INITIAL SALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Inspection Report No. 346/91001

Toledo Edison Company

Davis-Besse Nuclear Power Station

July 1, 1990, through November 30, 1991

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 licensee management regarding the NRC's assessment of the facility's performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on January 8, 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 Davis-Besse Nuclear Power Station for the period July 1, 1990, through November 30, 1991.

The SALP Board for Davis-Besse was composed of the following individuals:

Board Chairman

H. J. Miller, Director, Division of Reactor Safety (DRS)

Board Members

E. G. Greenman, Director, Division of Reactor Projects (DRP)
W. L. Axelson, Deputy Director, Division of Radiation Safety and Safeguards (DRSS)
J. N. Hannon, Director, Project Directorate III-3, Office of Nuclear Reactor Regulation (NRR)
R. C. Knop, Chief, Reactor Projects Branch 3, DRP
J. B. Hopkins, Project Manager, Project Directorate III-3, NRR
W. Levis, Senior Resident Inspector

Other Attendees at the SALP Board Meeting

W. E. Scott, PQEB/NRR
I. N. Jackiw, Chief, Projects Section 3A, DRP
A. Dunlop, Project Engineer, DRP
L. R. Greger, Chief, Reactor Program Branch, DRSS
R. A. Paul, Senior Radiation Specialist, DRSS
M. C. Shumacher, Chief, Radiological Control & Chemistry Section, DRSS
J. R. Creed, Chief, Safeguards Section, DRSS
J. R. Knicely, Physical Security Inspector, DRSS
C. E. Brown, Reactor Engineer, DRP

M. P. Phillips, Chief, Operational Program Section, DRS
M. A. Ring, Chief, Engineering Branch, DRS
F. A. Maura, Reactor Inspector, DRS
J. W. McCormick-Barger, Chief, Emergency Preparedness Section, DRSS

II. SUMMARY OF RESULTS

Overview

During this assessment period, overall performance consistently continued to improve from the previous assessment and was good. Improvement was noted in four of the seven functional areas. Performance in the area of security sustained Category 1 performance. A declining trend was noted in the area of Emergency Preparedness primarily due to the deficiencies noted in the last exercise. Strong management support and excellent facilities resulted in this area still being rated as Category 1 performance.

Performance in the area of Operations ended the previously noted declining trend and was rated Category 2. Management initiatives were effective in correcting previous deficiencies in control of outage activities and attention to detail issues. With further reinforcement and refinement of th e initiatives further improvement in this area can occur.

Performance in the area of Maintenance improved to Category 1 performance. This improvement resulted from continued equipment reliability, good training and preventive maintenance programs, and use of state-of-the-art technology for performance monitoring. Additionally, the unit forced outage rate was low and safety system availibility was high.

The areas of Safety Assessment/Quality Verification and Engineering/Technical Support were both noted to have an improving trend. the engineering area, this good performance was supported by strong mana nt initiatives, effective system engineering support, experienced staff and completion of outage modification packages in a timely manner. Challenges remain to reduce the backlog of modifications. Several notable management initiatives were undertaken in the Safety Assessment/Quality Verification functional area. The increased use of critical self-assessments, a shutdown risk assessment and implementation of its findings, and steps taken to assure zero fuel defects indicate a management team committed to safe operation of the facility. Continued implementation of such initiatives and correction of deficiencies found by the licensee's self assessments are important to continue this improving trend.

Performance in the Radiological Controls area remained constant. While improvements were noted in the ALARA (as-low-as-reasonably-achievable) area, some weaknesses in the implementation of program requirements were identified as evidenced by the increased number of personnel contaminations. Progress was also slow in decontaminating areas which contained vital plant equipment and required routine access by plant personnel.

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 declining	2	
Radiological Controls	2	2	
Maintenance/Surveillance	2 improving	1	
Emergency Preparedness	1	1	declining
Security	1	1	
Engineering/Technical Support	2	2	improving
Safety Assessment/Quality Verification	2	2	improving

III. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

Evaluation of this functional area was based on the results of 12 routine inspections by the resident inspectors.

Enforcement-related performance improved significantly from the previous assessment period and was considered good. However, the violations noted in this area involved problems similar to those noted in the previous assessment period, indicating that the corrective actions to prevent recurrence were not always effective. The number of licensee event reports (LERs) attributed to the plant operations area declined by a factor of two; however, the number of events caused by personnel error remained essentially the same. Management undertook a number of initiatives to help reduce the number of human errors which were effective in reducing the significance of events. However, when events such as steam generator 1-2 overfill or valve mispositioning occurred, there were several individuals and administrative controls in place that should have prevented the events indicating that these initiatives need further reinforcement.

Plant performance improved during this assessment period. One reactor trip occurred on reactor coolant system (RCS) low pressure which resulted from the group 7 control rods dropping in response to a failed component in the control rod drive power supply. The plant had a 99.4 percent availability factor. Notably, when the unit shut down for its seventh refueling outage, no major safety equipment was out of service and overall primary system leakage and the number of leaks were low indicating that the unit had been well maintained throughout the cycle.

Plant management was aggressively engaged in ensuring quality. For example, management undertook such initiatives as the Operations Performance Improvement Program, formation of a work control group, and implementation of

the "BE CERTAIN" program to improve the performance of the operations organization. These initiatives identified weak areas and were designed to improve personnel performance. The Operations Concern List, which is published as part of the Plan of the Day, was effective in relaying operations concerns to management and focusing maintenance resources on repairing equipment important to the operation of the unit. Quality of procedures also improved as a result of the Procedure Upgrade Program. On the other hand, some problems concerning procedure implementation existed as evidenced by the overfill of a steam generator during the refueling outage and the mispositioning of several valves. These problems were not isolated to one individual or crew and occurred despite the numerous opportunities to prevent them.

Operator response to events was good. Operators effectively stabilized power after a runback caused by a mispositioned switch during a reactor protection system (RPS) calibration. When the operating decay heat pump tripped during the refueling outage, operators promptly recognized the condition and placed the other loop in service. Reactor shutdown, mid-loop operations, reactor startup, and removal and subsequent restoration to service of the main generator following a switchyard fire were all performed well and in a controlled manner. Improvement was noted particularly in operations' ability to transition to automatic operation of the Integrated Control System (ICS) during plant startup.

The licensee demonstrated better control of activities during outages this assessment period. Although some problems similar to those experienced in the last outage occurred, the number and magnitude of these problems were reduced. Management initiatives, such as appointment of full-time outage directors, formation of a work control group, and greater involvement of operations personnel in outage planning and increased management involvement during high risk evolutions, were effective in correcting the weaknesses noted previously.

Some improvement in communications between operators and other plant personnel was evident. The installation of a plant antenna system allowed operators in the plant to effectively communicate with control room personnel. A more questioning attitude by operations personnel was evident concerning work on plant equipment. Also, recent requalification training emphasized use of "repeat backs" and proper annunciator response. However, weaknesses in communication were evident during a 350 gallon primary coolant spill in the yard, and in the improper temporary lifting of a tag for the station blackout (SBO) diesel generator (DG).

Operator response to annunciators was acceptable, however guidance given in administrative procedures was not always followed when acknowledging annunciators. Shift turnover adequately included status of plant equipment and evolutions in progress. The control room was noisy and congested at times during turnovers.

Staffing was ample. Turnover was low; the staff is experienced and stable. A new operations manager was named to replace a contractor who was temporarily filling the position. An additional assistant shift supervisor served as fire brigade captain and provided additional management presence in the power block.

In addition, the operations department had sufficient staff to provide licensed individuals to other onsite organizations. Performance in initial licensing exams was very good. Overall, 13 of 13 reactor operators and 14 of 15 senior reactor operators passed their licensing examinations. Four operators, who failed NRC requalification examinations in the previous assessment period, passed their retake requalification examination. The site specific simulator was installed and certified in this assessment period. The use of the simulator for training for such evolutions as startup, shutdown, and mid-loop operations was effective in allowing these evolutions to be performed smoothly during plant operations.

Fire protection has improved as evidenced by the reduced need for compensatory measures to deal with inoperable equipment. The designation of a responsible group to correct previous discrepancies was effective. Housekeeping was generally good. Some weaknesses were noted in limited access areas such as the Auxiliary Building and in the cleanup following the refueling outage.

2. Performance Rating

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

3. Recommendations

None.

B. Radiological Controls

1. Analysis

Evaluation of this functional area was based on the results of six inspections.

Enforcement-related performance was excellent, a significant improvement.

Management effectiveness in ensuring quality improved, and was considered good, although weakness were still evident. Good progress was made in involving all station groups in a newly established ALARA committee that addresses ALARA planning, budgeting, and implementation. An ALARA planning section was created to bring a stronger ALARA focus to the station planning group and strengthened the ALARA section in the radiation protection department. A revised shutdown chemistry program that extended the outage by about two days was credited with removing about 100 curies of radioactivity from excore piping and reducing containment dose rates during the recent outage. A full-time individual was used to evaluate other potentially important source term reduction initiatives. Management efforts improved radiological controls during the period, but weaknesses were still identified by the ...ee during the recent outage. Poor work practices while changing a lau ...lter and inadequate ventilation controls during work on a control ...rive mechanism led to personnel contaminations. Weaknesses were also ... ...nt in recent events involving the

release of several hundred gallons of contaminated steam generator water and the release of several hundred gallons of contaminated makeup tank water in the station yard, and problem resolutions associated with contaminated soil.

The approach to identification and resolution of technical issues was mixed. During the 17 month assessment period, station dose (about 220 person rem) was low owing considerably to less outage work, improved outage planning, and the ALARA program improvement. From a longer term perspective (3 years), the station continued to perform satisfactorily in this area. Dose projections for 1991 were considerably higher than experienced reflecting limitations caused by weak job-history files. The number of personnel contamination events in 1990 was 160, but increased significantly to 265 in 1991, owing largely to poor control of contaminated protective clothing at the licensee's new wet-wash facility during the outage. Although contamination control in the plant was reasonably good, some areas containing safety related equipment remain contaminated posing potential barriers for operations and maintenance personnel in the performance of their duties.

Radiological releases from the station continued to be a small fraction of regulatory requirements. Shipped solid waste volume was low, but had increased from 1989 because of the increase in spent demineralized resin caused by the primary to secondary leakage. No problems were identified concerning transportation or burial site requirements. Plant water quality was very good, reflecting the quality of chemistry controls at the station. The station's laboratory showed very good analytical capability in achieving 56 agreements from 57 comparisons in radiochemistry and 28 agreements from 30 comparisons in cold chemistry. The radiological environmental monitoring program was well implemented and improved over the previous period.

Staffing, training, and qualifications were good. Establishment of a permanent ALARA group remedied a staffing weakness noted in the previous assessment period. Low turnover in chemistry management and staff contributed to improved performance in this area. Professional health physics expertise remained good and turnover was relatively low. All radiation protection technicians (RPTs) at the senior and journeymen level me American National Standards Institute qualification requirements and seven P achieved certification by the National Registry of Radiation Protection Technology. Good training was provided to the RPTs on radiological hazards of plant systems. Contract RPT training appeared satisfactory.

2. Performance Rating

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

3. Recommendations

None

C. Maintenance/Surveillance

1. Analysis

Evaluation of this functional area was based on the results of 12 routine inspections by the resident inspectors and 3 inspections by region-based inspectors.

Enforcement-related performance improved over the previous assessment period and was excellent. The number of LERs attributed to the Maintenance/Surveillance area was lower than in the previous assessment period. Two events resulted in inadvertent safety features actuations (SFAS) during maintenance activities and two events led to deficient testing of the reactor protection system as a result of procedure inadequacies.

Indications of management's effectiveness in ensuring quality were seen in the good equipment reliability, continued excellent scheduling of maintenance and surveillance activities, and an aggressive preventive maintenance program. The nonoutage corrective maintenance backlog was 740 work orders, which represents about 14 weeks of work. This compares to approximately 900 work orders at the beginning of the assessment period and denotes management's commitment to reducing the number of outstanding work orders. Changes in maintenance management made at the end of the previous assessment period added experience to the maintenance program. At the request of the maintenance manager, a multi-departmental team performed a thorough, critical assessment of the maintenance program in February 1991. The maintenance program is being enhanced in response to team recommendations.

Good communications between maintenance and operations personnel ensured equipment concerns received proper maintenance attention and resulted in minimizing time spent in limiting conditions for operation (LCO). The ratio between time spent on preventive maintenance and time spent on corrective maintenance continued to increase from 52 percent the previous assessment period to 57 percent this assessment period. Management also focused its attention on decreasing the number of control room indicators and annunciators out-of-service. The check valve reliability program evolved into a preventive maintenance program during this assessment period. Valves more susceptible to failure were inspected with greater frequency. A continued low forced-outage rate was the result of a "fix it before it breaks" attitude. Diagnostic equipment, such as thermography, air-operated valve testing, VOTES (valve operator testing and evaluation system), lubrication analysis, and corrosion and erosion monitoring, have resulted in more reliable detection of equipment faults. The continued use of the Data Acquisition and Analysis System (DAAS) allowed monitoring equipment conditions and was particularly useful in troubleshooting instruments with intermittent faults.

The approach to identification and resolution of technical issues was excellent as evidenced by work on the No. 2 EDG turbocharger. Excellent communications existed between engineering, maintenance and planning personnel to complete the job in a timely manner. The overall quality of maintenance activities continued to be excellent, as evidenced by both a low forced outage and high safety system

availability. All aspects of a good trending program were present and well implemented. The rework program was initiated, but was not defined by procedures and has not been in place long enough to determine effectiveness of implementation.

The licensee did an excellent job in ensuring quality during performance of the integrated leak rate test (ILRT). The test was well planned and executed. As a result of priorities established and maintenance performed on containment isolation valves (CIVs), no CIVs required repair due to excessive leakage. The extremely tight leakage requirements imposed on the CIVs ensured that the containment structure easily met the test requirements. New and more accurate instrumentation was purchased for use during the ILRT. In addition, a leakage rate testing program was purchased to allow tighter control over the testing process. Double valve verification and procedural changes ensured good control of equipment needed to support the ILRT.

Indications found on the decay heat drop line were aggressively investigated and found to be a result of the manufacturing process and were not detrimental to plant operations. Inservice inspection (ISI) activities were adequately planned with appropriate priorities assigned. These activities were controlled with well-stated and well-defined procedures. Records were complete, well-maintained, and accessible.

Greater control of the contract work force was exhibited when compared with the previous outage. Planning and scheduling of work continues to improve but weaknesses were noted during the outage with coordination of work efforts. Overtime during the outage was controlled well by management and improved from the previous outage. A nonoutage overtime rate of about 5 percent and a reduction of the work backlog were evidence that maintenance staffing was adequate. Staff training had a high priority and continued to be excellent. Errors by maintenance personnel during the outage resulted in a loss of a vital bus and resulted from poor work practices. When an EDG was out of service for a scheduled outage, the remaining operable EDG was made inoperable when work was conducted outside the scope of a work package. Maintenance personnel caused two plant transients during this assessment period when instrument and control (I&C) personnel operated switches improperly during a surveillance test and when a main feedwater pump tripped because maintenance personnel did not understand the lube oil cooler design. Some poor work practices such as poor cleanup of work sites following completion of maintenance activities were also noted.

2. Performance Rating

Performance is rated Category 1 in this area. Performance was rated Category 2 with an improving trend in the previous assessment period.

3. Recommendations

None.

D. Emergency Preparedness

1. Analysis

Evaluation of this functional area was based on the results of three Emergency Preparedness (EP) routine inspections. These inspections included observation of two EP exercises and one EP program review.

Enforcement history was excellent; no violations were identified.

Management effectiveness in ensuring quality was very good. Self-critiques of drills and exercises were concise and comprehensive, and included all major NRC inspection team findings. These self-critiques included relevant suggestions for improving the program, which were formally tracked on the emergency preparedness tracking system. To increase the realism in drills and exercises, the licensee purchased radio-controlled simulators of radiation detection instruments commonly used for offsite monitoring. The licensee was one of the first to complete final testing of the Emergency Response Data System (ERDS) and to fully incorporate the ERDS program into its emergency plan. As in previous assessment periods, management strongly supported liaison with State and county officials and provided considerable resources for offsite training.

The approach to identification and resolution of technical issues was good. The licensee revised its emergency action levels pertaining to shutdown and electrical systems after reviewing them in relation to a recent industry event. Emergency plan revisions were c well, and adequate justifications were provided for each change. One Unusual Event was conservatively declared and appropriate timely notifications were made to NRC, State, and county officials. The post-activation review was thorough and well done.

Overall performance during the 1990 exercise was very good, although some concerns related to communicating with the NRC via the emergency notificatic system were identified. However, performance in the 1991 exercise declin with one exercise weakness identified concerning the untimely declaration of a General Emergency and three concerns identified: incomplete documentation of certain Operation Support Center activities, lack of fire response training for radiological controls technicians, and lack of communications among key response facilities during significant events or changes in plant conditions. The licensee identified the exercise weakness and promptly initiated training to correct these problems. Both exercise scenarios were challenging and exercised a major portion of the licensee's emergency plan.

Staffing of the EP organization was ample. There was a minor restructing of the onsite and offsite EP organization that resulted in the loss of 2 positions; however, the EP organization still had 16 positions. This restructuring did not appear to have a negative impact on the EP program. Staffing and training of the emergency response organization (ERO) were good; at least three individuals were qualified for each ERO position.

2. Performance Rating

Performance is rated Category 1 with a declining trend in this area. Performance was rated Category 1 during the previous assessment period.

3. Recommendation

None.

E. Security

1. Analysis

Evaluation of this functional area was based on the results of two security inspections and one fitness-for-duty (FFD) inspection.

Enforcement-related performance improved and was considered excellent; no violations were identified.

Management effectiveness in ensuring the quality of the security program remained excellent. A protected area barrier reconstruction project was completed, which included installing a new state-of-the-art perimeter intrusion detection system, security fence, and closed-circuit television cameras. Management oversight, planning, and extensive compensatory measures for these projects and routine daily security activities were a program strength.

The approach to identification and resolution of technical issues was good. The need to install a state-of-the-art intrusion detection system, to reduce maintenance requirements and false alarm rates, was identified. The selection of a "video capture" system should improve the performance capabilities of perimeter alarm assessment. A clear understanding of the issues was demonstrated throughout the planning and implementation of security requirements associated with these upgrades. The program for required reporting of security events was excellent. Required logs and reports were accurate and timely. In general, security-related records were complete, well maintained, and readily available.

Security staffing was ample. The experience level of the security force was high as a result of the low turnover rate. Security resources were effectively used and a high level of security awareness and performance was evident. A close and effective liaison continued between local law enforcement agencies and licensee security management. Also, excellent communication was maintained between senior station management and the security staff. During this assessment period, security managers kept both resident inspectors and regional personnel fully informed of security issues at the site.

The training and qualification of the security force were excellent. The security department had a thorough, well-thought-out contingency training program that used defensive strategy and armed response contingency drills to test armed response capabilities. Security personnel performed their duties competently. The licensee continued to utilize the coordinated talents of

security, engineering, and contractor personnel to perform evaluations, to install new security equipment, and to train personnel. A timely and comprehensive program to heighten security awareness during the Persian Gulf conflict was implemented.

The FFD program satisfied the general performance objectives of 10 CFR 26.10. Program strengths included strong management support for the program, a new high-quality specimen collection and medical facility onsite, thorough auditing of the program, an ample number of personnel resources devoted to implementing the FFD program, and an active canine program to locate controlled substances.

2. Performance Rating

Performance is rated Category 1 in this area. Performance was rated Category 1 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 12 resident and 2 regional-based inspections and 2 operator licensing examinations.

Enforcement-related performance was good; only one violation was issued. In addition, the number of LERs attributable to this area remained low; none were indicative of a programmatic weakness.

Management effectiveness in ensuring quality was good. Management was aggressive in identifying and correcting engineering department weaknesses. For example, surveys were conducted of both engineering organizational personnel and customers to identify program strengths and weaknesses. An appropriate level of resources and expertise were available to support the operation of the facility. Special resources were allotted to resolve problems that had more generic implications. Special training provided to the performance engineering group facilitated their oversight of contractor activities during outages, an area of weakness in the past. Problems identified with the SBO DG modification and the SFAS bypass modification were promptly addressed and emphasized root-cause determination. A high degree of planning was evident in plant modifications, and emphasis was placed on assigning priorities. Complete modification packages prepared by design engineering, preceding the seventh refueling outage, significantly improved the planning and installation process. The technical quality of the packages was good. Management involvement in the operator licensing training program was evidenced by the high quality of the material submitted to the NRC and the improvement in pre-examination reviews which reduced the number of post-examination comments. Support to maintenance was apparent in both preventive maintenance requirement determinations and system performance monitoring.

A weakness was noted in the size of the engineering backlog. Over the years this backlog had increased to approximately 1600 modifications and 500 deficiency-related items, some of which had been physically started but not completed. This problem, which the licensee noted may have contributed to several potential personnel safety issues, was brought to management's attention early in the assessment period by an Independent Safety Engineering Group (ISEG) investigation. A prioritized program was approved late in the assessment period to clear the backlog by 1993.

The approach to identification and resolution of technical issues was generally good. When potential safety concerns related to boron precipitation were relayed to the licensee, the reactor was maintained at an appropriate power level until engineering fully evaluated the concern. The initial approach to criticality following startup from refueling was delayed by nuclear engineering, with management's support, until questions related to the predicted criticality point were resolved. A reanalysis of containment design parameters following a possible design analysis deficiency involving a feedwater line break outside containment was both timely and correct. In addition, a design change was implemented to prevent the known problem of a reactor trip following the loss of a single feedwater pump. The performance engineering group continued to use sophisticated diagnostic equipment to detect equipment deficiencies. The licensee's use of system engineers was very good. System engineers were routinely present at shift turnovers and provided excellent support to maintenance and operations. For example, they were instrumental in the discovery of the problem with No. 2 EDG's turbocharger. In addition, the system engineer's use of the DAAS allowed the cause of the reactor trip to be identified even though it was an intermittent problem. Their use of the DAAS improved the operations staff's ability to make the transition to automatic operation of the Integrated Control System during plant startup. System engineers were involved in all aspects of the maintenance process including problem resolution, root cause analysis, preventive maintenance determinations, and system performance monitoring. This involvement resulted in a definite sense of system ownership. Communication between maintenance personnel and system engineers was good.

The licensee's application of the American Society of Mechanical Engineers (ASME) Code at times lacked thoroughness, most notably in an application dealing with steam generator tube plugging. In this case, an ASME Code relief focused on an automatic welding process without sufficient recognition of the unique plug and weld design. Misinterpretations of the ASME Code also were noted in the submittal of the licensee's second 10-year inservice testing program for pumps and valves. Deficiencies were noted in the modification program. In one case, an inadequate design, coupled with installation and testing errors, resulted in the catastrophic failure of a transformer. In another case, deficiencies during the installation of the SFAS bypass modification rendered the EDG sequencer inoperable. In the case of the EDG field flash failures which occurred at the end of the assessment period, engineering was initially slow in identifying the root cause, however, once the third failure occurred, an aggressive problem resolution program was implemented.

Staffing levels were adequate, and resources were available to deal with emergent problem areas. Support for the NRC's requalification examination development was excellent. The new design engineering supervisor brought both engineering and operations experience to the department.

Although some knowledge deficiencies were noted in the engineering department, the overall effectiveness of training in the engineering area, as reflected in the support of, and credibility with, operations and maintenance organizations was good. The engineering staff was experienced in all phases of design engineering and as a result design packages were done at the site. System engineers' experience levels were good. Not only did they receive detailed training on their specific systems, they were also provided the opportunity to attend national industry conferences related to system or associated component performance. In addition, a continuing education program encouraged personnel to obtain advanced degrees. Training effectiveness in the initial operator license area and requalification training programs was very good.

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.

G. Safety Assessment/Quality Verification

1. Analysis

Evaluation of this functional area was based on the results of 12 routine inspections by resident inspectors, and 3 inspections by region-based inspectors. In addition, licensee requests for amendments, exemptions or relief, responses to NRC generic communications, and other interactions with the NRC staff were considered.

Enforcement-related performances continued to be good. One violation was identified where the corrective action to preclude recurrence of a similar event was inadequate. This event involved the overfill of steam generator 1-2 and subsequent release of 700 gallons of water to an onsite storage pond during the seventh refueling outage. A similar event occurred during the sixth refueling outage. This event was attributed to personnel error, as was the case with the majority of events at the site. Management took many initiatives to improve human performance and to reduce the number of personnel errors; however, some problems with personnel errors remained.

Management effectiveness in ensuring quality was generally good, as shown by the corrective actions taken in response to unresolved issues previously identified by NRC staff. The licensee has addressed systematic weaknesses by modifying the SFAS circuitry to prevent unnecessary SFAS actuations when the plant is in a mode where SFAS is not required. Their commitment to zero fuel defects resulted in the ultrasonic inspection of all fuel rods used in the present operating cycle. The licensee performed a shutdown risk assessment to identify the contributions to risk and to recommend methods to minimize that risk during a refueling outage. The assessment was comprehensive, focused on

safety, and resulted in plant initiatives that exceeded technical specification (TS) requirements. The licensee made some hardware changes, many procedural enhancements, and implemented several policy changes. Management involvement was evident during reduced inventory operations to ensure program requirements were carried out. Further challenges remain to reduce potential barriers faced by maintenance and operations personnel in conduct of their normal duties such as improved contamination controls, lighting, and clean-up of areas containing safety related equipment.

The approach to identification and resolution of technical issues was good. The design and implementation of the anticipated transient without scram (ATWS) mitigating systems were generally acceptable. For the most part, design attributes were retrievable, the systems and related support equipment were properly installed in the plant, and the material condition of the ATWS systems was acceptable.

Technical recommendations (TRs) resulting from the safety and performance improvement program (SPIP) were satisfactorily implemented. The licensee made hardware and software changes that met the intent of the TRs, and had acceptable analyses that verified existing bases for rejection or nonapplicability of a TR. The licensee implemented an excellent SPIP.

The licensee was generally timely in its submittals, but needed some improvement for those submittals associated with refueling outages. For example, a response to NRC questions on an exemption request regarding respirators was submitted just 6 weeks before the start of the outage. Also, some amendments were submitted 3 months before the start of the outage, rather than the NRC-desired time of at least 6 months.

A multi-disciplined task force was established to assess the corrective action program and provide recommendations to improve the program's effectiveness. The team determined that the in-place corrective action program was adequate, but its implementation was weak. Since their report was issued, some progress has been made. The potential-condition-adverse-to-quality process was strengthened by implementing improvements that provided consistency in review board membership and better guidance regarding root-cause determination. Root-cause determination and event investigation for equipment failures were thorough and comprehensive. Engineers were trained in root-cause analysis techniques that follow Institute of Nuclear Power Operations guidelines. Evaluations for the decay heat removal pump trip and the SBO transformer failure were good in identifying the causes of these events. Evaluation of the root cause for personnel errors had limited success. A formal root-cause procedure was still in development.

Licensee management strongly supported critical self-assessment of activities in all functional areas. Maintenance self-assessment, engineering customer survey and management discussion with the operating crews about lessons learned from previous events were notable initiatives. The ISEG continued to be a strength in identifying and resolving emerging issues. The ISEG was involved in a shutdown risk assessment and its implementation by assigning group members to inspect certain elements of the study recommendations. The ISEG also

conducted a setpoint inspection, EDG safety system functional inspection and a solenoid-operated valve inspection, and was responsible in developing an agreement between the site and transmission personnel outlining switchyard lines of responsibility. In addition, the ISEG identified the concern with the modification backlog and its potential personnel safety concerns and was instrumental in the prioritization program developed to resolve this concern.

Quality assurance (QA) audits were performance based. The increased use of surveillances, combined with audits, allowed the QA management to make broad conclusions concerning a given functional area performance. Management corrective action requests (MCARs) were initiated for a series of radiological events, software controls, and an SBO DG modification. When QA identified inadequate management oversight early in the refueling outage, the deficiencies were corrected before they got worse.

In response to the MCAR in the radiological controls area, management took innovative measures to identify and resolve personnel issues. As stated by a psychologist, people issues were aired and discussed and appropriate measures were implemented to improve the performance of the group.

There is a stable, experienced management team onsite. The onsite organization displayed a willingness to be introspective and was proactive in identifying and resolving issues. The licensee also rotated personnel including licensed operators between organizations to improve overall plant performance and broaden individual experience levels. These changes allowed the communications between organizations to improve during the refueling outage. The licensee also was proactive in sharing information and in participating in industry initiatives.

2. Performance Rating

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

3. Recommendations

None.

IV. SUPPORTING DATA AND SUMMARIES

A. Major Licensee Activities

1. On July 1, 1990, the unit was brought to criticality following the completion of the sixth refueling outage.

2. On December 13, 1990, a reactor trip occurred on low reactor coolant pressure. Group 7 control rods dropped into the core in response to insufficient current to the control rod drive magnet stators during a surveillance test.

3. On August 31, 1991, the unit was shut down to commence the seventh refueling outage.

4. On November 4, 1991, the unit was brought to criticality following completion of the seventh refueling outage.

B. Major Inspection Activities

The inspection reports discussed in this SALP are listed below:

Docket Number 50-346
Inspection Report Numbers 90015 through 90023 and 91002 through 91021.

1. From July 23, 1991, through July 25, 1991, a special inspection was conducted of the licensee's fitness-for-duty program (Inspection Report No. 346/91012).

2. From November 4, 1991, through November 22, 1991, a special engineering inspection was conducted of the licensee's modification program (Inspection Report No. 346/91016).