ENCLOSURE

INITIAL SALP REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBERS

50-413/92-10 AND 50-414/92-10

DUKE POWER COMPANY

CATAWBA UNITS 1 AND 2

FEBRUARY 3, 1991 THROUGH MAY 2, 1992

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I. INTRODUCTION

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 on the basis of this information. The program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide rational basis for allocation of NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC's assessment of their facility's performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on June 11, 1992, to review the observations and data on performance, and to assess licensee performance in accordance with the guidance in NRC Manual Chapter NRC-0516, "Systematic Assessment of Licensee Performance". The Board's findings and recommendations were forwarded to the NRC Regional Administrator for approval and issuance.

This report is the NRC's assessment of the licensee's safety performance at the Catawba Units 1 and 2 for the period February 3, 1991, through May 2, 1992.

The SALP Board for Catawba was composed of:

L. A. Reyes, Director, Division of Reactor Projects (DRP), Region II (RII), (Chairman)
E. W. Merschoff, Deputy Director, Division of Reactor Safety (DRS), RII
B. S. Mallett, Deputy Director, Division of Radiation Safety and Safeguards, RII
A. R. Herdt, Chief, Reactor Projects Branch 3, DRP, RII
D. B. Matthews, Director, Project Directorate II-3, Office of Nuclear Reactor Regulation (NRR)
R. E. Martin, Senior Project Manager, Project Directorate II-3, NRR
W. T. Orders, Senior Resident Inspector, Catawba, DRP, RII

Attendees at SALP Board Meeting:

G. A. Belisle, Chief, Reactor Projects Section 3A, DRP, RII
W. H. Miller, Jr., Project Engineer, Reactor Projects Section 3A, DRP, RII
P. C. Hopkins, Resident Inspector, Catawba, DRP, RII
J. Zeiler, Resident Inspector, Catawba, DRP, RII

II. SUMMARY OF RESULTS

During this assessment period, Catawba was operated in a safe manner. Operator performance during routine evolutions was good. Deficiencies were identified during outages and complex maintenance activities. Corrective actions are in process to resolve these deficiencies.

The performance in the Radiological Control area is superior. The ALARA program is effective and resulted in dose reduction. The radiological effluent and chemistry control programs remain effectively implemented.

Maintenance/Surveillance activities were good. Strengths were noted in staffing levels, training and personnel qualifications. Instances of failure to follow procedures and configuration control deficiencies were noted. Surveillance activities were effectively scheduled.

Management has supported emergency preparedness and has good emergency response capabilities. Performance in this area remains superior. During annual exercises, the emergency organizations were staffed in a timely manner. Exercise weaknesses were effectively corrected.

Performance in the Security area remains superior. Technicians were assigned to the security staff to assure that malfunctioning equipment could be rapidly repaired. The security staff remains effectively staffed, equipped and trained.

Performance in the Engineering and Technical Support area was effective. Safety system availability has increased. Numerous Design Basis Documentations were completed and a self initiated electrical distribution inspection was performed. Weaknesses were identified in the licensed operator requalification program.

Performance in the Safety Assessment/Quality Verification area was good. Submittals for NRC review were well prepared and accurate. Responses to generic issues were high quality. Configuration control issues continue to be of concern.

Overview

Performance ratings assigned for the last rating period and the current period are shown below.

Functional Area	Rating Last Period 11/01/89 - 2/02/91	Rating This Period 2/03/91 - 5/02/92
Plant Operations	2	2
Radiological Controls	2	1
Maintenance/Surveillance	2	2
Emergency Preparedness	1	1
Security and Safeguards	1	1
Engineering/Technical Support	2(Improving)	2
Safety Assessment/ Quality Verification	2	2

III. CRITERIA

The evaluation criteria which were used to assess each functional area are described in detail in NRC Manual Chapter MC-0516, which can be found in the Public Document Room files. Therefore, these criteria are not repeated here, but will be presented in detail at the public meeting to be held with licensee management.

IV. PERFORMANCE ANALYSIS

A. Plant Operations:

1. Analysis

This functional area addresses the control and performance of activities directly related to operating the facility including fire protection.

Overall operator performance during routine power operations including startups, power changes, and unit shutdowns was good although there was one incident noted early in the assessment period where an operator was inattentive to plant status and allowed steam generator level to increase to the point that an Engineered Safety Features (ESF) actuation occurred.

The operators responded effectively to reactor trips and other unanticipated events, utilizing appropriate emergency and abnormal plant procedures. These procedures were recently revised to incorporate various human factor improvements. Numerous operator performance deficiencies in

using the emergency procedures were identified during the NRC Requalification Program evaluations conducted this assessment period. These deficiencies indicate operator weaknesses in using infrequently performed procedures and performing infrequent evolutions.

Operator performance deficiencies were also noted during outages and complex maintenance activities. Incidents of inattention to detail, procedure non-compliance, shift personnel mis-communication, and mis-coordination of shift activities were noted. This resulted in numerous plant configuration control problems involving mis-positioned breakers and valves, some of which resulted in the plant entering the shutdown action requirements of the Technical Specifications. This requires initiating action within required time frames when a Limiting Condition for Operation cannot be met. One configuration control example involved operating a centrifugal charging pump without a suction source, and another involved operating the Nuclear Service Water (RN) system without adequate minimum flow protection.

Configuration control incidents during the Unit 1 refueling outage, between March and June 1991, included two failures to realign emergency power supplies for unit shared equipment prior to removing diesel generators from service, improper valve alignment for a diesel generator cooling water system, and conducting fuel movement with a containment penetration open.

An NRC management meeting was held in July 1991 to discuss these incidents and the licensee's corrective actions. The licensee identified a number of areas needing improvement including; the Tagout Removal and Restoration process, fire protection controls, inconsistencies in operator training, excess operations workload, and control room access controls. A lower tier problem identification program was initiated to track, trend, and correct problems that were below the original problem identification threshold. In addition, the Reverse the Trend (RTT) task force was formed to identify problems, determine root causes, develop corrective action plans, and trend performance. Based on RTT findings, several fire protection weaknesses were corrected. Results of other RTT initiatives for resolving configuration control problems were not as evident, but were viewed to be beneficial to long term performance.

Operator procedure compliance, independent verification deviations, inattention to detail, and mis-communication continued during the Unit 2 outage from October 1991 to January 1992 and resulted in a number of mis-positioned valves and breakers, as well as other configuration control

problems. Examples included an incorrect breaker alignment in the control room ventilation system resulting in the system being inoperable, a mis-positioned valve in the Safety Injection (NI) system resulting in an NI pump experiencing runout flow and three mis-positionings of containment penetrations.

At the end of the assessment period, significant management attention was devoted to improving human performance, including utilizing a "Total Quality Management" approach to emphasize employee involvement. Operations established the Continuous Improvement Action (CIA) group to continue the activities started previously by the RTT. In addition, a multi-disciplinary group called the Component Mispositioning Team was established to devote specific attention to improve equipment configuration control.

Similar configuration control deficiencies were noted in the previous SALP period. Although considerable management attention and involvement in correcting these problems was evident toward the latter part of this assessment period, the results of those efforts have yet to be realized.

Operator professionalism in the control room remained well established. The department continued to staff five operating crews, each working 12 hour shifts. Operating crews were consistently staffed with one or more supplemental senior reactor operators (SROs) and reactor operators (ROs) allowing for additional shift flexibility and less dependence on overtime.

Strong support for operations from other departments was evident and available when needed. "Tailgate" meetings held with operations personnel prior to performing major testing or involved evolutions continued to be effective. The use of tailgate meetings was expanded to include less significant plant activities further enhancing operator awareness.

Management continued to focus attention on and provide support for safe operation of the plant. For example, enhancements for controlling mid-loop conditions involved increased SRO staffing, procedural enhancements and controls, detailed shift briefings prior to entering mid-loop operations, and the addition of ultrasonic level indication to enhance the operator's ability to monitor Reactor Coolant System level.

Plant housekeeping has improved since the previous assessment period as evidenced by a reduction in the number

of instances identified in which debris was detected in less frequented locations.

In the previous assessment period, programmatic weaknesses were noted regarding the control of plant drawings. A particular concern was raised involving the assurance that control room drawings reflect the as-built plant configuration after plant modifications are completed. The corrective action implemented was effective in precluding similar problems this assessment period.

Unit 1 had four automatic reactor trips and Unit 2 had two automatic reactor trips during the assessment period. All but one of the trips were the result of equipment failures. There were no reactor trips caused by operator error.

The fire protection program was well implemented with adequate procedures. Early in the assessment period, system impairments were not always corrected in a timely manner nor were appropriate compensatory measures consistently established for degraded conditions. Toward the latter part of the assessment period several program improvements were implemented. These improvements included appointing a fire protection specialist to coordinate and implement the fire protection program and assigning a non-licensed operator as fire protection console equipment operator. The fire brigade was well trained and equipped and performed satisfactorily during drills. A secondary fire brigade composed of maintenance and other personnel is considered a program strength. The required fire protection program audits performed by the licensee were comprehensive and thorough and corrective action on audit identified problems were promptly corrected. Surveillance and maintenance of the fire protection features and systems were adequate.

Ten violations were cited.

2. Performance Rating:

   Category: 2

3. Recommendations

   While improvements have been noted in the areas of configuration control and operator performance, the Board recommends continued management attention to these areas.

B. Radiological Controls

1. Analysis

This functional area addresses those activities related to radiation safety and primary/secondary chemistry control.

Overall, the radiation protection program continued to adequately control personnel exposure to radioactive materials and protect the health and safety of the plant personnel and the public.

Management oversight and support were noted to be effective during the SALP period. For example, the licensee's internal audit program was considered a strength with regard to scope and planning. Also, management supported upgrades of equipment and procedures to improve radiation protection. Management responded quickly to a hot particle incident occurring on April 1, 1992, providing additional training in basic radiation protection as corrective action.

The licensee continued to encourage and implement ALARA concepts effectively for major outage tasks. These efforts resulted in a dose reduction this assessment period. For example, dose reduction was realized due to extended reactor water cleanup times, improved training, increased shielding, and improved preventive maintenance of equipment. Although the ALARA program has accomplished dose reduction for major tasks, the licensee did experience problems with completing and documenting ALARA procedures for maintenance activities.

The licensee's health physics staff was considered adequate with a strong base of experience within the radiation protection area. An ample supply of radiation protection contractor personnel was available to support the refueling outages.

During the assessment period, examples of lack of attention to detail and inadequate procedures were noted. Examples included; failure to have an adequate procedure for RWP preparation, failure to evaluate internal exposure properly, failure to post and label containers in the RCA properly, failure to complete breathing air surveillances, and failure to evaluate noble gas surveys.

The licensee exhibited good planning for dose goals for major outage tasks and maintained doses well below the goals. One exception occurred when the licensee performed inadequate work area radiation surveys prior to performing a reactor coolant system valve maintenance procedure. The

licensee continued to have actual doses less than their total collective dose goals.

The licensee was aggressive in reducing personnel contamination events (PCEs) from 1991 through May 1992. The lower number of PCEs was attributed to improvements in training, increases in experience within work crews, and installation of small article monitors at exits to the RCAs. The licensee continued to maintain contaminated square footage to less than one percent. During the assessment period, contaminated square footage averaged 7,400 square feet in a total controllable area of 156,000 square feet. Housekeeping and cleanliness, and controlling leaks were considered program strengths contributing to maintenance of low contaminated areas.

The licensee's radiological effluent control program was effectively implemented. The total activity released in liquid effluents decreased during 1991 due to improvements in radwaste processing. The doses from the liquid and gaseous effluent were a small percentage of their respective limits.

The licensee's chemistry control program was also effectively implemented. The elemental chemistry parameters to be monitored were maintained well below their TS limits. The Dose Equivalent Iodine (DEI) was also well below the TS limit which indicated that the integrity of the fuel cladding had been adequately maintained.

Good performance was demonstrated by the licensee during intercomparison of radiological measurements with the NRC's mobile laboratory. Agreement was achieved on each of the 84 comparisons made of radionuclide concentrations in various matrices.

During the last assessment period, operability problems were noted with the post accident sampling systems and some process/effluent monitors. Good progress was made in improving the operability of the post accident sampling systems. A new liquid sampling system was installed during the fall of 1991. The liquid and gaseous sampling systems were both brought to operational status and performed satisfactorily. Licensee actions to date have not restored operability to all the process/effluent monitors.

The licensee's environmental monitoring program was effectively implemented. The program results for 1991 indicated that there were no significant radiological impact on the health and safety of the general public resulting from plant operations. Dose estimates calculated from

environmental monitoring program data were in reasonable agreement with dose estimates calculated from effluent release data and were well within 40 CFR 190 dose limits. The licensee's performance in the Environmental Protection Agency's interlaboratory crosscheck program indicated that an effective quality assurance program had been maintained for analysis of environmental samples.

The licensee's program for shipping and transportation was effectively implemented. The program provided for preparation of radioactive material for shipment and preparation of shipping papers pursuant to Department of Transportation regulations.

Two violations were cited.

2. Performance Rating:

Category: 1

3. Recommendations

None

C. Maintenance/Surveillance

1. Analysis

This functional area addresses those activities related to equipment condition, maintenance, and surveillance testing. An Electrical Distribution Safety Function Inspection (EDSFI) was conducted late in the assessment period.

Maintenance performance was good throughout the report period although there were a number of examples in which personnel failed to follow written procedures in the performance of their activities. One example involved technicians manipulating the incorrect switch during the performance of a nuclear instrument calibration, while another involved technicians incorrectly adjusting the limit switches on a motor operated valve actuator causing the valve to not operate.

There were also a number of examples where plant equipment configuration control was compromised. One example involved technicians covering safety-related ventilation return air ducts with tape and another involved an inadvertent safety system actuation when technicians inappropriately terminated an electrical jumper.

In general, periodic surveillance activities were effectively scheduled and implemented employing plant computers to plan not only testing, but preventive maintenance, and equipment rotation as well. There were some surveillances which were improperly scheduled/performed including several instances when the vital batteries were removed from service and tested at the wrong time. Another example involved an instance in which a valve stroke test was aborted but was not properly rescheduled.

The Inservice Inspection (ISI) and Inservice Test (IST) programs were effectively implemented with strengths noted in the areas of personnel qualification, containment leak rate testing techniques, and containment isolation valve trending. One example of inadequate containment integrity verification occurred regarding a failure to establish/maintain the upper-lower containment divider barrier on Unit 1.

To improve maintenance and surveillance activities coordination, a computerized work management system (WMS) was implemented to improve equipment/component data, work request origination, maintenance history, and work request tracking. Also, the process for scheduling periodic maintenance activities was reviewed resulting in a number of recommendations designed to prevent missed surveillances, eliminate inconsistencies between the mechanical and instrument/electrical disciplines, and to eliminate duplication of efforts. These initiatives resulted in more expeditious responses to requests for maintenance and better coordination of maintenance activities with operations personnel.

The material condition of the plant has improved this assessment period. A decline in the number of incidents where debris was detected in less frequented locations and an overall enhancement in the general appearance of the plant and equipment was noted. Equipment is well labeled.

Strengths were noted in the areas of maintenance staffing, training, and qualification. Maintenance training capabilities have been enhanced by the addition of the on-site Interim Advanced Training facility which provides the opportunity to utilize mockups, laboratory control loops and controlled testing environments to provide hands-on training.

The maintenance and surveillance organization is staffed with a motivated, professional, and knowledgeable workforce and has a low turnover rate. The functional assignments of the staff encourages system and component expertise and

promotes ownership of the equipment. This has resulted in examples of enhanced tooling and the use of innovative techniques in dealing with unusual maintenance problems and expedited procedure development, validation and review.

In the latter part of the assessment period, a Work Improvement Steering Team comprised of maintenance managers and their peers was formed to provide oversight relative to determining site priorities and resources. The team is currently involved in work control center enhancements, work request backlog reduction, identification of work management techniques, work coordination improvements, ALARA planning improvements and modification process improvements.

A number of initiatives were implemented including vibration monitoring of newly purchased or rebuilt motors, team training for craft crews and planners, maintenance participation in component mis-positioning teams, and a more formal maintenance management observation program.

During the latter part of the SALP period, both units ran well for long durations. Collectively, the units experienced five automatic reactor trips due to equipment failure.

Fourteen violations were cited. Eight of these violations were the result of the Maintenance Team Inspection which was conducted in the previous SALP period.

2. Performance Rating:

Category: 2

3. Recommendations

None

D. Emergency Preparedness:

1. Analysis

This area addresses those activities related to the Emergency Plan, support for and training of emergency response organizations both on and offsite, and licensee performance during emergency exercises and actual events.

Good management support for emergency preparedness was evident throughout the period. Program strengths included: 1) a strong management commitment for emergency preparedness staffing as evidenced by additional staff provided on site this assessment period; 2) good facilities and equipment; 3)

a well established program organization and management control system; 4) an effective emergency response training program; 5) a comprehensive independent audit function; and 6) an experienced and well qualified staff. The licensee also effectively addressed all inspection findings through use of a thorough corrective action program as well as a comprehensive open issues tracking system.

The licensee continued to build on a good emergency response capability this assessment period through several self initiated program enhancements over and above the annual exercise requirement. The licensee conducted numerous simulator driven station drills, two contamination injury drills, and one unannounced off-hours staff augmentation drill in order to maintain a heightened state of overall response readiness. Other licensee initiatives during the assessment period included upgrades in the siren system to include new software for improved silent tests and monitoring, a reorganized and improved Operational Support Center, use of mockups for actual team training on emergency repairs during drills, and emergency communication improvements such as the auto dial-out system.

Two graded exercises were held during the assessment period. Overall, the licensee's performance during the exercises was excellent. The licensee met the exercise objectives, demonstrated a capacity to protect the public health and safety in the event of a radiological emergency, and demonstrated the ability to staff the emergency organization in a timely manner. The licensee experienced some problems in the medical portion of the 1991 exercise including untimely notification of the State/local agencies and inadequate health physics practices and first aid response techniques. The licensee also had some problems in following procedures and with inadequate notification messages during the 1992 exercise. Prior to the end of the assessment period, the licensee had corrected the medical drill problems and was pursing correction of the items from the 1992 exercise.

The licensee submitted three Emergency Plan revisions which were reviewed during the assessment period. Two were determined to not decrease the effectiveness of the plan and were approved as submitted. One submittal containing Emergency Action Levels (EALs) was deemed a decrease in several specific EAL areas. The licensee promptly corrected the EALs as needed.

The licensee has been aggressive in correcting offsite concerns identified during exercises. During this assessment period, the licensee completed corrective actions

offsite in response to FEMA deficiencies identified during the previous assessment period. These involved training of school administrative personnel as well as a call back system for school bus drivers. During the March 1992 exercise, an offsite deficiency was identified for failure of a siren system to operate and no Emergency Broadcast System message. The deficiency was corrected and the system redemonstrated successfully later in the same exercise and is now closed.

During the assessment period, the licensee did not experience conditions which warranted an emergency declaration.

Three exercise weaknesses were identified.

2. Performance Rating:

Category: 1

3. Recommendations

None

E. Security

1. Analysis

This functional area addresses those security activities related to protection of vital plant systems and equipment, and Fitness for Duty.

During this assessment period, the licensee implemented and managed an effective security program. Security management at both the site and corporate level was experienced and highly visible in the program activities. Support was indicated by the implementation of numerous program improvements. Examples of these improvements included enhanced alarm assessment capabilities, and improving access control with new search and badging equipment.

A corporate reorganization has resulted in an engineer being assigned to the station to work with the security organization on security related modifications. Also a security specialist has been reassigned to the station's Compliance staff. Three instrumentation and electrical (IAE) technicians have been assigned to security. The technicians report to Security and are directed by security. The assignment of these technicians and development of an independent Work Request System allows malfunctioning

security equipment to be prioritized by security and repaired quickly, thus reducing compensatory requirements.

During this SALP period, the licensee purchased a new digital picture badge system that stores all necessary access information and individual pictures within the system's computer. This data can be electronically transferred to the other licensee's facilities. The licensee installed new upgraded metal detectors and improved X-ray equipment at the protected area access portals. Printers at the Badging Office have been replaced with video monitors which allow officers to view badge transactions without leaving the issue window which allows for more efficient badge issuance. A terminal has also been placed in the Badging Office which allows officers to input transactions, thus reducing demands on the CAS/SAS operators, increasing operator efficiency and expediting badge transactions.

Other areas of the licensee's security program were enhanced during this period. There were improvements made in upgrading protected and vital area barriers. Upgrades included: repositioning some sectors of the protected area fence; installing additional intrusion detection equipment; and repositioning, realigning and installing additional closed circuit television equipment. The licensee initiated a program to replace their older tube cameras with solid state cameras. This effort is part of an ongoing action to improve the marginal picture quality of the closed circuit television cameras.

The security force was professionally and effectively staffed, equipped, and trained to perform their assigned duties. Observation of Security Officers during firearm requalifications demonstrated their familiarization and proficiency with their weapons. The security training staff was dedicated, knowledgeable and motivated. The licensee had initiated several programs that have enhanced the security force's professionalism. The most effective items included: implementing a new Physical Performance Test Battery for security officers; developing a new shift rotation schedule suggested by security officers ; conducting frequent and regular meetings by security management with each shift/team; reviewing draft security procedure revisions by security force personnel for clarity; and training selected security personnel as hostage negotiators.

The licensee's Physical Security, Contingency, and Training and Qualification Plan revisions submitted during this period were consistent with 10 CFR 50.54(p), timely and

adequately coordinated with NRC. The licensee's staff coordinating plan revisions and technical specification changes were generally knowledgeable of regulatory requirements. In one instance, the NRC identified that prior to this SALP period, the licensee's General Office administratively amended a revision to its Security Plan, thus resulting in a commitment which was not being complied with at the site.

One violation was cited.

2. Performance Rating:

Category: 1

3. Recommendations

None

F. Engineering/Technical Support

1. Analysis

This functional area addresses those activities associated with engineering and technical support including plant modification design, operations, outages, maintenance, testing and surveillance, procurement, and operator training.

Overall, engineering and technical support has been effective during the assessment period. The Catawba Engineering Division (CED) has undergone significant reorganization with additional emphasis being placed on systems engineering support. The Design Engineering group has been moved to the site.

The Design Basis Documentation program completed 4 plant level and 15 system level reviews. The program was effective in identifying design deficiencies. Examples include; the Auxiliary Feedwater System flow optimization circuitry did not meet the single failure criteria, the DG fuel oil level instrumentation was not being calibrated correctly, and the Main Steam PORV nitrogen pressure setpoint was not documented. These problems were corrected.

To improve the availability of safety systems, system expert teams were formed with personnel from Maintenance, Operations, Systems Engineering, and Design Engineering. These teams addressed needed improvements in controlling preventive and corrective maintenance, modifications and

testing. This approach increased AFW availability for both units.

As discussed in the Operations section, tailgate briefings are conducted prior to testing. As part of these briefings, engineering generates a tailgate document. This tailgate document proved effective by preventing damage to a safety injection pump that had a runout condition due to a valve misalignment. The test engineer recognized that the pump flowrate exceeded the testing limits established by the tailgate document and immediately ordered the pump tripped.

The EDSFI concluded that offsite power was flexible and reliable and that the electrical distribution system was in general compliance with reference documents. However, weaknesses with engineering calculations and analysis and breaker coordination studies were identified. Component Engineering provided effective daily maintenance support, trending, and long term program development for the Electrical Distribution System (EDS). A testing program for molded case circuit breakers and a Class 1E breaker performance database was implemented which has enhanced the reliability of the EDS. A strong knowledge level of the EDS was demonstrated by the engineers. Operations Engineers provided effective support for daily operations and outage planning.

An on-site root cause training program was initiated for engineering and other station personnel. This resulted in improved root cause analysis and corrective actions for identified problems. An example involved the pneumatic control system for the DGs which was identified as a significant contributor to DG failures and was replaced with an electric control system. The number of DG failures was substantially reduced.

Design engineering significantly contributed to plant operations by generating well founded calculations to support using reverse leakrate testing on isolation valves. Engineering effectively performed reviews of high-energy piping for erosion using the EPRI Chec and Checmate computer programs to identify sample points. As a result, AFW piping on all four S/Gs was found to be significantly eroded and was replaced. However, Design Engineering has not yet fully resolved the challenges posed by the inherent design weaknesses in the Control Room Ventilation and Service Water systems.

Steam Generators received appropriate level of attention due to high tube degradation rates. Significant actions included; 100 percent eddy current testing, the pulling and

evaluation of tubes to improve the understanding of the degradation mode, and the plugging and sleeving of tube defects. The licensee has also decided to replace the moisture separator reheater tube bundles with stainless steel tubes to eliminate a source of copper believed to accelerate the tube degradation process.

The trending and predictive maintenance program was effective in identifying several problems prior to failure. Examples were replacement of a Nuclear Service Water pump motor and AFW pump bearings, and a reactor trip breaker undervoltage coil. Identified problems included circuit breaker tripping characteristics and motor starter failures. The circuit breaker tripping led to identification of a manufacturing defect in contact carriers that had industry wide application.

The licensee implemented several measures to reduce shutdown risk. These include nitrogen assisted draining of the steam generators, vacuum refill of the reactor coolant system, and installation of an ultrasonic reactor coolant system water level measurement system. Also, the preventive maintenance program was revised to increase availability of electrical and heat removal systems during refueling periods.

The licensee completed installation of Digital Feedwater and Digital Turbine Control systems to improve plant response to plant transients and instrumentation failures. This is expected to result in fewer challenges to plant safety systems.

The Inservice Inspection (ISI) program and inspections are managed and conducted by the corporate ISI organization, which is a part of the Quality Assurance Organization. The corporate ISI organization provided a strong technical staff for the control and review of inspections conducted by contractors.

The system engineer program was improved this assessment period by the formation of system expert teams that are composed of representatives from various applicable disciplines. A system engineer is the team leader for each of these teams. The system engineer development process was also improved this assessment period to include a series of formal plant and system courses as well as on the job mentoring.

During the assessment period, a licensed operator requalification program evaluation was conducted and was rated as satisfactory. However, during the requalification program evaluation several crews did not implement required

Emergency Operating Procedure actions in a timely manner; deviated from the Emergency Operating Procedures; and failed to transition within the Emergency Operating Procedures as required. Examples included: operators failed to vent the upper head when required, failed to depressurize the reactor coolant system after a steam generator tube rupture, and conducted reactor coolant system depressurization before cooldown. These performance deficiencies were similar to those found during the previous requalification program evaluation. The Catawba training and operations departments have not effectively implemented corrective actions to remedy these performance deficiencies.

Preexamination reviews were not effective and resulted in ten post-examination comments on an initial operator licensing written examination. In addition, deficiencies with the examinations, examination banks, and material were noted during the development of the requalification examination such that the week two Reactor Operator requalification written examination was invalidated and had to be replaced with a new written examination developed by the NRC examiners.

Following the operator requalification program evaluation, a training program audit was conducted by the NRC which identified programmatic weaknesses in the area of supervisory involvement in on-the-job training.

Two violations were cited. One deviation was identified.

2. Performance Rating:

Category: 2

3. Recommendations

The Board is concerned with weaknesses noted in the licensed operator training program which have resulted in deficiencies in the knowledge and use of Emergency Operating Procedures by licensed operators. Management attention to this area is necessary.

G. Safety Assessment/Quality Verification

1. Analysis

This functional area addresses the licensee's implementation of safety policies; amendments and relief requests; responses to Generic Letters, Bulletins and Information Notices; resolution of safety issues; safety review

committee activities; and the use of feedback from self-assessment programs and activities.

Licensee proposals for license amendments and requests for relief were well prepared, accurate, and thorough. Fourteen amendments to the licenses and one relief request were granted during the period. The initial applications for several issues addressing broad scope complex concerns were well prepared and required few requests for revision or additional information. Of particular note is that the application for Technical Specification (TS) changes to address the first Unit 1 reload utilizing B&W fuel and B&W reload analysis methodology is described in a series of seven supporting Topical Reports, required no further requests for information. The application addressing the corporate wide reorganization and several other applications required only one additional request for information. Several of these major application submittals were preceded by licensee initiated meetings to brief the staff on forthcoming developments.

The licensee generally maintains current awareness of industry developments and operating experience and takes action in a conservative manner to maintain its operating license and technical specifications accordingly. Specific examples are the applications addressing changes to the Control Room Area Ventilation System (CRAVS) smoke and radiation initiating signals based on experience at another of its facilities, a change in the control rod drop time based on test data, a change in the overtemperature reactor protection system trip function based on industry and vendor information, and changes for the boron dilution mitigation system based on vendor information.

The licensee's responses to generic issues were of high quality and supported the closure of seven issues. Of particular note is that the licensee is one of the first to adopt Generic Letter 90-06, Adequacy of Safety-Related DC Power Supplies, guidance on TS for surveillance of the pressurizer power operated relief valves and block valves.

During the latter half of this period, a major corporate and site reorganization began. It decentralized support for much of the nuclear power production activities to the three respective licensee plant sites under a newly established position of Vice President for the site. The functional areas of the previous corporate level Quality Assurance (QA) department were assigned to the corporate office (Quality Verification and QA Technical Services) or to the sites (Safety Review and Quality Control Inspections). Quality Verification includes the corporate Nuclear Safety Review

Board (NSRB) and the independent QA audit group. The Site Safety Assurance organization now includes the Safety Review Group (SRG), Regulatory and Environmental Compliance units and the Emergency Planning unit. These reorganizational changes were being implemented in the latter part of the assessment period. It is premature to reach conclusions regarding their impact on licensee performance.

The licensee has developed several initiatives to provide it with an independent assessment of performance. One of these is the Integrated Safety Assessment Program (ISAP). It is intended to assess plant performance from a nuclear safety and operational performance perspective and to provide a focused report biannually to senior management on all three stations. The process was initiated in 19 and provides indications of trends in the performance of hardware, people management, and nuclear safety-related parameters. The licensee's use of this program is still evolving. The licensee concluded that it has value and plans to continue the program.

In response to concerns that the Problem Investigation Report (PIR) program was not capturing all problems of concern, the program was revised. A wider scope of problems are now documented and categorized as upper tier or lower tier problems. Upper tier problems are pursued similar to previous practices. The lower tier problems are analyzed and trended with the intent of allowing management to take earlier corrective action on problem areas. As an example, a team of operations personnel (Reverse the Trend, RTT) was developed largely in response to results from the lower tier program. The RTT addressed several problem areas with varying degrees of evident success as discussed in the operations section of this report.

The licensee has also conducted several Self Initiated Technical Audits (SITAs) to assess the operational readiness of the auxiliary feedwater system and the electrical distribution system (EDS). The NRC staff's EDS Functional Inspection, which followed the licensee's SITA by several months, found numerous calculational errors, omissions, and/or lack of calculations. These were similar in number and type to those previously identified by the licensee and the NRC staff at another of its facilities, and to those identified by the licensee's SITA at Catawba.

The Corporate Nuclear Safety Review Board membership was revised during the reorganization and its reporting level changed to the Executive Vice President, Power Generation Group. The NSRB's scope of activities is broad and its consideration of issues is comprehensive and of a

substantive nature. Its membership's qualifications and experience are appropriate to address the technical disciplines of the NSRB. The issues addressed by the NSRB include those that have been of regulatory concern (e.g., configuration control, corrective action programs) and also those that it believes could be of future concern (e.g., the Qualified Reviewer Program, the Removal and Restoration Process).

One of the principal regulatory concerns during this period has been configuration control. Similar configuration control deficiencies were noted in the previous SALP period. Several teams were developed by the licensee (e.g., the RTT and CIA teams, the Component Positioning Team) to resolve these problems. Management attention and revision of guidance on verification actions were evident. The full effectiveness of these efforts have yet to be realized.

An area of weakness was identified in the licensee's operator requalification program. Although the program continued to be rated as satisfactory, there was evidence of weakness in operator performance of emergency procedures. These performance deficiencies were similar to deficiencies found during the previous requalification evaluation.

Licensee management has been involved in station activities. This includes the Executive Vice President outlining his expectations to the NSRB for its activities, the site Vice President and Station Manager's presence in many of the working group level team meetings and other manager's frequent personal attention to activities under their direction. Communication among all levels of the licensee's staff has been open, candid and conducted in a professional manner. Employee surveys have been used on several occasions to communicate concerns to management.

One violation was cited.

2. Performance Rating:

   Category: 2

3. Recommendations

   None

V. SUPPORTING DATA AND SUMMARIES

A. Licensee Activities

A major reorganization was announced in November 1991, including relocating Design Engineering to the site. Implementation of the reorganization is essentially complete with the exception of reassigning the Emergency Preparedness functions and certain administrative assignments called for by the QA Topical.

B. Direct Inspection and Review Activities

In addition to the ongoing routine resident inspections, 36 regional inspections were performed at the Catawba facility by the NRC staff, and two special inspections were conducted as follows:

August 5-9, 1991:	Station Blackout Audit by NRR.
January 13-17, 27-31, and February 10-14, 1992:	Electrical Distribution System Functional Inspection.

C. Escalated Enforcement Activities

1. Orders

None.

2. Civil Penalties (CP)

A Severity Level IV violation (EA 91-191) for five examples of failure to follow procedures which resulted in configuration control problems for safety related systems which were similar to previously identified violations. ($15,000)

D. Management Conferences

April 23, 1991: A management meeting was held at the Catawba station to discuss the SALP Board's assessment of Catawba's performance.

July 29, 1991: A management meeting was held in Region II for the licensee to discuss recent configuration control problems at Catawba and the proposed corrective improvements.

September 4, 1991: An NRC/Duke interface meeting was held at the Oconee Nuclear Station to discuss issues of interest to both organizations.

September 6, 1991: An Enforcement Conference was held in Region II to discuss the improper K2 gain settings for the over-temperature delta-temperature reactor protection system trip set points for the Catawba and McGuire facilities.

October 15, 1991: A management meeting was held in NRC Headquarters to discuss the overall status of the three Duke nuclear stations.

January 15, 1992: An Enforcement Conference was held in Region II to discuss recent configuration control problems at Catawba.

January 28, 1992: A management meeting was held in Region II for the licensee to give a self-assessment of the performance at the Catawba Station from February 3, 1991.

March 5, 1992: A meeting was held at NRC Headquarters to discuss the status of various licensing activities and safety initiatives at Duke's nuclear stations.

E. Confirmation of Action Letters (CAL)

None.

F. Reactor Trips

Unit 1

Four automatic trips occurred.

June 20, 1991: Reactor tripped from 71 percent power when a relay failed for reactor coolant pump No. 1A.

July 10, 1991: Reactor tripped from 92 percent power when turbine tripped on loss of both feedwater pumps caused by loss of flow from 1C heater drain tank pump.

September 11, 1991: Reactor tripped from 100 percent power following turbine trip on loss of both feedwater pumps due to feed regulator valve failing to the closed position.

October 2, 1991: Reactor tripped from 100 percent power following an automatic turbine tripped due to erroneous high moisture separator reheater level which occurred when water was inadvertently sprayed into an electrical cabinet during cleaning operations.

Unit 2

Two automatic trips occurred

May 29, 1991: Reactor tripped from 100 percent power due to low reactor coolant system flow caused by loss of reactor coolant pump which was deenergized by a spurious signal from a faulty reactor coolant pump relay.

January 15, 1992: Reactor tripped from 100 percent power following a turbine trip due to turbine control problems from low hydraulic oil system pressure which occurred during testing operations. Exact cause of the event was not determined.

G. Review of Licensee Event Reports (LER)

During the assessment period 49 LERs were analyzed. The distribution of these events by cause as determined by the NRC staff was as follows:

Cause	Totals	Unit 1	Common	Unit 2
Component Failure	7	2	2	3
Design/Procedures	7	2	1	4
Construction/Fabrication Installation	5	3	1	1
Personnel				
- Operating Activity	15	7	4	4
- Maintenance Activity	4	-	1	3
- Test/Calibration Activity	5	4	-	1
- Other	4	2	2	-
Other	2	1	-	1
Totals	49	21	11	17

Notes: 1. With regard to the area of personnel, the NRC considers lack of procedures, inadequate procedures, and erroneous procedures to be classified as personnel error.

2. The Other category is comprised of LERs where there was a spurious signal or a totally unknown cause.

3. 24 Special Reports were submitted but are not included in the above tabulation (17 in 1991, 7 in 1992).

4. The above information was derived from a review of LERs performed by the NRC staff and may not completely coincide with the licensee's cause assignments.

H Licensing Activities

During the rating period, 14 licensing amendments and one relief request for the two Catawba units were issued.

I. Enforcement Activity

	Number of Deviations and Violations in Each Functional Area					
	Dev.	V	IV	III	II	I NCV
Plant Operations			10			5
Radiological Controls			2			7
Maintenance/Surveillance			14			-
Emergency Preparedness			-			1
Security			1			-
Engineering/Technical Support	1		2			-
Safety Assessment/Quality Verification			1			1
TOTALS	1		30			14