical Equipment and one was a follow up on generic implications of the Salem Anticipated Transient Without a Scram Event (Generic Letter 83-28).

Weaknesses were noted in the EQ program in that concerns identified by the inspection should have been resolved prior to the inspection. This is based on the fact that adequate information existed in the form of an NRC Information Notice and industry forums on the subject. Weaknesses were also noted with regard to the Generic Letter 83-28 inspection in the area of the Quality Standard Manual (QSM) updating process and the certification program for qualified reviewers. These were the subject of a Severity Level IV violation issued subsequent to the SALP period, but considered here.

The licensee's action with regard to NRC initiatives, was very good. The resolution of technical issues was normally sound and characterized by viable and thorough approaches. Management's involvement in the response and development of actions with regard to Generic Letter 83-28 was evident in the documentation, procedures, training and implementation of actions of resolve the potential generic problems identified in the Generic Letter.

On July 2, 1987, a reactor trip breaker on Unit 2 was found to have failed to open. An Augmented Inspection Team (AIT) reviewed the event. The cooperation of the plant and corporate personnel during the inspection was superb. The licensee was found to have an excellent program of preventative maintenance on the breakers and a cracked weld was found to be the main contributing factor to the breaker's failure to open.

Two violations were identified during this evaluation period.

a. Severity Level IV violation for performing a temporary modification (lifting a refueling water storage tank heater lead) without employing an active Unit 1 test procedure (87-08, Unit 1 only).

b. Severity Level V - Failure to perform trending of reactor trip breaker response time test data (87-11/87-11).

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommend.

D. Surveillance

1. Analysis

During this surveillance period, routine inspections were performed by the resident and regional inspection staffs. The computerized program employed to schedule surveillance testing is adequate. The program identifies on a weekly basis the specific requirements by due dates. Improvements are being made in the operating schedule to minimize opposite train component test schedule overlap. Furthermore, plans have been made to assign a licensed senior reactor operator to the Planning/ Integrated Scheduling staff to assist in minimizing operability conflicts.

Surveillance activities reflected adequate preplanning and assignment of priorities. Surveillance procedures were adequate with few examples of deficiencies identified. Surveillance activities were thorough and proper with exceptions identified below. Surveillance records were given thorough post completion reviews.

Implementation of the surveillance testing and calibration control program was adequate and reflected an acceptable level of management overview. Weaknesses were apparent with respect to procedural adequacy, procedural compliance and the failure to recognize and perform certain surveillance requirements. Specific examples of these deficiencies are delineated below.

Concerning the performance of certain surveillances, enforcement action was taken when the licensee failed to recognize the surveillance requirements for determining the "as found" containment integrated leak rate during the Unit 2 integrated leak rate test in June 1986. Once the problem was recognized, the licensee's corrective action was both adequate and prompt. An extensive review of maintenance and test records was performed and the Unit 2 "as found" leak rate was established. During the Unit 1 integrated leak rate test in August 1986, adequate controls for determining the "as found" leak rate were in place and functioned properly.

With respect to procedural inadequacies previously identified, effective January 7, 1986, the instrumentation and electrical (IAE) section, which is responsible for a major portion of the required surveillance, has committed to upgrade all procedures to meet the standards of a recently developed procedure development guide. Each plant superintendent, in response to identified problems of procedural compliance, developed formal training on procedure use and adherence for all supervisors and staff reporting to them.

Licensee resolution of surveillance related technical issues indicated a thorough understanding of the issues and was conservative and viable.

An example of a resolution to a surveillance related technical issue is the case of the detection of inadequate service water (RN) flow to certain safety related components. Although this was the subject of escalated enforcement action, once the problem was identified and analyzed, the licensee developed an extensive program for performance and maintenance testing of the RN system on both units. The current RN testing program was implemented in April 1986, and has resulted in a substantial increase in the reliability of the system and dependent components.

Six violations were identified in this area as detailed below.

a. Severity Level IV violation for failure to 1) verify emergency diesel generator (EDG) operability within eight hours of removing the redundant EDG from service and 2) perform a 7-day source range channel operational test within the required time period (86-28/86-28).

b. Severity Level IV violation for a deficient slave relay test procedure resulting in a control room chiller trip on loss of service water flow (87-05/87-05).

c. Severity Level IV violation for failure to determine the as-found containment leak rate prior to performing maintenance on certain containment isolation valves (86-16, Unit 2 only).

d. Severity Level IV violation for an inadequate reactor trip breaker response time testing procedure (86-21, Unit 2 only).

e. Severity Level IV violation for three examples of failure to follow/inadequate surveillance procedures (containment cleanliness inspection, containment divider barrier integrity, and containment integrity verification for core alterations) (87-21, Unit 2 only).

f. Severity Level IV violation for not performing the cumulative offsite dose periodic test within the required time span (86-08/86-08).

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommended.

E. Fire Protection

1. Analysis

During this assessment period routine inspections were conducted by the regional staff in the areas of the licensee's implementation of the fire protection program and followup on previously identified fire protection and safe shutdown related issues from an Appendix R team inspection made during the

previous assessment period (September 1984). The followup inspection during this period indicated that the licensee's corrective actions on seven of the previously identified issues were adequate.

For the routine program, the licensee has issued procedures for: the administrative control of fire hazards within the plant; surveillance and maintenance of the fire protection systems and equipment; and organization and training of a plant fire brigade. These procedures were reviewed and found to meet the NRC requirements and guidelines except for procedure weaknesses which could result in future discrepancies in the control of combustible plastic materials in safety related areas. The licensee promptly initiated appropriate corrective actions to resolve the issues.

The staff inspections reviewed the licensee's implementation of the fire protection and administrative controls. General housekeeping and control of combustible and flammable materials were satisfactory.

The fire protection extinguishing systems, detection systems and fire barriers and fire barrier penetrations were found to be in service or the appropriate limiting condition for operational requirements of the Technical Specifications had been implemented. Surveillance inspection and tests and maintenance of the fire protection systems and features were satisfactory.

Organization and staffing of the plant fire brigade met the NRC guidelines. The training and drills for the fire brigade members met the frequency specified by the procedures and the NRC guidelines. It was noted during a drill exercise that the overall response readiness of the plant fire brigade was weak. Subsequent drill observations by the resident inspectors and followup inspections noted improvement in this area and identified no other weaknesses.

The results of the annual fire protection/prevention audit, 24 month QA fire protection program audit by offsite organizations, and triennial audit by an outside fire protection organization required by the Technical Specifications were reviewed. These audits were conducted within the specified frequency and covered all of the essential elements of the fire protection program. The licensee has implemented corrective action on discrepancies identified by the audit.

Management involvement and control in assuring quality in the fire protection program is evident. The licensee's approach to resolution of technical fire protection issues indicates an

understanding of the issues, and is sound and timely. Their responsiveness to NRC initiatives is technically sound and timely in most cases.

Staffing for the fire protection program was adequate. Fire protection staff positions were identified and authorities and responsibilities were clearly defined. Personnel were well qualified for their assigned duties.

One deviation was identified:

- Deviation for failure of the Unit 1 Halon system to be constructed in accordance with applicable design drawings and industry standards as committed to the NRC (87-14, Unit 1 only).

2. Conclusions

Category: 2

3. Board Recommendations

No change in the NRC's inspection resources is recommended.

F. Emergency Preparedness

1. Analysis

During the assessment period, inspections were performed by resident and regional staffs. There were two inspections of implementation of the radiological emergency plan and procedures, and observation of two annual radiological emergency exercises. Three emergency plan revisions were reviewed.

The annual emergency preparedness exercises disclosed no adverse findings regarding the licensee's emergency organization and staffing. An adequately staffed corporate emergency response and planning organization routinely provided support to the plant. Key positions in the corporate and plant emergency response organizations were filled. Corporate management continued to demonstrate a strong commitment to maintenance of an effective emergency response program, as demonstrated by corporate management involvement in the 1986 and 1987 annual emergency preparedness exercises and respective critiques. The licensee continues to promptly and effectively respond to NRC emergency preparedness issues as demonstrated by implementation of corrective actions in response to enforcement items and exercise weaknesses.

Observation and critique of the annual emergency preparedness exercises and conduct of the routine inspections disclosed that the Emergency Preparedness Plan and procedures could be effectively implemented by the licensee. The licensee and the NRC observed areas where action was appropriate to improve emergency response, including the failure of all sirens located in Mecklenburg County to sound following attempted actuation. This failure resulted from a faulty encoder. The licensee replaced the encoder and conducted a followup siren test. All areas requiring action identified during the exercise were documented by the licensee who committed to implement corrective actions consistent with regulatory requirements and guidance.

The licensee completed a new Emergency Operations Facility (EOF) at the Corporate Headquarters near the end of the evaluation period. This EOF was designed to incorporate the lessons learned from emergency exercises was used in the September 1987 emergency exercise. The Technical Support Center (TSC) at the plant has minimal space for operations. The licensee has identified this lack of space and has scheduled the construction of a new TSC to alleviate the cramped quarters.

The following essential elements for emergency response were found acceptable: emergency detection and classification; protective action decision making; notification and communications; dose calculation and assessment; training, except as defined above; public information; audits; and coordination with offsite agencies. The controller/evaluator critiques conducted by the licensee immediately following termination of annual exercises were detailed, and effectively managed to identify, document, and resolve all deficiencies and improvement items identified.

An NRC review of revisions 20, 21 and 22 to the McGuire Nuclear Radiological Emergency Plan confirmed that the plan met regulatory standards as defined in 10 CFR 50.47(b) and the requirements of Appendix E to 10 CFR 50.

One violation was identified.

Severity Level IV violation concerning failure to provide required annual emergency response retraining to selected personnel assigned to the site emergency response organization (87-10/87-10).

2. Conclusions

Category: 1

3. Board Recommendation

No change in the NRC's inspection resources is recommended.

G. Security

1. Analysis

During this evaluation period, inspections were performed by the resident and regional inspection staffs. The total of seven inspections of the security program included three special inspections, one of which was conducted in conjunction with the NRC Regulatory Effectiveness Review (RER) Team evaluation. The RER evaluation did not identify any potential sabotage vulnerabilities. The other two special inspections related to a licensee reported Safeguards Event that occurred in the licensee's corporate offices.

The licensee continues to demonstrate an ability to effectively plan and implement safeguards measures. Security plans and implementing procedures were current and provided ample guidance for effecting operational requirements. In response to newly established regulatory requirements, the licensee implemented a program to fingerprint employees as a prerequisite for unescorted access. This was accomplished jointly by corporate and site security staffs and is indicative of the licensee's responsiveness to NRC initiatives. In addition, the licensee initiated an ongoing survey and analysis of protected and vital area barriers to determine adequacy. The licensee is taking compensatory measures for inadequacies determined. The licensee's Security Compliance Review Program continues to enhance security program effectiveness by ensuring adherence to procedural requirements and Physical Security Plan commitments.

A long term deficiency relating to closed circuit television (CCTV) assessment capability for alarms generated at the protected area barrier was addressed as a concern during the Regulatory Effectiveness Review in January 1987. This concern, while being compensated for, detracts from the overall effectiveness of the security program. In response to the RER, the licensee initiated a modification action to revise/upgrade the protected area lighting. The modification design is scheduled for completion by November 2, 1987. In addition, an evaluation of CCTV capability relative to the necessity for changes was initiated and scheduled to be available for consideration by September 9, 1987.

During the evaluation period, an event occurred in the licensee's corporate offices that involved the inadequate destruction of safeguards information which had a potential

adverse impact on the McGuire Nuclear Station Security Program. The event and resulting impact were discussed during an enforcement conference in the Region II office. The licensee initiated corrective actions which included revision of applicable procedures and retraining of personnel.

The operational capability of the security organization was enhanced by an effective training program. The effectiveness of the training and qualification program was evident in personnel performance and positive morale. The licensee has initiated efforts to computerize security training records to improve scheduling and documentation control.

Two violations were identified during this evaluation period. The level III violation listed below was considered in the previous SALP evaluation but was issued during this SALP period.

a. Severity Level III violations for failure to maintain adequate barriers for a portion of the protected area (86-03/86-03).

b. Severity Level IV violation for failure to conduct night firing and stress firing as a part of weapons requalification (86-37/86-37).

c. Severity Level IV violation for inadequate destruction of Safeguards Information at the licensee's corporate office (87-20/87-20).

2. Conclusion

Category: 2

3. Board Recommendations

No change in the NRC's inspection resources is recommended.

H. Outages

1. Analysis

During this evaluation period, inspections were performed by the resident and regional office staffs.

Three refueling outages were completed during the evaluation period - one on Unit 1 and two on Unit 2. Additionally, both units were shutdown to resolve Rotork motor operated valve operability concerns that came to light in October 1986; those outages each lasted for approximately 2-3 weeks.

The licensee's performance in the outage area continues to be satisfactory. An improvement was noted with respect to outage completion. The end-of-cycle (EOC)-3 outage completed on Unit 2 in July 1987 was scheduled for and completed in 65 days and included such major activities as upper head injection removal, steam generator shot peening, sludge lancing, eddy current testing and tube plugging and emergency diesel generator overhauls. Of the 96 significant jobs identified for the outage and nine which were added, 100 were completed. Only five were postponed due to material and/or manpower availability. Of the 58 nuclear station modifications identified for the outage, five were deleted prior to entering the outage, the rest were completed. Of the 1133 work requests identified and the 400 added, all were completed.

The 1986 refueling outage on Unit 1 entailed 100 pre-identified significant jobs, 36 jobs which were added and all of which were completed. In terms of nuclear station modifications, 67 were pre-identified, 12 were added and all were completed. There were 1134 work requests scheduled, 446 were added and all were completed. The outage was scheduled for 78 days but actually ran 122 days due to the identification of damaged fuel.

The 1987 Unit 2 refueling outage also showed evidence of improvement in the operability of work and configuration control. The unit was started up and placed on line with few significant problems that often plagued the McGuire units after previous refueling outages. One minor configuration control problem, involving manual valve position control, revealed itself during the unit power escalation; that problem was cited in the Surveillance analysis.

One significant configuration control deficiency was detected by the licensee in January 1987, when sections of six inch high curbing were found missing from both units refueling floors. The curbs, which were designed to minimize the influx of containment spray water into the containment air return fan pits, had been removed during a previous refueling outage and never replaced. The issue was considered for escalated enforcement, but was ultimately cited as a Level IV procedure violation because of the licensee's initiative in identifying and correcting the deficiency. (Refer to the Operations Analysis for further discussion.)

The licensee's inservice inspection, inservice testing and repair and restoration activities were found to be well-managed and controlled. The licensee staff involved was adequate and exhibited a good level of competence. The licensee's responses to technical issues and NRC initiatives relative to inservice

inspection was satisfactory. A weakness was noted in a licensee response. The licensee failed to take adequate corrective action on a valve testing deficiency which had been identified as a violation. The licensee was cited on the matter.

Significant damage to a Unit 1 fuel assembly was discovered following the cycle 4 refueling. Although the discovery was fortuitous, the licensee's actions in response were well-planned, prompt, and effective. This event also revealed that control of foreign material intrusion into the primary system during the outage had not been effective. This material would have gone undetected had it not been for the activities associated with the search for fuel pellets.

Post-refueling startup tests were performed with care and attention to production of quality data. Some concern was raised because the dilution rate during control rod worth measurements of 700 pcm/hr was greater than the Westinghouse recommendation of 500 pcm/hr. That recommendation was empirical and based on historical experience. Careful review of the data obtained, however, clearly demonstrated that no anomalies or errors had been introduced by the higher rate.

The following violations were identified:

a. Severity Level IV violation for inadequate procedural control of containment air return fan pit curbs (87-04/87-04).

b. Severity Level IV violation for failure to promptly identify and remove irradiated specimen access hole plugs from the core barrel support ledge prior to Unit 2 vessel reassembly (86-18, Unit 2 only).

c. Severity Level IV violation for failure to properly revise a valve test procedures to correct a deficiency previously identified in an NRC violation. (86-26/86-26)

d. Severity Level V violation for failure to maintain documented evidence to verify that certified material and calibrated equipment had been utilized for the qualification of a shot peening procedure. (86-14, Unit 1 only)

e. Severity Level V violation for failure to evaluate abnormal or erratic inservice inspection/test data for valves 1ND-34 and 1NI-332A. (86-11, Unit 1 only)

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommended.

I. Quality Programs and Administrative Controls Affecting Quality

1. Analysis

During the assessment period, inspections were performed by the resident and regional inspection staff.

For the purpose of this assessment, this area is defined as the ability of the licensee to identify and correct their own problems. It encompasses all plant activities, all plant personnel, as well as those corporate functions and personnel that provide services to the plant. The plant and corporate QA staff have responsibility for verifying quality. The rating in this area specifically denotes results for various groups in achieving quality as well as the QA staff in verifying that quality.

The regional QA staff performed one inspection during this assessment period in the area of licensee actions on previously identified NRC follow-up items. The licensee has initiated a program to reduce the number of open items. The corrective actions were complete and adequately addressed any generic implications for the items reviewed .

A review was performed on all sections of the SALP report in an attempt to capture apparent strengths and weaknesses related to management controls affecting quality. The following are some observed strengths in management controls affecting quality:

Management attention in the operations area, reducing amount of contaminated areas in the auxiliary building, and establishing corrective actions for violations and other abnormal plant events.

Management attention in resolving Rotork valve maintenance issues and implementing a system performance monitoring system.

Management attention in maintaining an effective emergency response program.

Management attention in demonstrating an ability to effectively plan and implement safeguards measures and by providing effective training for security personnel.

The following are some observed weaknesses in management controls affecting quality:

Management attention in the operations area relative to procedural compliance.

Attention in resolving EQ issues when guidance was available.

Management attention in the surveillance area relative to procedural adequacy, procedural compliance and failing to recognize and perform certain surveillance requirements.

Management attention in the engineering support area as evidenced by poor interface and communications between corporate based design engineering and the operating staff.

One violation was identified:

- Severity Level IV violation for failure to accomplish activities affecting quality such as adequate cleanliness in that two towels were discovered beneath the reactor vessel lower core plate (86-19, Unit 1 only).

2. Conclusion

Category: 2

3. Board Recommendations

No change in the NRC's inspection resources is recommended.

J. Licensing Activities

1. Analysis

The basis for this appraisal was the licensee's performance in support of licensing actions that were either completed or had a significant level of activity during the rating period. These actions consisted of amendment requests, Code relief requests, responses to generic letters, TMI items, and other actions. The number of licensing actions completed during this SALP period for both units was 99. These can be divided into three major categories. The three categories and the number of actions completed for each category are:

Plant specific actions	92
Multi-plant actions	6
TMI actions	1

The licensee continues to exhibit evidence of prior planning and assignment of priorities. Decision making appears to be at a level that ensures management review. Management maintains an awareness of generic and plant-specific safety issues and the schedule for their resolutions. Corporate management exhibited increased involvement in site activities associated with licensing areas.

The licensee needs to improve the adequacy and content of proposed technical specification amendments, including significant hazards determinations. The licensee also needs to assure that prior NRC staff approval is obtained when appropriate. Two examples in which the need for prior staff approval was not recognized regarded a 50.59 report to utilize the Equipment Staging Building and application of a rod-swap methodology.

The licensee understands the technical issues and considers carefully the impact of various NRC requests and positions on the plant. The licensee's responses are generally sound and exhibit conservatism. This resulted in efficient NRC staff reviews for changes regarding use of a portion (Region 2) of the fuel storage pool, and higher enriched fuel, and few interactions for complex issues such as use of a multielement shipping cask and plugging criteria for steam generator tubes with defects in the tubesheet region.

Duke understands well the regulatory environment and takes an active role from the safety standpoint. Duke often takes the lead or is usually an active participant in the nuclear industry activities regarding matters of generic concern.

The overall staffing to support licensing activities is adequate. The staff has good knowledge of the plant with good historical background of plant systems and program integration. Experienced individuals in the licensing staff seem to be overburdered. Licensing seems to be the training ground to newcomers who have not been exposed to the regulatory environment. The licensee's licensing staff needs to exert increased influence and control over the requests from site personnel regarding change requests to the NRC.

The licensee usually provided timely responses to NRC requests and positions, and responses were generally sound and thorough. The licensee utilized meetings with NRC staff in several complex issues when appropriate to discuss issues in detail. The licensee usually notifies the NRC if deadlines cannot be met but seldom provides sufficient information to the NRC staff to justify reordering of priorities.

The licensee's activities relating to licensing continues to be conducted in a professional and efficient manner. Their effort for the most part is well managed. No major deficiencies affecting licensing activities became apparent during the evaluation period, although Duke does need to improve on the quality of its submittals. Duke's approach to the resolution of technical issues is generally sound and conservative; and the licensee is usually responsive to NRC initiatives.

The reporting of operational events through the Licensee Event Report (LER) program at McGuire is adequate. LER submittals are made on a timely basis and contain adequate information on the event description, event evaluation and corrective actions. A recent NRC evaluation noted that the overall quality of McGuire LERs had improved compared to a previous evaluation. There was a significant improvement in the quality of discussion of safety consequences. The quality of discussion of operator actions and safety system response remained very high.

No violations or deviations were identified in this area.

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommended.

K. Training

1. Analysis

During the assessment period, there was one routine inspection conducted in the area of training at the McGuire facility, as well as numerous examinations of licensed operator candidates. Training was determined to be acceptable to support safe plant operation.

The routine unannounced inspection was conducted during the week of August 4, 1986, and revealed improvements in the licensed and non-licensed training programs. These improvements were evident by the licensee's continued effort to devote significant resources in reorganizing and consolidating training management, and in establishing and implementing a comprehensive Employee Training and Qualification System (ETQS). Detailed task analyses and field qualifications for both the licensed and non-licensed staff are progressing under the ETQS.

The inspection also identified several items of inspector concerns relating to training effectiveness. An administrative weakness was identified in that the licensee lacked both management review and established techniques for the proper regrading of annual licensed operator requalification examinations. However, in the cases reviewed, there appeared to be an adequate basis for the specific regrading. The licensee's ability to readily retrieve training records for licensed operators was considered marginal due to the various locations used for record storage. Finally, observations of the conduct of licensed operator requalification self-study sessions revealed little formality or structure. The licensee management was responsive to the NRC concerns, and prompt corrective measures were implemented to satisfactorily resolve these items. No violations or deviations were identified during the inspection.

Written, simulator, and oral operator licensing examinations were administered during the evaluation period. Initial licensing examinations were given to fourteen senior reactor operator (SRO) candidates and fifteen reactor operator (RO) candidates; eleven senior reactor and eleven reactor operator candidates passed their initial examinations. Two of the senior reactor operator and one of the reactor operator candidates who failed the initial examination were administered retake examinations during the SALP evaluation period, with all passing. Greater detail regarding the results of licensed operator examinations administered during the SALP evaluation period are provided in the table below. The results indicate a 76% pass rate for initial examinations of licensed operators, comparable to the licensee's pass rate of 75% during the previous SALP period for initial examinations.

	SRO Candidates		RO Candidates	
	Pass	Fail	Pass	Fail
March 1986	8	2	3	3
Dec. 1986	5*	1	9**	1

*includes two retakes
**includes one retake

No violations or deviations were identified in this area.

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommended.

L. Engineering Support

Engineering support is a new SALP functional area which encompasses corporate design engineering (D/E) and on site support relative to plant design, testing and analysis of identified problems. This evaluation is based on routine and special inspections conducted by resident and regional personnel in this as well as related functional areas. The licensee has a capable corporate based D/E group with the expertise to conduct thorough analyses. On occasion, D/E evaluations of problems identified at McGuire were not timely nor did they contain the detail expected. Some of this can be credited to the difficulty in recognizing the operational aspects of the identified problems. The overriding concern, however, is related to poor coordination between D/E and the McGuire staff. The licensee is improving in this regard.

It should be noted that after the identification of a nuclear service water heat-exchanger fouling problem, the onsite engineering support group formulated and implemented an impressive and effective periodic test and maintenance program to prevent future associated equipment degradation.

There has also been evidence to indicate that D/E input into the McGuire nuclear station modification process was somewhat deficient with respect to total scope delineation, test acceptance criteria inclusion, and a lack of D/E - field interface prior to, during and after implementation.

The ability for the plant staff and headquarters staff to cooperate was evidenced during the AIT inspection concerning the failed reactor trip breaker. This cooperation led to an enhanced inspection procedure for the breaker well in advance of the final cause of the problem being determined at the vendor's facility.

The licensee's own reviews, appears to have recognized the weaknesses described above. Proposed corrective actions were presented to Region II management on March 6, 1987. These improvements include a system engineer concept and the implementation of a D/E program called TOPFORM. The goals of the TOPFORM program are to provide improved support and interface with site personnel, strengthen the modification process, improved and more formalized design interface and improved documentation. A review of the proposed actions indicates the potential for significant improvement.

No violations or deviations were identified in this area.

2. Conclusion

Category: 2

3. Board Recommendation

No change in the NRC's inspection resources is recommended.

V. SUPPORTING DATA AND SUMMARIES

A. Licensee Activities

During the assessment period major activities included normal power operations, one refueling outage on unit one, and two refueling outages on unit two. Both units were also shutdown in October 1986 for a motor operated valve maintenance outage. Major activities accomplished during the outages are listed below:

Unit 1

- Steam Generator Eddy Current Testing, Tube Plugging and Tube Peening
- Fuel Pellet Recovery
- Low Pressure Rotor Change Out
- Generator Rotor Swap

The unit ended the assessment period conducting normal power operations.

Unit 2

3/86 Outage
- Steam Generator Eddy Current Testing
- Pressurizer Heater Replacement
- Equipment Qualification Modifications
- Reactor Vessel Internals Repairs
- Steam Generator Row 1 Tubes Plugged
- Generator Rotor Replacement

5/87 Outage
- Steam Generator Eddy Current Testing, Shot Peening and Tube Plugging
- Upper Head Injection Removal
- Digital Electro - Hydraulic Control System Replacement
- Diesel Generator Overhaul
- Main Control Board Modifications

The unit ended the assessment period conducting normal power operations.

B. Inspection Activities

During the assessment period, routine inspections were performed at the McGuire facility by the resident inspectors and the regional inspection staff. Special inspections were conducted to augment the routine inspection program as follows:

June 3-5, 1986, an onsite inspection of external exposure control.

June 28 - August 1, 1986, an inspection to evaluate implementation of a program for establishing and maintaining the qualification of electric equipment important to safety.

January 12-16, 1987, an inspection to accompany the NRC Regulatory Effectiveness Review Team.

December 30, 1986 - February 10, 1987, an inspection conducted in the area of operations.

February 18-20, 1987, an inspection at the licensees general office and at McGuire in the area of Three Mile Island action items.

March 16-20, 1987, an evaluation of licensee responses and corrective actions on items identified during the Emergency Response Facilities Appraisal conducted in September 1985.

March 16-20, 1987, an assessment of compliance with Generic Letter 83-28.

July 7-10 and July 29-30, 1987, an augmented inspection conducted to investigate the reactor trip breaker failure at McGuire.

C. Investigation and Allegation Review

No major investigative activities occurred during this assessment period.

D. Escalated Enforcement Actions

1. Civil Penalties

a. Volume Control Tank - Motor Operated Valves Inoperable, Severity Level III violation, $50,000 CP issued June 2, 1986

b. Nuclear Service Water System, Severity Level III violation, $50,000 CP issued March 6, 1987

2. No Civil Penalties Issued

   a. Access Control - Manholes/Drains, Severity Level III issued March 10, 1986

3. Enforcement Conferences

   10-10-86 MOV Design/LCO
   12-08-86 Nuclear Service Water System
   04-16-87 Containment Recirculation Cofferdams
   06-01-87 Improper Disposal of Safeguards Information (Corporate Offices)

E. Licensee Conferences Held During Appraisal Period

1. NRC and licensee management met at the site on December 11, 1986, to discuss back to back level 3 SALP ratings in operations.

2. NRC and licensee management met in the RII office on March 6, 1987, to discuss recent events and enforcement issues.

3. NRC and licensee management met at the site on April 22, 1987, to discuss improvements in operations.

F. Licensee Event Report Analysis

1. During the assessment period, 47 LERs for Unit 1 and 2 were analyzed. The distribution of these events by cause, as determined by the NRC staff, was as follows:

Cause	Unit 1	Unit 2	Total
Component Failure	7	6	13
Design	3	1	4
Construction, Fabrication, or Installation	3	0	3
Personnel			
-Operating Activity	0	3	3
-Maintenance Activity	0	3	3
-Test/Calibration Activity	5	4	9
-Other	4	3	7
Out of Calibration	0	0	0
Other	2	3	5
TOTAL	24	23	47

G. Licensing Activities

The assessment of licensing activities was based on licensing actions which included the following:

- NUREG 0737 II.K.3.31 Small Break LOCA Analyses
- Item 2.1 Equip Class and Vendor Interface - RTS Component
- Wood Disposal
- DG Testing and Reliability (GL 84-15)
- Replacement and Requalification Operator Training Program
- MSLB in Doghouse
- Pressurized Thermal Shock
- Electray Supports Fire Proofing
- Relief from Hydro Test for SI Check Valve Replacement
- Rod Swap Methodology
- 10 CFR 50.59 on Equipment Staging Building
- Relief from Hydro Test for UHI Capping
- Leak Before Break (GL 84-04)
- Appendix J Exemption on Glycol Valves
- Intermediate High Energy Breaks
- Rod Worth Deviation Unit 2 Cycle 3
- Item 4.5.2 RTS On-line Testing
- Unit 1 License Amendments 51 through 73
- Unit 2 License Amendments 32 through 54

Significant amendments included:

- UHI Removal
- SG Tube Plugging in Tubesheet Region
- Multielement Shipping Casks
- License Extensions
- Increased Outage times for RTS Analog Channels
- DG Testing and Surveillance TS
- Correct Allowed Operating RCS Loops and CPCS logic in TS
- Reloads (U1-C4 and U2-C4)
- Discharge of Wastewater with Tritium to River
- Maximum Fuel Enrichment
- Restoration of Boron Concentration in Accumulator

Three discretionary enforcement actions were granted to the licensee during the rating period.

Meetings with the licensee and/or site visits occurred during the assessment period to discuss and work toward the resolution of various technical issues and planned changes. These included the following:

- Hydrogen Control and NSWS Testing
- SG Tube Shot Peening Plans
- Electray Fire Performance

- SG Tube Plugging
- Baffle Jetting of Fuel
- Operating Events Resulting from Procedures
- RTD Bypass Elimination
- Use of B&W Reload Fuel
- SPDS Followup
- Groundwater Monitoring and Control
- RG 1.97 SG Water Level Instrumentation

H. Enforcement Activity

1. Violations vs. Functional Areas

FACILITY SUMMARY

UNITS / FUNCTIONAL AREA	SEVERITY LEVELS D 1/2	V 1/2	IV 1/2	III 1/2	II 1/2	I 1/2
A. Plant Operations		3/2	5/2	2/1		
B. Radiological Controls		2/2	6/6			
C. Maintenance		1/1	1/0			
D. Surveillance			3/6			
E. Fire Protection	1/0					
F. Emergency Preparedness			1/1			
G. Security			2/2	1/1		
H. Outages		2/0	2/3			
I. Quality Programs and Administrative Control Affecting Quality			1/0			
J. Licensing Activities						
K. Training						
L. Engineering Support						
TOTALS	1/0	8/5	21/20	3/2		

I. Reactor Trips

Unit 1

Four unplanned reactor trips and four unplanned manual shutdowns occurred during this evaluation period. The unplanned trips are listed below:

1. On March 25, 1986, the unit tripped from 100 percent power when CF-30, a main feedwater isolation valve, failed closed causing a loss of feed to the "B" steam generator and a low-low level trip. The unit was restored to service the following day.

2. On September 24, 1986, the unit tripped from 100 percent power when a malfunction in the digital electro-hydraulic (DEH) control system caused all four turbine governor valves to close. The rapid loss of load caused primary system temperature and pressure to increase, resulting in a reactor trip on high pressurizer pressure. The plants response was normal, and the unit was returned to service on September 25.

3. On February 18, 1987, the unit tripped from 100 percent power when the "Y" phase surge protection on the "C" reactor coolant pump (RCP) motor failed causing a loss of power to the RCP. All systems functioned normally and the reactor was restarted on February 20.

4. On April 15, 1987, the reactor tripped from 100 percent power when testing of the turbine auto stop oil pressure switches caused an erroneous turbine trip signal. All systems functioned normally. The reactor was restarted on April 16, 1987.

Unit 2

Five unplanned reactor trips and two unplanned manual shutdowns occurred during this evaluation period. The unplanned trips are listed below:

1. On July 22, 1986, the unit tripped from 92 percent power when a DEH malfunction caused the turbine governor valves to shut. The rapid loss of load caused primary system temperature and pressure to increase, resulting in a reactor trip on high pressurizer pressure. The unit returned to service the following day.

2. On August 12, 1986, the unit tripped from 100 percent power when the supply breaker to a vital DC bus was inadvertently opened (personnel error) resulting in a main feedwater (CF) and main steam isolation. The CF pumps tripped on high discharge pressure causing a turbine trip which, in turn, caused a reactor trip. Some loss of indication and equipment malfunction occurred due to the loss of power but the plant was quickly stabilized when power was restarted. The reactor was restarted the following day.

3. On August 27, 1986, the reactor was manually tripped from 100 percent power when CF-26, the "D" steam generator (SG) feedwater containment isolation valve, failed closed. The reactor was restarted the following day.

4. On November 20, 1986, the reactor tripped from 100 percent power when the 6900 volt switchgear supplying power to the "A" RCP was inadvertantly deenergized. The unit was restarted the following day.

5. On January 20, 1987, the reactor tripped from 100 percent power in response to a turbine trip. The turbine trip was caused by a Spurious hotwell emergency low level signal which tripped the hotwell pumps, condensate booster pumps and main feedwater pumps in sequence. The primary systems responded normally, but portions of the secondary system (feed and condensate) suffered water hammer transients and mechanical damage. Affected secondary components were inspected and repaired and the unit was restarted on January 24, with power limited to 58 percent until repairs to the "A" CF pump could be completed.

J. Effluent Summary for McGuire Nuclear Station

	1984	1985	1986
Gaseous Effluents (curies)			
Fission and Activation Gases	4.56E+3 (1.06E+4)	3.86E+3 9.37E+3)	2.10E+3 (8.04E+3)
Iodine and Particulates	2.48E-2 (9.56E-2)	2.58E-2 (9.62E-2)	7.18E-2 (4.60E-2)
Liquid Effluents (curies)			
Fission and Activation Products	3.02E+0 (3.27E+0)	1.24E+0 (2.59E+0)	1.56E+0 (2.11E+0)
Tritium	6.66E+2 (7.23E+2)	8.04 E+2 (7.35E+2)	9.16E+2 (7.42E+2)

Values in parenthesis are Region II averages for PWRs.
Values are expressed in curies.

Dose Offsite (mrem)			
Maximum Whole Body	4.14E+0	1.65E+0	1.04E+0
Maximum Skin	4.47E+0	3.92E+0	2.00E+0