SALP 10

INITIAL SALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Inspection Report No. 331/92001

Iowa Electric Light and Power Company

Duane Arnold Energy Center

April 1, 1991, through August 31, 1992

CONTENTS

I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated U. S. Nuclear Regulatory Commission (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 a rational basis for allocating NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC's assessment of the facility's performance in each functional area.

An NRC SALP Board, comprised of the staff members listed below, met on October 14, 1992, to review the observations and data on performance, and to assess licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance."

This report is the NRC's assessment of the licensee's safety performance at Duane Arnold Energy Center from April 1, 1991, through August 31, 1992.

The SALP Board members for Duane Arnold are listed below:

Board Chairman

C.E. Norelius, Director, Division of Radiation Safety and Safeguards (DRSS)

Board Members

E. G. Greenman, Director, Division of Reactor Projects (DRP)
J. N. Hannon, Director, Project Directorate III-3, Office of Nuclear Reactor Regulation (NRR)
T. O. Martin, Deputy Director, Division of Reactor Safety (DRS)
L. R. Greger, Chief, Reactor Projects Branch 3, DRP
C. Y. Shiraki, Project Manager, Project Directorate III-3, NRR
M. E. Parker, Senior Resident Inspector, DRP

Other Attendees at the SALP Board Meeting

A. B. Davis, Regional Administrator, RIII
A. C. Thadani, Director, Division of Systems Safety and Analysis, NRR
C. D. Pederson, Chief, Reactor Support Programs Branch, DRSS
B. L. Burgess, Chief, Operational Programs Section, DRP
J. R. Creed, Chief, Safeguards, DRSS
R. L. Hague, Chief, Reactor Projects Section 3C, DRP
R. D. Lanksbury, Chief, Reactor Projects Section 3B, DRP
J. W. McCormick-Barger, Chief, Emergency Preparedness and Non-Power Reactors Section, DRSS
W. G. Snell, Chief, Radiological Controls Section 2, DRSS
J. A. Hopkins, Project Engineer, DRP
C. G. Miller, Resident Inspector, DRP
T. Polich, Operations Engineer, NRR
J. E. House, Senior Radiation Specialists, DRSS
D. L. Nelson, Radiation Specialists, DRSS
C. E. Brown, Reactor Engineer, DRP
T. J. Ploski, Senior Emergency Preparedness Analyst, DRSS
T. J. Madeda, Security Inspector, DRSS
K. Salehi, Reactor Inspector, DRS

R. M. Lerch, Reactor Inspector, DRS
V. Ordaz, Reactor Engineer Intern, NRR

II. SUMMARY OF RESULTS

Overview

The licensee's overall performance was good and improved from the previous assessment period. The improvement resulted in a positive change in the SALP ratings of the Engineering and Technical Support (E&TS) and Safety Assessment and Quality Verification (SA/QV) functional areas which were rated Category 2. Although improvements in the remaining functional areas were noted, they were not sufficient to merit an increase in the numerical ratings. An improving trend was specifically noted in the area of Plant Operations which was also rated as Category 2. The functional area of Emergency Preparedness received a Category 1 rating for the second consecutive SALP period. The remaining functional areas received Category 2 ratings.

The improved ratings in E&TS and SA/QV were the result of management's effectiveness at addressing the weaknesses identified during the previous assessment period and other management initiatives to improve performance. Improvements in E&TS were specifically noted in increased staffing of engineers and the implementation of a formal qualification program for system engineers, in the Regulatory Guide 1.97 program, in the quality of operator licensing and requalification test material and simulator scenarios, and in the approach to identifying and resolving technical issues from a safety standpoint. Improvements in SA/QV were specifically noted in management's promotion of an environment that fostered quality work and a sense of ownership, the commitment control process, the procurement process and spare parts programs, quality assurance and quality control staffing and involvement in plant activities, and activities in the licensing area.

Improved performance in Operations was evidenced by the reduction in the number of scrams and improved outage performance. However, corrective actions to address two scrams that occurred in the previous assessment period were not broad enough in scope to prevent two similar scrams during this assessment period. While overall performance improved and was good, there were certain areas where increased management attention would appear to be warranted. For instance, the resolution of long term problems, broader evaluation of events to prevent similar occurrences, timely operability evaluations, and the effective prioritization of engineering resources appear to be areas warranting improvement. Additionally, corrective actions for issues were not always taken in advance of the concerns being emphasized by the NRC.

Overall, staffing levels were considered a strength. For example, the increased staff allowed the engineering department to follow routine and reactive issues more closely. However, increased supervisory staff did not improve the operational overview of day-to-day security activities. Operator licensing training and requalification programs improved consistently through the period and resulted in a satisfactory requalification program. The performance ratings during the previous assessment period and this assessment period according to functional areas are given below:

Functional Area	Rating Last Period	Rating This Period	Trend
Plant Operations	2	2	Improving
Radiological Controls	2	2	
Maintenance/Surveillance	2	2	
Emergency Preparedness	1	1	
Security	2	2	
Engineering/Technical Support	3	2	
Safety Assessment/Quality Verification	3	2	

III. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

Evaluation of this functional area was based on the results of 11 routine inspections, 2 team inspections, and 3 operator licensing examinations.

Enforcement history improved and was excellent. One Severity Level IV violation was issued citing failure to maintain the operability of the control building chillers according to the design basis. Although the violation was issued this assessment period, it was originally identified during the previous assessment period.

Operator responses to operational events were good. Their responses to the two automatic reactor scrams were both conservative and timely. Operating history, combined with two effectively conducted short outages following the reactor scrams, indicated that the plant was operated well during the assessment period.

The two reactor scrams which occurred resulted from equipment problems (closure of a main steam isolation valve (MSIV) on nitrogen header failure and high-frequency noise interference with a recirculation flow signal), and there were no manual scrams or unplanned outages. This was a significant improvement in performance over the previous assessment period during which five automatic scrams, three manual scrams, and two unplanned outages occurred. Of the licensee event reports issued, six were directly attributable to plant operations. Of these, two were attributable to personnel error: (1) high pressure coolant injection (HPCI) pump isolation due to improper venting of an instrument line and (2) the blocking open of a fire door.

The approach to identifying and resolving technical issues from a safety standpoint was good. Considerable resources were expended to improve configuration management controls (procedures, drawings, and labeling) that had contributed to problems during the previous assessment period. However, numerous discrepancies, potentially affecting piping and instrument diagrams and other drawings used by control room operators, remain to be resolved. To

address concerns related to previous reactor scrams, considerable action was taken to reduce scram frequency, including modifications of turbine trip logic. However, both reactor scrams during this assessment period were similar to previous reactor scrams indicating corrective actions to address the earlier ones were not broad enough in scope.

Management effectiveness in ensuring quality was good. A strong and conservative approach to plant operations was taken including dedicating a licensed operator to assist with monitoring core reactivity during low-power operations when the plant is most vulnerable to plant transients. Modifications performed to control room annunciators have been successful in maintaining a "blackboard" concept for all control room annunciators including those on backpanels, with very few annunciators bypassed. An aggressive management approach to shutdown risk management was successfully implemented during the refueling outage. Management has taken some action, but has been slow to resolve previously identified problems with excessive reliance by control room operators on technical specification interpretations and with timely operability calls.

Management oversight of daily plant operations and outages was good, and management appeared to have a strong commitment to safe plant operation. Early in the assessment period, management implemented improved daily plan-of-the-day meetings. The meetings were well attended and had wide participation by all departments. Initial problems with a lack of accountability by management for failure to meet commitments and a lack of responsibility by cognizant individuals and departments was improved. Performance during outages improved and was excellent. The outage organization had been revamped to provide more comprehensive management oversight because of problems identified during the previous assessment period pertaining to the conduct of refueling outages, principally the control of contractors, which is now good.

Implementation of the fire protection program was good; however, the program continued to experience some problems. The licensee aggressively addressed fire protection problems that emerged during the outage. For example, in order to understand the failure to implement fire protection impairment requests for several activities, management initiated a work stoppage. In addition, further action remains to fully ensure the adequacy of all fire barrier penetrations. Cleanliness and control of combustibles were satisfactory, and the material condition of the plant and housekeeping were good and considerably improved over the previous period. In particular, the torus room has been completely recovered.

Staffing levels were excellent. The number of licensed operators remained the same, although some formerly licensed personnel were transferred to other departments to improve the overall capabilities of the staff. Management also continued its practice of rotating licensed senior reactor operators (SROs) to various positions at the plant to provide an operations perspective to the other departments. In most cases the use of overtime was within administrative limits; management approved all exceptions from these limits beforehand. Two permanent assistant operations supervisors were assigned to the department late in the last assessment period. Since these additions, operations supervision has been assigned to observe all major evolutions of the plant, thus providing additional management oversight.

Training and qualification results were excellent. The initial license and requalification examinations continued to show improvement over the previous assessment period. Eight crews consisting of 18 SROs and 9 reactor operators (ROs) successfully passed all portions of two requalification examinations. The pass rate was significantly higher than that during the previous assessment period when the requalification training program was rated unsatisfactory because of the number of crew failures. Initial license examinations were successfully completed by the 3 SRO and 6 RO candidates.

2. Performance Rating

Performance is rated Category 2 with an improving trend in this area. Performance was rated Category 2 during the previous assessment period.

3. Recommendations

None.

B. Radiological Controls

1. Analysis

Evaluation of this functional area was based on the results of one reactive and five routine inspections by regional inspectors and observations by the resident inspectors.

Enforcement history was acceptable. One Severity Level III violation was issued because of a substantial potential for an overexposure.

Management effectiveness in ensuring quality was good. Management continued to emphasize as-low-as-reasonably-achievable (ALARA) radiation exposure as evidenced by the addition of several experienced personnel to the ALARA staff. Management continued its commitment to reduce their source term by performing a recirculation system chemical decontamination, accelerating the replacement of control rod blades with blades having low cobalt content, and developing a detailed cobalt reduction plan. However, although improvements in outage planning were noted, management was not completely effective in preventing recurrent job planning and communication problems. For example, because of poor planning, communication, and coordination between departments, an inadequate survey was performed prior to an inservice inspection of a recirculation system riser which resulted in the substantial potential for an overexposure mentioned previously.

The approach to identifying and resolving technical issues from a safety standpoint was good. The cumulative radiation dose in 1991 was 193 person-rem, which included 95 person-rem for the extensive decontamination of the torus. Considering the torus work accounted for half of the total dose, the remaining dose was average for a year without a refueling outage. The dose received due to the torus decontamination should result in future dose savings. Cumulative dose for 1992 through the end of the assessment period was approximately 463 person-rem, which included 393 person-rem for the refueling outage. This represented a significant improvement over previous

outage years and represents satisfactory performance. The contamination control program also improved during this period. Personnel contamination events showed a declining trend, but the number was somewhat high. The radiological condition of the plant was excellent. However, several radioactive liquid spills contaminated the corner rooms and torus which required decontamination efforts in these areas.

The radiological environmental monitoring program was well implemented, and the chemistry laboratory proficiency was excellent; all 58 radiological comparisons were in agreement. Results of the interlaboratory comparison program were also excellent; of 134 comparisons, 132 were in agreement. The conservative policy of prohibiting routine radioactive liquid releases continued and gaseous releases were low and well within technical specification (TS) limits. No radioactive waste or transportation problems were identified.

Training and qualifications were good and staffing levels improved and were excellent. Staffing was enhanced by hiring experienced personnel to fill key positions such as the Radiation Protection Manager (RPM), the Health Physics Supervisor, and the Radwaste Supervisor. The ALARA group was expanded and its importance was enhanced by elevating the ALARA Coordinator to a first line supervisory position reporting directly to the RPM. The number of qualified technicians and their experience level increased because of low turnover and implementation of a high-quality training program. The laboratory staff also remained stable and was knowledgeable and skilled in performing their jobs.

2. Performance Rating

Performance is rated Category 2 in this area. Performance was rated Category 2 during the previous assessment period.

3. Recommendations

None.

C. Maintenance/Surveillance

1. Analysis

Evaluation of this functional area was based on the results of 13 routine inspections, a modified operational safety team inspection, and a maintenance team follow-up inspection.

Enforcement history improved and was good. Two Severity Level IV violations were issued: one involved post maintenance testing of main steam isolation valves, and the other involved inadequate calibration of test equipment. Neither appeared to have programmatic implications.

There were fewer reportable events this period than last period. Only one engineered safety feature (ESF) actuation was attributable to personnel error, compared to six ESF actuations and six scram signals during the previous assessment period. Efforts to increase supervisory oversight, adherence to

procedures, and attention to detail, as well as modifications to reduce scram frequency, contributed to this success.

The approach to identifying and resolving technical issues from a safety standpoint was good. Maintenance was usually well planned and scheduled, and safety significance was appropriately factored into the prioritization process. Comprehensive outage risk management guidelines and risk evaluation data sheets for maintenance requests are examples of the good safety perspective demonstrated during maintenance activities. The approach to resolving problems with surface preparation of weld overlays was innovative and conservative. The resolutions of previous problems with feedwater check valve maintenance and feedwater flow inaccuracies were thorough. Vibration monitoring on some components, such as the HPCI pump, identified required maintenance before failure. However, weaknesses were evident in resolving problems identified by vibration monitoring on other components such as the river water and residual heat removal (RHR) service water pumps. Problems also existed in local leak rate testing methodology. Planning and parts support for safety-related components, such as the control building chillers improved greatly during the period. Some problems remained in parts support for solenoid valves, control building chillers, standby filter unit fan motors, and other equipment.

Management effectiveness in ensuring quality in the surveillance area was good. Surveillance activities were well coordinated, and most were performed and reviewed in a timely manner. However, near the end of the assessment period one TS required American Society of Mechanical Engineers surveillance was performed outside its allowable time interval. Several others were almost outside of their intervals, due to inadequate controls and the assignment of an inappropriate interval for increased testing of the valves. Improved performance was noted after management addressed previous problems with surveillance procedure revisions and compliance. Some minor problems with the temporary change process still existed. A continuing effort was under way to reduce the temporary procedure change backlog.

Management effectiveness in ensuring quality in the maintenance area was good. Outage coordination and work control showed significant improvement over the previous period. Craft incentives, project team assignments, improved training, and coordinated use of workers with varying experience were key initiatives in resolving previous work control issues during outages. The relatively trouble free post-outage startup phase provided confirmation of these results. Maintenance rework rates remained low. Instrument trending efforts improved markedly and helped to identify and correct chronic problems with several instruments. Preventive maintenance completion rates remained consistently high. However, the relatively high corrective maintenance backlog hindered the timely resolution of some issues, as evidenced by the fact that about 50 percent of the corrective maintenance action requests (CMARs) were over 90 days old. Compounding the problems with the timely resolution of issues were long term resource intensive projects such as fire barrier penetration inspections and copper pipe joint repairs. Kaman radiation monitors, reactor recirculation system speed control circuitry, and the refueling bridge continued to have chronic maintenance problems.

Although staffing for this area was good, the non-outage maintenance backlog had increased to over 1000 CMARs following the 1992 refueling outage, representing a 16 week backlog. Contract workers and overtime were being used

to reduce the backlog to less than 600 CMARs by the end of 1992. This effort had brought CMAR levels to less than 800 (13 week backlog) by the end of the assessment period. Use of overtime was well controlled and fell within plant administrative and NRC guidelines. Craft experience levels, especially in the instrument and control shop, declined because of turnover and hiring practices which made it difficult to fill vacant positions with experienced personnel.

The training and qualifications of maintenance personnel were good. In most cases, workers were prepared for their tasks and knowledgeable of equipment and procedures. Previous problems with outage contractor training were addressed successfully by increasing oversight and pairing experienced workers with inexperienced ones.

2. Performance Rating

Performance is rated Category 2 in this area. Performance was rated Category 2 during the previous assessment period.

3. Recommendations

None.

D. Emergency Preparedness

1. Analysis

Evaluation of this functional area was based on the results of two inspections by regional inspectors and observations by the resident inspectors.

Enforcement history remained excellent and no violations were identified.

Management effectiveness in ensuring quality remained excellent. All emergency response facilities continued to be very well maintained. Emergency response data system and additional safety parameter display system (SPDS) computer terminals were installed in the technical support center and emergency operations facility. The SPDS terminals were linked to the control room simulator to provide greater realism to drill and exercise participants. Interfaces with State and county support organizations remained excellent, as indicated by continued assistance in training more than 2,000 local responders and by the following ongoing joint projects: upgrading the emergency planning zone's (EPZ's) siren system, redefining the EPZ's evacuation subarea boundaries and revising offsite plans and procedures accordingly, and upgrading the EPZ's evacuation time estimate study.

The approach to identifying and resolving technical issues from a safety standpoint remained excellent. All actual emergency declarations were correct and timely, and associated notifications to offsite officials were timely and detailed. A thorough review of emergency action levels used to classify emergencies was completed, coordinated with offsite officials, and approved by the NRC. The review resulted in a number of good revisions to the classification criteria. Several procedures were being revised to provide

accurate guidance on the interfaces between the emergency response organization (ERO) and NRC incident responders.

Overall performance during the 1991 exercise was good with two concerns identified. Challenging aspects of the scenario included use of the control room simulator and inplant equipment mockups. In response to one concern, the supervisory organization and layout of the operational support center were refined to facilitate the briefing and dispatching of inplant teams. In response to the other concern, additional training, related to the adequate documentation of messages transmitted to offsite officials, was given to appropriate personnel.

The emergency planning group's staffing levels remained excellent. Clearly defined tasks included onsite and offsite responsibilities which increased the staff's flexibility and expertise. An effective computer-based action item tracking system replaced a manual system and improved the timeliness and ensured completion of corrective actions. The onsite and offsite EROs' staffing levels, which had improved, were excellent and ensured 24-hour staffing of key and support positions. Semiannual off-hours drills demonstrated the capability to augment onshift personnel in a timely manner, and an automated call out system was implemented to further enhance augmentation capability.

The EROs' training program was being upgraded by making lesson plans more position specific rather than topic oriented. Administrative controls were effective in ensuring that only currently trained personnel were listed in quarterly updates to the call out roster. In addition to the annual exercise, full-scale drills, involving the onsite and offsite EROs and occasional voluntary participation by county responders, were conducted and critiqued three or four times a year. These drills were in excess of the training commitments in the emergency plan.

2. Performance Rating

Performance is rated Category 1 in this area. Performance was rated Category 1 during the previous assessment period.

3. Recommendations

None.

E. Security

1. Analysis

Evaluation of this functional area was based on the results of three routine security inspections, one fitness-for-duty (FFD) inspection, and one operational safeguards response evaluation (OSRE).

Enforcement history declined and was acceptable. Four Severity Level IV violations were identified compared with one violation during the previous period. However, none of the violations had major safety significance.

Management effectiveness in ensuring quality was good. Plant and corporate management were effectively involved in site security activities. Management strongly supported initiatives involving the acquisition of new security equipment, specialized response training activities, and voluntary participation in an OSRE. Security management's overview of day-to-day operations declined from the previous period and resulted in a lack of attention to detail involving the access authorization program and weak overview of search activities for the package and vehicle control programs. Corrective measures including increasing supervisory resources were not totally effective. Additional measures to improve these areas were under plant management review.

The approach to identifying and resolving technical issues from a safety standpoint was excellent. Significant improvement was noted in intrusion hardware system effectiveness and reduction in personnel errors through effective engineering, maintenance support, and management awareness. Enhancements included upgrades in access control x-ray equipment and construction activities to improve the effectiveness and reliability of alarm station operations. To support this effort, which began during the previous period, professional security consultants were used, and a member of the security supervisory staff was assigned to monitor activities.

Performance in handling security events was good. Implementation of corrective action for prior security events resulted in a decreased number of events during this assessment period. This reduction was due to security management efforts in developing and monitoring tracking and trending programs, identifying actual and potential problems, and implementing corrective action. Security related events records were complete, well maintained, and readily available.

Staffing levels to implement day-to-day operational activities were good. Supervisory staff increases and redesignation of supervisory duties expanded staffing resources but did not improve operational overview of day-to-day security activities. The working relationship between security contractor site personnel and licensee security personnel was excellent.

The effectiveness of the training and qualification program was good. The basic security force training program, as implemented, met regulatory requirements. Results of the OSRE showed that security force contingency response capabilities were effective, as demonstrated by high quality drills and exercises and operational involvement in the planning of response capabilities. To support this effort, a security consultant was retained to conduct independent physical exercises and evaluations of the actual training program. Despite these efforts, several minor vulnerabilities involving weapons and tactical training program formalization were identified by the OSRE.

Management's implementation and support for the FFD program were good. However, two weaknesses were identified by the licensee and one by the NRC. When made aware of the weaknesses, management aggressively implemented corrective measures.

2. Performance Rating

Performance is rated Category 2 in this area. Performance was rated Category 2 during the previous assessment period.

3. Recommendations

None.

F. Engineering/Technical Support

1. Analysis

Evaluation of this functional area was based on the results of 10 routine and 5 special inspections and 3 operator licensing examinations.

Enforcement history was good with four violations identified. The number of violations remained fairly constant with none being indicative of a programmatic weakness. The most significant event involved a modification to the river water system in which inappropriate 480 Vac electrical breakers were installed, subsequently causing an electrical fire and river water pump inoperability. This breakdown in the design process resulted from the licensee failing to thoroughly evaluate the suitability of the upgraded breaker for the existing breaker equipment.

Management effectiveness in ensuring quality improved and was good. The number of engineers was increased significantly, allowing the engineers to follow routine and reactive issues more closely. This increase made it possible to reduce the backlog of design change packages for closure and unreviewed vendor manuals. The shifting of responsibility for the Regulatory Guide (RG) 1.97 program, a weakness during the last assessment period, was corrected. As a result, significant improvements were noted in the assignment of priorities and work completion for that program. Management initiatives included the HPCI performance upgrade program, the analysis of the electrical distribution system, the top 10 priority issues program, an expanded and improved trending program, the establishment of a priority review board for plant modifications, the implementation of an improved procurement process to ensure an adequate supply of spare parts, and half-day assignments of component engineers to maintenance to follow field activities. However, many of these initiatives had not been implemented long enough to show results. For example, the engineering trending group was refining the process for gathering and disseminating information late in the assessment period. The scope and results of the motor operated valve (MOV) program (Generic Letter 89-10) self-assessment were excellent.

Management effectiveness in regard to operator licensing and requalification improved consistently throughout the assessment period and was excellent. During the last requalification examination, the assignment of training personnel ensured accurate and timely incorporation of examination changes and smooth administration of the examinations. The problems identified during the last period regarding the quality of the test material were resolved. Simulator scenarios improved significantly. In addition, the initial

licensing program showed improvement; with few exceptions, operators displayed a strong knowledge of procedures, systems, and components.

Weaknesses in management effectiveness were evident in the failure to make a prompt evaluation of operability for control building ventilation issues and after several heat exchangers were found to be receiving less flow than specified in the Updated Safety Analysis Report. In addition, management failed to effectively prioritize engineering resources to ensure that catastrophic failures of RHR service water and river water supply pumps were adequately resolved to prevent recurrence. Other weaknesses involved delays in resolving quality assurance audit findings regarding safety evaluations, incomplete corrective action for pump vibrations, and trending of steam leaks from piping that should have been tracked in the erosion and corrosion program.

The approach to identifying and resolving technical issues from a safety standpoint improved and was good. The potential for inboard MSIVs to not fully close, or to reopen, without nitrogen pressure to the actuators while at maximum drywell pressure, and inaccuracies in feedwater flow and recirculation loop flow were thoroughly evaluated. In addition, actions to improve the reliability of the control room chillers were comprehensive and included overhauls of both units and increased trending. Responsiveness to industry events, including those pertaining to Thermo-Lag 330 fire barrier, reactor vessel level inaccuracies, outage risk management issues, and scram frequency reduction efforts was good. Design changes and temporary modifications, with few exceptions, were technically sound. However, numerous design change procedure reviews and a significant backlog of drawing changes remain to be completed.

Weaknesses also existed as evidenced by problems with the recirculation scoop tube lockup, recurring steam leaks, and missing backdraft dampers. A reactor scram occurred because an MSIV nitrogen header solder joint failed. This was a similar occurrence to a reactor scram from an instrument air header failure during the last assessment period. Another scram, caused by an average power range monitor flow biased trip signal, was a repeat of a previous scram caused by high-frequency noise interference. Other technical issues not appropriately addressed included the General Electric Service Information Letter identifying the potential for unnecessary HPCI and reactor core isolation cooling steam line high flow isolations, and the MOV calculations regarding degraded voltage and switch settings.

Staffing of the engineering and technical support organization was good. The number of system engineers was increased from 15 to 30, and the engineering staff was increased from 80 to 148. Staffing for the RG 1.97 program, which had been poor during the previous assessment period, was good. The personnel assigned to the RG 1.97 and the MOV programs were experienced and knowledgeable.

The initial and requalification training programs for licensed operators were excellent. Operators were well prepared, and crews responded well as an integrated group, kept each other informed, and anticipated required actions. The operating staff was aware of the RG 1.97 control room instrument identification method and its meaning.

Training and qualification of system engineers were good. Early in the assessment period, the lack of a formal qualification program for system engineers was identified as a weakness. Subsequently, action was taken to formalize the qualification process. The training provided to engineers on the performance of safety evaluations resulted in improved evaluations.

2. Performance Rating

Performance is rated Category 2 in this area. Performance was rated Category 3 during the previous assessment period.

3. Recommendations

None.

G. Safety Assessment/Quality Verification

1. Analysis

Evaluation of this functional area was based on the results of numerous inspections by resident, regional, and headquarters inspectors. In addition, amendment requests, exemption and relief requests, responses to generic communications, and other interactions with the NRC were considered.

Enforcement history was excellent. No violations were issued compared with two during the previous period.

Management's effectiveness in promoting an environment conducive to quality work and a sense of ownership was good. Attention to concerns identified during the previous assessment period resulted in the implementation of numerous new programs, revisions to existing programs, and increased staffing resources. The increased use and effectiveness of the priority review board and adoption of a business plan were examples of program implementation. Management's increased demand for accountability and error free performance from the engineering staff and craft persons yielded higher quality products. The commitment by management to quality work resulted in an effective outage and a good post outage run.

Management's effectiveness in improving the commitment control process, the extensive use of business plan goals, and outage management efforts resulted in improvements in safety as well as increased operational efficiency. Effective use of the forced outage work list allowed more efficient use of unanticipated reactor down time. Daily plan-of-the-day meetings during normal power operation had wide participation and improved when the Plant Superintendent assumed the position as chairperson of the meetings. However, increased accountability for commitments and more incisive determination of the reasons a commitment is not met continued to be areas for improvement. In addition, the need to remedy problems did not always gain management attention until they were raised to a high level of visibility. For example, longstanding plant problems, such as control building ventilation and copper solder joints, did not receive sufficient management attention until they caused immediate operational difficulties, failed tests, or were emphasized by

the NRC. Another example was the implementation of the commitment to formalize the technical specification interpretation process. The initial procedure failed to include engineering review and approval and was not corrected until emphasized by the NRC.

Open communication channels with the NRC at all levels of the organization were excellent, and frequent management meetings were conducted. During meetings with the NRC, management effectively communicated licensee positions on current issues and briefed the NRC on anticipated licensing actions.

Management demonstrated a more conservative philosophy when selecting TS sections to be amended than was noted in the previous assessment period. Resources were appropriately utilized to submit amendments that contributed to safer operation and increased plant efficiency.

Operational events attributable to weaknesses in Safety Assessment and Quality Verification remained few in number. However, weaknesses were evident in the resolution and followup of the root cause of a manual reactor scram that resulted from a failed solder joint on an instrument air line. In addition, the reactor scram on an average power range monitor flow biased upscale trip signal due to radio frequency interference was similar to a previous occurrence. Although the source of the radio frequency interference has not been identified, more thorough action was taken after the scram to reduce the impact which high frequency signals could have on the plant. However, additional action is still required to complete the modification to other susceptible instruments.

The approach to identifying and resolving technical issues from a safety standpoint was mixed. When appropriate attention was focused on plant problems, the result was often a well coordinated team effort. Examples of this can be found in the Engineering and Technical Support Section. However, weaknesses in operability and modification reviews were evident in the cases of control building ventilation and filtration, river water supply pump vibrations, and emergency service water flows. Followup of industry events and generic information was adequate. Although the program for reviewing incoming generic industry information had been enhanced, a comprehensive program to review past closed issues for errors in analysis had not been implemented.

The response to a long standing quality assurance (QA) finding on safety evaluations required an inordinately long period of time to develop. Procedures governing the conduct of 10 CFR 50.59 reviews and safety evaluations were issued during this assessment period, over a year after the issue had been raised initially. Training that addresses the performance and verification of safety evaluations has been developed and conducted.

The corrective action program improved and was good. Implementation of corrective actions for the lessons learned from the previous refueling outages was excellent. The licensee restructured the outage organization to more effectively control contractor work activities. Changes to the procurement process and spare parts program were improvements. The approach to outage risk management issues was comprehensive, providing an in-depth approach to ensure adequate means to provide core cooling, circulation, and power supply availability. The formal root cause analysis process was good, as evidenced

by the comprehensive analysis to determine the reason the MSIVs failed their local leak rate test and subsequent followup actions to prevent recurrence.

Staffing in the QA department has improved and was excellent. Quality assurance and quality control involvement in plant activities showed improvement following the move to the site of the QA audit group and the addition of high quality employees. The number of open QA findings was reduced, and the trend was steadily downward. The QA auditors have been trained to conduct more performance-based audits, and the quality of the findings improved. The efforts of the QA organization were well supported by the audited departments, which view it as a tool to assist them in determining areas that need improvement.

Activities in the licensing area showed significant improvement. Early in the assessment period, problems were identified that could have been remedied by better communication with the NRC. However, by the end of the assessment period, ongoing dialogue ensured that correct and complete information was provided in the first submittal. Questions about submittals did occasionally arise, but open communication with the NRC greatly expedited the process of amending the TS and reviewing replies to generic communications.

2. Performance Rating

Performance is rated Category 2 in this area. Performance was rated Category 3 during the previous assessment period.

3. Recommendations

None.

IV. SUPPORTING DATA AND SUMMARIES

A. Major Licensee Activities

The unit was operating at full power at the beginning of the period. Significant outages and other major events are discussed below.

1. On June 22, 1991, the reactor automatically scrammed on high flux due to an MSIV closure resulting from a failed solder joint in an MSIV nitrogen line. Following repairs, the reactor was restarted on June 30, 1991.

2. On February 27, 1992, the reactor was shut down for refueling outage number eleven. Major activities besides refueling included MSIV nitrogen piping replacement, MSIV repairs, HPCI pump overhaul, scram frequency reduction modifications, and detailed control room design review (DCRDR) modifications. The reactor was restarted on April 24, 1992.

3. On May 3, 1992, a reactor recirculation pump tripped on high temperature due to the failure of a cooling water control valve.

4. On August 17, 1992, the reactor automatically scrammed because of a spurious average power range monitor flow biased trip signal. Following corrective actions and maintenance, the reactor was restarted on August 22, 1992.

5. On August 31, 1992, a ruptured solder joint on a 3 inch instrument air header initiated a transient which left the plant at about 70 percent power at the end of the period.

B. Inspection Activities

The inspection reports discussed in this SALP are listed below.

Docket No. 50-331
Inspection Reports No. 91009 through 91022
92002 through 92019

Significant inspection activities are listed below.

1. From October 15 to October 25, 1991, a special modified operational safety team inspection was conducted to review problem areas and improvement programs in the areas of Maintenance, Engineering/Technical Support, and Safety Assessment/Quality Verification. (Inspection Report No. 331/91017)

2. From December 9 to December 13, 1991, a special inspection was conducted to review implementation of commitments pertaining to Regulatory Guide 1.97. (Inspection Report No. 331/91020)

3. From March 17 to March 27, 1992, a special inspection was conducted to review the circumstances surrounding an unplanned radiation exposure. (Inspection Report Nos. 331/92007 and 331/92009)

4. From April 13 to May 11, 1992, a special vendor inspection was conducted to review procurement programs.

5. From June 1 to June 19, 1992, an inspection was conducted to review engineering and technical support areas, including modifications and design changes. (Inspection Report No. 331/92015)

6. From June 16 to June 26, 1992, an inspection was conducted to review implementation of the motor operated valve program required by Generic Letter 89-10. (Inspection report No. 331/92011)

7. From July 27 to July 30, 1992, an operations safeguards response evaluation was conducted to review the onsite security force's capability to respond to an external threat.

8. From August 3 to August 7, 1992, a special inspection was conducted to assess licensee followup actions from inspection items previously identified in the electrical distribution system functional inspection and the emergency service water safety systems functional inspection. (Inspection Report No. 331/92018)