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Docket No. 50-285  
License No. DPR-40

Omaha Public Power District  
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Gentlemen:

SUBJECT: INITIAL SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE REPORT

This forwards the initial Systematic Assessment of Licensee Performance (SALP) Report (50-285/91-99) for the Fort Calhoun Station. The SALP Board met on September 10, 1991, to evaluate Fort Calhoun's performance for the period May 1, 1990, through July 31, 1991. The performance analyses and resulting evaluations are documented in the enclosed initial SALP report.

In accordance with NRC policy, I have reviewed the SALP Board's assessment and concur with their ratings, as discussed below:

1. The performance in the functional area of Plant Operations continued a Category 2, with an improving performance trend. Performance in this area was characterized by a conservative management approach to safe plant operations, a highly experienced and knowledgeable operating staff, and an overall improving performance trend. Nevertheless, issues related to the quality of emergency operating procedures, operator training, and the lack of a proactive approach to degraded reactor coolant pump seal operations indicated the need for additional operations management attention in day-to-day operating activities.
2. In the functional area of Radiological Controls, performance was rated as Category 1. The SALP Board noted continued performance at the same high level that was evident during the previous assessment period.
3. The performance in the functional area of Maintenance/Surveillance was determined to be Category 2, with an improving performance trend. Performance in this area was characterized by strong programs, superior surveillance program implementation, completion of Safety Enhancement Program initiatives, and an overall improving trend in maintenance program implementation.

*RIV:SRI	*PE:DRP/C	*C:DRP/C	*AD:DRSS	*AD:DRS	*PM:FCS
RPMullikin	EECollins	PHHarrell	EJButcher	LJCallan	WCWalker
09/ /91	09/ /91	09/ /91	09/ /91	09/ /91	09/ /91

*AAD:RIV&V	*DD:DRP	DRM	RA RDM
TRQuay	TPGwynn	JMMontgomery	RDMartin
09/ /91	10/ /91	10/ /91	09/4/91

\*previously concurred

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Q PDR

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4. The functional area of Emergency Preparedness was rated as a Category 2 and was noted to have improved. Management attention and support, subsequent to the November 1990 exercise, demonstrated aggressive actions to improve overall performance.
5. The performance in the functional area of Security was rated as a Category 1. Improvement in all aspects of this functional area was noted.
6. The performance rating in the functional area of Engineering/Technical Support was determined to be a Category 1. This rating was based on the excellent response provided by engineering personnel to identified plant deficiencies and the nuclear safety oversight provided by engineering management and supervision.
7. The performance in the functional area of Safety Assessment/Quality Verification was rated as Category 1. The oversight of all safety-related activities by corporate and plant management was superior. Audits performed by the licensee's quality assurance organization were notable.

Overall, the performance by the licensee's management and staff displayed a conservative, safety conscious approach toward operation of the plant and implementation of various programs. Especially noteworthy were the contributions of engineering to safe plant design and operations and the completion of the items contained in the Safety Enhancement Program and the integration of program enhancements into the safety policies and procedures at the Fort Calhoun Station

Based on the SALP Board's assessment, which reflects an overall improving performance trend at the Fort Calhoun Station, the length of the next SALP period will be 18 months; therefore, the SALP period will be from August 1, 1991, through January 30, 1993.

A management meeting has been scheduled with you and your staff on October 22, 1991, at your Emergency Offsite Facility in Omaha, Nebraska, to review the results of the SALP Board. Within 20 days of this management meeting, you may provide written comments on, and amplification of, as appropriate, the initial SALP report. Your written comments, a summary of our meeting, and the results of my consideration of your comments will be issued as an appendix to the enclosed initial SALP report and will constitute the final SALP report.

Sincerely,

Original signed by  
Robert D. Martin

Robert D. Martin  
Regional Administrator

Enclosure: (see next page)

Enclosure:  
Initial SALP Board Report  
50-285/91-99

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INITIAL SALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBER

50-285/91-99

Omaha Public Power District

Fort Calhoun Station

May 1, 1990, through July 31, 1991

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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 based upon 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'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 September 10, 1991, to review the observations and data on performance and to assess licensee performance in accordance with NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance."

This report is the NRC's assessment of the licensee's safety performance at the Fort Calhoun Station for the period May 1, 1990, through July 31, 1991.

The SALP Board for the Fort Calhoun Station was composed of:

### Chairman

T. P. Gwynn, Deputy Director, Division of Reactor Projects (DRP), Region IV

### Members

L. J. Callan, Acting Director, Division of Reactor Safety (DRS), Region IV  
E. J. Butcher, Acting Director, Division of Radiation Safety and Safeguards (DRSS), Region IV  
T. R. Quay, Acting Assistant Director, Region IV & V Reactors, Office of Nuclear Reactor Regulation (NRR)  
W. C. Walker, Project Manager, Fort Calhoun Station, NRR  
P. H. Harrell, Chief, Project Section C, DRP, Region IV  
R. P. Mullikin, Senior Resident Inspector, Fort Calhoun Station, DRP

The following personnel also participated in the SALP Board meeting:

E. E. Collins, Project Engineer, Project Section C, DRP, Region IV  
R. A. Gramm, Acting Project Director, Project Directorate IV1, NRR  
J. L. Pellet, Chief, Operator Licensing Section, DRS, Region IV  
K. M. Kennedy, Licensing Examiner, Operator Licensing Section, DRS, Region IV  
L. T. Ricketson, Radiation Specialist, Radiological Protection and Emergency Preparedness Section, DRSS, Region IV  
J. E. Gagliardo, Chief, Operational Programs Section, DRS, Region IV  
C. L. Cain, Chief, Nuclear Materials and Safeguards Inspection Section (NMSIS), DRSS, Region IV  
T. F. Stetka, Chief, Plant Systems Section, DRS, Region IV  
M. L. McLean, Inspector, NMSIS, DRSS, Region IV  
I. Barnes, Chief, Materials and Quality Programs Section, DRS, Region IV

## II. SUMMARY OF RESULTS

### Overview

During this assessment period, the licensee's performance displayed a conservative, safety conscious approach toward operation of the plant and implementation of various programs. Especially noteworthy was the completion of the items contained in the Safety Enhancement Program and implementation of the program commitments into the procedures used during plant operation and safety-related activities.

In plant operations, the operations staff and plant management demonstrated a conservative and safe approach to operation of the plant. Operators exhibited professionalism and dedication towards the performance of their duties. Management support for plant operations was excellent, with the exception of operations management oversight of the control and upgrade process for emergency operating procedures and the contingency planning for a potential failure of a reactor coolant pump seal.

The radiation protection department continued to perform at a high level. Management effectiveness was evident by several improvements and refinements made during this assessment period.

The licensee's efforts in the implementation of maintenance programs and activities resulted in a continuing overall improving trend. The licensee's efforts in completing the commitments in response to Generic Letter 89-13 were generally good. Implementation and oversight of the surveillance testing program was noteworthy.

Performance improvement was seen in all areas related to plant security. The licensee's emergency preparedness program improved during this assessment period. Management attention and support for the emergency preparedness program, subsequent to the November 1990 exercise, demonstrated aggressive actions to improve overall performance.

Engineering/technical support performance was superior. Excellent progress in the design reconstitution program and development of effective design basis documents was made. Weaknesses were noted with the operator training program.

The licensee continued to maintain a high level of performance in the oversight of the operation of the plant, as was evident during the previous assessment period. This level of oversight has resulted in an increase in the performance level in all functional areas.

The licensee's performance category rating for each functional area is provided in the table below, along with the ratings from the previous SALP assessment period:

Functional Area	Rating Last Period (05/01/89 to 04/30/90)	Rating This Period (05/01/90 to 07/31/91)
Plant Operations	2I+	2I*
Radiological Controls	1	1
Maintenance/Surveillance	2I+	2I*
Emergency Preparedness	2	2
Security	2I+	1
Engineering/Technical Support	2	1
Safety Assessment/Quality Verification	1	1

+ Improving Trend - Licensee performance was determined to be improving during this assessment period.

\* Improving Trend - Licensee performance was determined to be improving during this assessment period. Continuation of the trend may result in a change in the performance rating.

### III. CRITERIA

The evaluation criteria, category definitions, and SALP process methodology that were used, as applicable, to assess each functional area are described in detail in NRC Manual Chapter 0516. This chapter is available 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 on October 22, 1991.

### IV. PERFORMANCE ANALYSIS

#### A. Plant Operations

##### 1. Analysis

The assessment of this functional area consists chiefly of the control and execution of activities directly related to operating the plant. Evaluation of this functional area was based on routine inspections performed by the resident inspectors and a region-based team inspection of the emergency operating procedures.

The previous SALP report (NRC Inspection Report 50-285/90-24) recommended that licensee management continue its efforts to increase operator staffing levels and to ensure that activities related to equipment operability and event reportability were performed in a timely and conservative manner.

Conservative equipment and component operability decisions in the latter part of the assessment period were noted in the previous SALP report. These efforts continued throughout this assessment period. Operability decisions were noted to be proper and conservative. Reporting of issues and events was noted to be excellent, with the exception of a ventilation isolation actuation system event



and the failed linkage pins for the actuators on the emergency diesel generator dampers.

Lack of management tours of the plant, other than the control room, was also identified as a concern in the last SALP report. The problem continued during the first half of the current assessment period; however, increased management presence in the operating spaces was noted later in this assessment period.

Plant management's support of operations personnel during abnormal plant conditions indicated a conservative approach to safe plant operation, as discussed below:

- ° In August 1990 the plant was shut down due to partial blockage of a reactor coolant pump seal. The licensee continuously monitored the status of the seal to determine if the blockage would clear. When it was apparent that seal failure was probable, the plant was shut down in a controlled manner.
- ° In September 1990 the plant was shut down after preliminary analyses indicated that the plant could be outside the containment cooling design bases for the component cooling water, raw water, and containment spray systems following a worst-case, design basis accident. The decision to shut down the plant was based on preliminary data and was a conservative course of action.
- ° In December 1990 the plant was shut down to locate and repair the source of unidentified reactor coolant system leakage that had been noted since October. The leakage never exceeded Technical Specification allowable limits, but initial attempts to locate the source of the leakage were unsuccessful. In November the licensee formed a task group to analyze the data gathered and determine the likely source of the leak. The group concluded that the likely source of the leakage was from the reactor vessel head area.

After the shutdown, a spare control element drive mechanism housing was found to have a through-wall crack. Additional cracks, that did not extend through the wall, were found in a similar spare mechanism housing. The communication between the licensee and the NRC staff during this event was excellent.

- ° On occasions, when the preferred offsite power source (161 kV) was out of service, measures were instituted to minimize the possibility of affecting the remaining electrical sources. Measures included controlling access to switchgear rooms and rescheduling of maintenance that could affect electrical system reliability.

As noted above, the plant was shut down because of the failure of a reactor coolant pump seal. Review of this event identified that, although management made a conservative decision to shut down the plant, operations management direction and preplanning for the potential of a catastrophic failure of the

seal was not apparent. For example, the operations staff was not required to review the appropriate emergency procedures and personnel assignments were not clearly specified. The shift technical advisor and the system engineer provided positive contributions to minimize the effect of the seal failure on plant operations. The information received from these individuals by the shift supervisor and plant management was extremely valuable in determining the safest course of action.

Licensed operators exhibited professionalism and a commitment toward the performance of their duties. Standards for formal, on-shift communications had been established and implemented in the training department; however, operations management did not implement the standards for on-shift personnel. Plant operators were challenged on occasion by plant perturbations and prevented more serious conditions from occurring. Examples included the rupture of an instrument air header, failure of a feedwater regulating valve, and loss of power to the control instrumentation for pressurizer pressure and level.

The licensee continued to maintain a very experienced and knowledgeable group of senior reactor and reactor operators. During this assessment period, the operations staff experienced a small turnover rate of two senior reactor operators. One additional senior reactor operator was transferred from on-shift to other duties. On-shift staffing was maintained at a level that permitted a six-shift rotation, even with the loss of three senior reactor operators from on-shift duties. This was accomplished by using senior reactor operators that are not normally assigned on-shift duties. Overtime in the operations department was maintained below the requirements specified in the Technical Specifications.

To address the issue of the loss of personnel, the licensee presently has a total of 15 individuals scheduled to take the NRC operator license examination in October 1991. This includes four upgrades to senior reactor operator, seven initial reactor operators, and four instant senior reactor operators.

Licensed operators have been transferred to other departments within the licensee's nuclear organization such as outage planning, maintenance planning, training simulator services, and engineering, resulting in a positive contribution to overall plant safety.

There were no automatic reactor trips during this assessment period and only one manual trip. There has been one automatic trip since July 1984. The one manual trip occurred in November 1990, when a soldered connection on the turbine building instrument air header failed and resulted in decreasing steam generator level. The shift supervisor's decision to trip the plant precluded an automatic trip and demonstrated a confidence that management has in their operations personnel to make safe and conservative decisions.

The licensee experienced personnel errors, as discussed below:

- ° A turbine trip, reactor protection system actuation while shut down and inadvertent emergency diesel generator start resulted from personnel errors.
- ° Two operating crews misinterpreted a Technical Specification action statement requirement for plant instrumentation. However, the performance of operations personnel in the interpretation of Technical Specification requirements has been excellent, except for this example.
- ° Equipment tagging errors have been a problem for several years and various procedure upgrades have been ineffective. As a result of ongoing equipment tagging errors and the failure of an independent verification requirement to adequately correct the problem, the licensee reviewed other licensee's tagging programs that had been identified as superior. This review was completed and lessons learned were incorporated into plant procedures and were considered sufficient to minimize tagging errors.
- ° Errors by nonlicensed operators resulted in unmonitored, unsampled acidic effluent being released to the Missouri River and sulfuric acid being released to the east lagoon without first going to the neutralization basin. Plant management determined that stricter controls were needed to prevent future releases and, as a result, enhancements were made to the appropriate procedures, which should prevent recurrences. Management's action was prompt and a strong commitment to balance-of-plant evolutions was evident.

The personnel errors discussed above are not considered to be programmatic. Management's efforts to correct these identified deficiencies was effective and the use of industry experience to correct the ongoing tagging problems was notable.

The interface between the operations staff and the departments that provide support to operations (e.g., engineering, health physics, maintenance, chemistry, and training) has been generally effective. However, inadequate communication of a decreasing boron concentration in a safety injection tank resulted in the initiation of a Technical Specification required plant shutdown and the declaration of a Notification of Unusual Event. Had plant management been alerted to this trend earlier, action could have been taken before the Technical Specification actions were required. Although significant, this event was considered to be an isolated case.

The licensee made continued progress with upgrading housekeeping, system and component labeling, and plant appearance. The painting of plant operating spaces has been completed with the exception of the radiologically controlled area, which was nearing completion at the end of this assessment period. Overall, the physical appearance of the plant was excellent. Housekeeping and the licensee's system and component labeling program were superior.

During this assessment period, a team inspection of the licensee's emergency operating procedures was conducted. The team concluded that the licensee's

plant-specific emergency operating procedures were adequate and that the operators had been adequately trained on the use of the emergency operating procedures, but a number of significant weaknesses were identified by the NRC in the development and the use of the procedures. The number and scope of the weaknesses identified indicated a lack of effective participation by operations management in ensuring the quality of procedures. It was also noted that operator performance in response to simulated emergencies was good.

In response to the problems identified with emergency operating procedures, the licensee assigned an individual with a senior reactor operator license to oversee the emergency operating procedures upgrade program. Each operating shift has been assigned specific procedures to review for verification of completeness and accuracy and to maintain in an up-to-date status. These efforts have resulted in significant changes being made to the procedures control process and have resulted in improvements in the content of emergency procedures.

Overall, the performance of the operations staff, in response to plant perturbations, was noteworthy. Although some isolated personnel errors were identified, overall performance was excellent. Management support for this functional area was excellent, with the exception of operations management's oversight of the implementation of the control process for emergency operating procedures. In addition, operations management's preplanning for the possibility of a catastrophic failure of a reactor coolant pump seal was not proactive. The enforcement history has been excellent. The operations staff and plant management demonstrated a conservative and safe approach to plant operations. Operators exhibited dedication towards the performance of their duties. Good interface was maintained between operations and other licensee organizations. Housekeeping and management tours were notable. Operator performance during simulated emergencies was considered to be good. The use of information from other licensees to resolve the ongoing problems with tagging was excellent.

## 2. Performance Rating

The licensee is considered to be in Performance Category 2 in this functional area, with an improving trend.

## 3. Recommendations

### a. NRC Actions

None.

### b. Licensee Actions

Management should continue with the efforts already in process for increasing the number of licensed, on-shift operators and upgrading of the emergency operating procedures. Operations management should become more proactive in providing guidance and direction to operations personnel.

## B. Radiological Controls

### 1. Analysis

The assessment of this functional area consists of activities related to radiation protection, radioactive waste management, radiological effluent control and monitoring, water chemistry controls, and transportation of radioactive material and solid radioactive waste processing. This area was inspected by resident and region-based inspectors.

Superior performance was noted in this functional area during the previous assessment period, but concerns were identified involving the survey of visitors leaving the site, continuous health physics coverage for a worker in a very high radiation area, and adherence to radiation protection procedures by a security guard. The SALP report recommended that the licensee implement a strong self-assessment program, ensure that radwaste personnel be given specific training, and include transportation activities in quality assurance audits. During this assessment period, the licensee pursued these concerns and implemented aggressive program improvements to address these matters in an effective manner.

Plant and corporate management demonstrated excellent support for the radiation protection department by maintaining sufficient staff, operating budget, and training opportunities. A good working relationship existed between the radiation protection section and other departments. Radiation protection supervisors and coordinators maintained an excellent knowledge of activities in the radiological controlled area. Personnel changes included the radiation protection manager and two group supervisors leaving the radiological protection department. No change in performance was observed subsequent to these personnel changes.

The quality assurance organization performed excellent audits, which were comprehensive and performance based. The audit teams included individuals with technical expertise in the radiation protection area. Responses to audit findings were timely and technically correct.

The radiological occurrence reporting program was refined during this assessment period and restructured into a more meaningful management tool. The handling of reported events were prioritized and the number of areas into which causes of the occurrences could be listed for trending purposes was expanded.

Overall, management support for the as-low-as-reasonably-achievable (ALARA) program was excellent as evidenced by the cumulative exposure being consistently within exposure goals. ALARA representatives performed thorough reviews on design changes, procedure changes, and maintenance work requests, which resulted in excellent ALARA packages. The ALARA suggestion program was well accepted and supported by plant personnel. The licensee demonstrated strong support for the ALARA program through the activities of the Executive ALARA Committee, which was composed of upper-level corporate and plant management.

The radiation protection department placed little reliance on contract personnel during normal operations and had stable radiation protection staffing levels. When contract radiation protection personnel were hired, the licensee used a screening examination to aid in the selection of qualified personnel. A high percentage of radiation protection personnel were registered by the National Registry of Radiation Protection Technologists. The supervisors and professionals in the radiation protection organization were provided training in their respective areas of responsibility through vendor-supplied training or attendance at professional meetings. An excellent training program was established for radiation protection technicians. Specific training was also provided in radiation hazards associated with various plant systems. The training department instructors were well prepared and knowledgeable and maintained their radiation protection qualifications by working in the plant during outages. The attributes discussed above have resulted in the licensee maintaining an excellent staff of trained and qualified personnel.

The effectiveness of the radiation work permit program increased during this assessment period. Changes were made in the radiation work permit program to heighten the awareness of the radiation protection staff and station personnel by using radiation work permits to identify special precautions or equipment that might be necessary. There was a downward trend in the number of personnel contaminations. The licensee established an excellent program for reducing the number of contaminated areas within the radiological controlled area.

An effective liquid and gaseous waste release permit program was established to ensure that planned releases to the environment received proper review and approval prior to the release. An effective sampling and analyses program was implemented to ensure compliance with the Radiological Effluent Technical Specifications and the Offsite Dose Calculation Manual. The quantities of radionuclides released were within specified limits. The licensee performed testing and surveillances of safety-related air cleaning systems, as required. The operability of several process and effluent radiation monitors continued to be a concern. The licensee was implementing a program to replace and/or relocate troublesome process and effluent radiation monitors. The licensee maintained a well-qualified staff to implement this program area. Management involvement was evident by the performance of a comprehensive quality assurance surveillance of the radiological effluent release program. Radioactive releases were properly documented in semiannual radioactive effluent release reports.

The licensee maintained state-of-the-art water chemistry and radiochemistry instrumentation and procedures that reflected current analytical techniques. A new chemistry laboratory was constructed that provides state-of-the-art facilities. The licensee implemented a good chemistry data management program to record and trend reactor coolant and secondary water quality data. The staffing level in the chemistry department remained at an appropriate level. The chemistry department personnel turnover rate was low. An excellent training and qualification program had been established for the chemistry staff. A comprehensive quality assurance surveillance and audit program had

been implemented with qualified and knowledgeable auditors to provide management oversight of the chemistry area.

The licensee maintained excellent implementing procedures for classification, characterization, and shipment of radioactive waste. Individuals involved in preparing radioactive packages for shipment were qualified and knowledgeable of the applicable regulations and station procedures. Excellent quality assurance audits of radwaste transportation activities were performed.

In summary, the radiation protection department continued to perform at a high level. Several improvements and refinements were made during this assessment period. The ALARA program received excellent support from upper management and the licensee implemented noteworthy programs in the areas of radiological protection training, radiochemistry and water chemistry, radioactive waste effluents, and transportation of radioactive materials. Performance of quality assurance and training was superior. The enforcement history was excellent.

## 2. Performance Rating

The licensee continued to be in Performance Category 1 in this functional area.

## 3. Recommendations

None.

## C. Maintenance/Surveillance

### 1. Analysis

This functional area includes the activities associated with the maintenance of plant structures, systems, and components and the installation of plant modifications. This area also includes the conduct of surveillance testing, containment integrated leak rate testing, and inservice testing activities.

This area was inspected by resident and region-based inspectors. The region-based inspections included a performance-based reinspection of selected maintenance activities inspected in the maintenance team inspection and a special inspection of the service water system.

The previous SALP report recommended that the licensee ensure that upgrade programs (i.e., maintenance, inservice testing, and the Safety Enhancement Program) be completed for performance improvement in this functional area. Implementation of the commitments contained in these upgrade programs resulted in a continuation of the overall improving performance trend noted in the previous SALP report.

The maintenance reinspection team, which included a review of previously identified inspection findings and weaknesses, determined that the licensee's maintenance process had improved in nearly all of the areas inspected. There were no areas in which performance had declined. The programmatic aspects of

each of the maintenance areas inspected was noteworthy, but many of the newly developed programs had not been fully implemented because the programs were so new. Overall, the licensee's response to the weaknesses identified in the maintenance team inspection report was good, with some areas showing marked improvement.

The licensee implemented the maintenance-related items contained in the Safety Enhancement Program that included increased staffing levels, upgrade of the preventive maintenance program, establishment of criteria for identifying postmaintenance testing requirements, development of an outage and maintenance planning manual, and periodic observations by field supervisors of work in progress and providing of timely feedback to maintenance personnel. Implementation of these items resulted in overall improvement in the control and performance of maintenance activities.

Maintenance activities were generally completed in a professional manner and in conformance with the appropriate procedures and instructions. Coordination among the maintenance, operations, quality control, and engineering departments was effective. The licensee maintained a stable and well-qualified maintenance work force.

The systems engineering organization was actively involved in maintenance and surveillance activities. The oversight provided by the engineers helped to ensure that the maintenance and surveillance programs were implemented in a satisfactory manner.

The licensee's program for the inspection, testing, and maintenance of the service water, component cooling water, and raw water systems was generally good and conformed with the Technical Specification requirements and the licensee's commitments, as specified in response to Generic Letter 89-13. The licensee had also effectively implemented the requirements of the inservice testing program for these systems.

The licensee's implementation of the surveillance program was noteworthy. Surveillance tests were scheduled and performed as required by the Technical Specifications. Personnel adherence to surveillance procedures was evident. The containment integrated leak rate test results were good. Coordination among surveillance, system engineering, and operations personnel during testing activities was effective.

The licensee implemented an aggressive program for upgrading the content of all maintenance and surveillance procedures by providing clearer guidance for task performance and making the procedures more user friendly. This effort resulted in the development and issuance of generally superior maintenance and surveillance procedures.

In summary, maintenance program improvements and the completion of commitments contained in the Safety Enhancement Program resulted in a continuing overall improving trend in maintenance performance. The licensee's efforts in completing the commitments in response to Generic Letter 89-13 were generally



good. The enforcement history in this functional area was excellent and implementation and oversight of the surveillance testing program was noteworthy. Continuation of the observed trend and additional experience in implementing maintenance program improvements were needed to achieve an overall superior maintenance program.

## 2. Performance Rating

The licensee is considered to be in Performance Category 2 in this functional area, with an improving trend.

## 3. Recommendations

None.

## D. Emergency Preparedness

### 1. Analysis

This functional area includes activities related to the establishment and implementation of the emergency plan and implementing procedures, onsite and offsite plan development and coordination, support and training of emergency response organizations, licensee performance during exercises and actual events that test emergency plans, and interactions with onsite and offsite emergency response organizations during planned exercises and actual events. Evaluation of this functional area was based on the results of inspections by regional inspectors and observations made by the resident inspectors.

Two events occurred during this assessment period which resulted in the declaration of unusual events and implementation of portions of the emergency preparedness program. One event involved a shutdown required by the Technical Specifications that involved a low boron concentration in a safety injection tank. The other event involved the loss of emergency assessment capability when the emergency response computer was declared inoperable. Each event was properly classified and the appropriate state and federal notifications were made within the specified time limit.

During emergency exercises, conducted in prior assessment periods in June 1988 and July 1989, weaknesses were identified involving the performance of the technical support center staff. During this assessment period, similar weaknesses were identified in the November 1990 exercise. These programmatic weaknesses involved the performance of the technical support center staff and included examples of poor coordination and direction, poor operational assessment, and technical support to operations. Because of the repetitive nature of the weaknesses, a Notice of Violation was issued. In addition, weaknesses were identified during the November 1990 exercise that included an untimely response to an onsite fire, inadequate plant access control of nonessential personnel during emergencies, poor information flow from the control room, and problems identified with the scenario. The significant

weaknesses identified during the 1990 exercise indicated a declining trend in the licensee's emergency preparedness program.

During the May 1991 exercise, the licensee's response improved in several areas, most notably in the technical support center. For the first time, the scenario was run from the control room simulator in the dynamic mode, adding challenge and realism to the exercise. The technical support center functioned in an excellent support and tracking mode, and the previous weaknesses identified in this area had been corrected. Despite the overall improvement noted during the May 1991 exercise, exercise weaknesses were noted that included the failure to adequately evaluate plant conditions and correlate them with a radiological release, failure to exercise adequate radiological controls in the operational support center, and the use of an out-of-date map by a field monitoring team to describe its location. Even though some weaknesses were identified during the 1991 exercise, a marked improvement was noted when compared to the licensee's performance during the 1990 exercise.

Overall, during observation of the exercises, the licensee's responses demonstrated the ability to implement the emergency plan and to protect the health and safety of the public. During both exercises, the licensee's personnel demonstrated an effective working relationship with state and local offsite authorities.

An operational status inspection determined that a sufficient number of personnel had been trained and assigned to the emergency response organization to support an initial emergency response and subsequent staff augmentation. The organization established a chain of command, with the duties and responsibilities of each position clearly defined. An effective methodology for notification and callout of the response organization had been established and periodically tested. The emergency planning organization was staffed with sufficient numbers of qualified personnel to support emergency planning activities. Emergency planning reported directly to senior licensee management and received good support. Emergency facilities, equipment, and supplies were maintained in a state of operational readiness.

Although not fully implemented, emergency responder training was upgraded. The upgrades included a well-defined training program for each emergency response position description, with performance-based objectives and practical evaluation checklists used to ensure that trainees obtained the skills required by their assigned positions.

During this assessment period, the licensee completed a comprehensive evaluation and revision of its emergency implementing procedures, which was part of a Safety Enhancement Program initiated in late 1988. Improvements were noted in many of the procedures. The licensee's internal process for reviewing and submitting changes to the emergency plan and implementing procedures was effective.

A series of emergency response walkthroughs with operating crews were performed using the simulator in the dynamic mode to evaluate the knowledge and

performance of personnel assigned to the control room during emergencies. The inspectors noted that the teams performed satisfactorily during the walkthroughs and demonstrated that they were trained and capable of responding to a simulated emergency.

An evaluation was performed of the licensee's dose calculation and assessment procedures and methodology. The licensee maintained dedicated computer terminals in emergency response facilities for performing dose assessments. The licensee's dose assessment programs were based on industry accepted methodologies, were quick and easy to use, and results compared well with those obtained for comparison purposes from the states of Nebraska and Iowa, when using the same input data.

The licensee's quality assurance program encompassed the emergency preparedness program as evidenced by the performance of effective audits. Audits were performed using qualified audit personnel. Audit findings were properly characterized, communicated to licensee management, appropriately tracked, and corrected in a timely manner.

In summary, the licensee's emergency preparedness program improved during this assessment period. Exercise performance improved at the staff and facility level, and the most recent exercise used the control room simulator for the first time in the dynamic mode. Improvements were made in the licensee's emergency implementing procedures and training program for emergency responders. The enforcement history in this functional area was good. Management attention and support for the emergency preparedness program, subsequent to the November 1990 exercise, demonstrated aggressive actions to improve overall performance.

## 2. Performance Rating

The licensee is considered to be in Performance Category 2 in this functional area.

## 3. Recommendations

### a. NRC Actions

None.

### b. Licensee Actions

Management should provide the appropriate oversight to ensure that weaknesses identified during emergency exercises are promptly addressed and comprehensive corrective actions are implemented.

## E. Security

### 1. Analysis

This functional area consists of activities associated with the security of the plant, including all aspects of access control, security background checks, safeguards information protection, and fitness-for-duty activities and controls. Evaluation of this functional area was based on the results of routine security and fitness-for-duty inspections performed by regional inspectors, one reactive inspection performed by regional inspectors accompanying personnel from the Office of Investigations, and observations made by the resident inspectors.

The reactive inspection conducted in conjunction with personnel from the Office of Investigations was performed to review allegations related to the security program. The minor violations identified did not reflect any programmatic concerns with the implementation of the security program.

The previous SALP report noted improving overall performance by the security organization and recommended continued management support. Significant security program improvements were noted during this assessment period. The previous SALP report also noted that the licensee experienced difficulties in implementing firewatch patrols required by the Technical Specifications. Event reports submitted by the licensee identified two instances of inadequate firewatch patrols. The licensee took immediate and comprehensive corrective actions to prevent recurrence of the events. The licensee has shown continued improvement in the performance of firewatch patrols.

Security quality assurance audits were reviewed and it was noted that the audit team included an individual with nuclear security expertise from outside the utility. The audits were comprehensive and performance oriented. Security management was prompt and comprehensive in dealing with issues identified in the audits.

The security management staff was found to be experienced and well organized. The security force was staffed and trained in a superior manner. During daily operations, the security force exhibited vigilance and responsiveness to routine duties and situations requiring their attention.

An inspection of the licensee's fitness-for-duty program identified many program strengths. For example, employee support and confidence in the program was found to be high and the supervisory training program was found to be comprehensive.

The licensee reported one security event regarding a vital area door left unlocked and unalarmed for about 12 hours. The licensee made modifications to security system computer software to prevent recurrence of this event. Overall, the enforcement history in the security area continued to be superior.

In summary, licensee management demonstrated considerable improvement and a strong commitment to the implementation of the security program. The security organization was experienced and well organized. The security force staffing, training, and overall enforcement history were considered to be superior.

## 2. Performance Rating

The licensee is considered to be in Performance Category 1 in this functional area.

## 3. Recommendations

None.

## F. Engineering/Technical Support

### 1. Analysis

This functional area consists of technical and engineering support for all plant activities. It includes all licensee activities associated with the design of plant modifications and engineering and technical support for operations, training, and fire protection and prevention. This functional area was inspected on an ongoing basis by the resident inspectors and periodically by region-based inspectors. The NRC inspection effort included a team inspection of the electrical distribution system.

Concerns addressed in the previous SALP report with implementation of firewatches required by the Technical Specifications are discussed in the functional area of Security.

The design basis reconstitution program, a part of the Safety Enhancement Program, has been aggressively implemented. This program was particularly noteworthy as evidenced by the safety issues identified by the licensee. The licensee's efforts to identify problems through the design basis reconstitution effort was considered a strength. The licensee's communication of emerging issues on potential design problems to the NRC staff was considered superior.

The engineering organization responded effectively to problems concerning cracks in two spare control element drive mechanism housings and high ambient air temperatures affecting emergency diesel generator operability. The licensee's investigation and identification of the cause of the cracking in the two spare housings was comprehensive and commendable. With respect to the diesel generator problem, the licensee completed testing to determine the ambient temperature at which the diesels could be run before elevated jacket water temperatures would force the diesels to be declared inoperable. Following this determination, the licensee performed effective maintenance and modifications to correct the problem.

The benefit of the systems engineering program was evident during this assessment period. The system engineers were involved in day-to-day activities

related to the performance and trending of safety-related and balance-of-plant systems. Their involvement was especially noteworthy during the reactor coolant pump seal blockage event, the early detection of a source of unidentified reactor coolant system leakage due to a crack in a spare drive mechanism housing, and the resolution of the emergency diesel generator operating temperature limit problem. The systems engineering group's contribution to overall plant safety was commendable.

An electrical distribution system functional inspection identified a number of strengths and few weaknesses. The licensee was noted to have a strong postmaintenance testing program, good design basis documents, a knowledgeable engineering staff, and equipment test procedures that were well developed and comprehensive. The licensee was also aggressive in their root cause analysis and the implementation of effective short-term corrective actions. The inspection also indicated that the licensee needed to improve their design calculation index and improve the accuracy of plant drawings.

Implementation of the licensee's fire protection and prevention program was satisfactory and met the appropriate regulatory requirements. No anomalies were identified during walkdowns of the fire protection system. It was noted that the procedures used for operating and maintaining the fire protection system were satisfactory.

General employee training and training for radiation and chemistry technicians was excellent. However, as a result of an emergency operating procedure inspection, several weaknesses were identified in the area of licensed operator training concerning support and effectiveness. The inspection indicated that lesson plans were focused on system details with little consideration of integrated system operation. To compensate for this lack of consideration, the licensee relied on corporate memory and personal experience to achieve licensed operator competence. As a result, it was noted that the emergency operating procedures were inconsistently applied depending on both the crew and the event. While the crews maintained the plant and mitigated the simulated events safely, the lack of consistent procedure implementation was indicative of a failure to assimilate operating experience and philosophy into plant emergency procedures and incorporate experience and philosophy effectively into the licensed operator training program.

Engineering management and supervision's role in the oversight of the engineering organization's involvement with safety issues was noteworthy. In addition, management's involvement with the development and implementation of the design basis reconstitution program was excellent and implementation of the commitments contained in the Safety Enhancement Program resulted in an increase in the safety consciousness of engineering personnel that was evident during this assessment period. Management oversight was a key element in the noted improved performance in this functional area.

In summary, the licensee's overall performance in this functional area was superior. The proactive approach of the engineering groups to identify and pursue problems to resolution was excellent. The ongoing efforts to establish

a documented design basis has focused resources on potential problem areas so the areas may be brought to timely resolution. The enforcement history in this area was excellent. Both the design and systems engineering organizations were staffed with knowledgeable and competent personnel. During the electrical design team inspection, only minor weaknesses were found in the areas of engineering responsibility; in general, these findings only confirmed the licensee's previously identified items. Although minor weaknesses were noted in the operator training program as the SALP cycle began, it became obvious that the licensee was working to overcome these. The overall performance, especially in the engineering area, demonstrated a long-term commitment to the assurance of safety.

## 2. Performance Rating

The licensee is considered to be in Performance Category 1 in this functional area.

## 3. Recommendations

None.

## G. Safety Assessment/Quality Verification

### 1. Analysis

This functional area includes all licensee review activities associated with the implementation of safety policies, including licensee activities related to exemption and relief requests and other regulatory initiatives. In addition, it includes licensee activities related to the resolution of safety issues, safety committee and self-assessment activities and the effectiveness of the licensee's quality verification function in the identification and correction of substandard or anomalous performance, identifying precursors of potential problems, and monitoring the overall performance of the plant. This area was inspected on a routine basis by the resident inspectors and by region-based inspectors. In addition, a self-assessment inspection and a review of the licensee's Safety Enhancement Program were performed.

The previous SALP report noted improved performance and recommended that the licensee ensure that all submittals to NRC are timely and address all the technical aspects of a given subject. It also recommended that the licensee provide the appropriate oversight to ensure that the Safety Enhancement Program is completed on schedule and in accordance with the licensee commitments. The licensee's assurance of quality and management attention to each of these areas was evident during this assessment period.

Of special note, was completion of the Safety Enhancement Program, which provided the mechanism for overall performance improvement in all SALP functional areas. The living commitments contained in the Safety Enhancement Program have been integrated as key elements into the licensee's programs for facility operations and oversight of all safety-related activities.

During this assessment period, six license amendments were issued that included a majority of items to improve the operating license and enhance plant operations. The most notable license amendments were the radioactive effluent and waste sampling and monitoring program, which allowed use of the new radioactive waste processing building, and addition of the hydrogen purge system to the Technical Specifications. In this and other reviews, the licensee provided timely, high-quality submittals and made plant personnel available to clarify positions or provide additional information.

The licensee continued to place emphasis on root cause analysis and trending of operational events, reactor trips, design problems, and maintenance. The quality verification activities performed in the area of root cause analysis and trending were effective in identifying and following up on problems to ensure timely resolution. Root cause analyses were comprehensive and complete. Some minor weaknesses were identified regarding procedural adequacy and the documentation and management of root cause analysis reports. An additional weakness identified in the licensee's root cause analysis program concerned the retention of physical evidence. In September 1990, after retrieving foreign material from a degraded reactor coolant pump seal, the material was inadvertently discarded before it could be analyzed. This could have affected the proper completion of a root cause analysis, but similar material was later discovered. The licensee subsequently revised the procedure, and there have been no similar problems noted.

During this assessment period, the quality assurance audit and surveillance programs were noted to be effectively contributing to the licensee self-assessment process. Activities were found to be well planned, audits were comprehensive in approach, appropriate observations of work activities were performed, and the issued reports were of high quality.

Management involvement continued to be evident in the planning and assignment of priorities and in coordinating site and licensing activities. The licensee was involved in various industry activities, which allowed the licensee to maintain an awareness of, and to integrate overall industry experience into, the appropriate programs.

Responses to NRC Bulletins and Generic Letters were timely and contained the level of detail needed to resolve the issue. The licensee continued to provide information and follow up on Generic Letters and Bulletins from previous assessment periods. In general, the licensee's responses were thorough, scheduled activities were well managed, and interactions with the NRC staff were timely.

Inspections performed during this assessment period indicated that a comprehensive program for the handling of external information had been developed and, in general, was effectively implemented. External information received an initial review for operability and safety concerns, with subsequent evaluations reflecting in-depth analyses.



A notable exception to the licensee's otherwise excellent performance with respect to handling of internal audit results and external information involved the emergency operating procedures. A team inspection of the licensee's emergency operating procedures was conducted in August 1990. The team concluded that the licensee's plant specific emergency operating procedures were adequate, but the licensee failed to establish effective means for developing and maintaining the procedures. Numerous deficiencies were identified in the procedures, despite the fact that the licensee had received ample prior notice of similar concerns by their own internal audit and at other plants through issuance of NUREGs 0899 and 1348 by the NRC.

A review of the licensee's program for implementation of the requirements provided in 10 CFR Part 50.59 was performed. This review noted that the licensee had established a program that fully implemented the requirements of Part 50.59 for permanent and temporary modifications. It was also noted that excellent documentation was generated that fully supported the basis for Part 50.59 determinations made by the licensee.

During review of the licensee's commitments made in response to Generic Letter 89-13, it was noted that the licensing organization had statused some of the commitments as closed, when, in fact, the commitments had not been completed. It appeared that poor communications between licensing and engineering was the reason for uncompleted commitments being statused in the commitment tracking system as closed.

Review of selected problems identified in licensee event reports, incident reports, and plant outage reports indicated that the licensee had implemented a process for assessment, resolution, and oversight of identified problems. The process was generally effective. In particular, their actions to investigate the control element drive mechanism housing cracking problem were found to be both comprehensive and commendable.

Licensee management was proactive in the communication of issues to the NRC staff. An atmosphere of openness was apparent throughout this assessment period. A new Plant Manager was appointed near the beginning of this assessment period. His timely communication of plant issues and potential safety concerns received from the design basis reconstitution program was excellent and was considered a strength.

Overall, the licensee maintained a high level of performance in this functional area. The comprehensive actions and manpower expended by the licensee to complete the Safety Enhancement Program was commendable. Through these efforts, the licensee significantly improved its overall performance and management oversight of all safety-related activities. The licensee implemented an effective root cause analysis program. Critical self-assessment was apparent as evidenced by the efforts of the quality assurance organization. The enforcement history in this functional area was superior. Licensee activities related to the submittal of Technical Specification amendments, and response to Generic Letters and Bulletins was good.

## 2. Performance Rating

The licensee is considered to be in Performance Category 1 in this functional area.

## 3. Recommendations

None.

## V. SUPPORTING DATA AND SUMMARIES

### A. Major Licensee Activities

#### 1. Major Outages

The twelfth refueling outage was completed on May 29, 1990. The outage duration was 102 days.

A 10-day outage was completed on September 3, 1990, to replace a degraded reactor coolant pump seal.

A 6-day outage was completed on October 5, 1990, due to questions concerning outstanding design basis problems associated with the raw water, component cooling, and containment spray systems.

A 25-day outage was completed on January 8, 1991, to repair a through-wall leak on an installed spare control element drive mechanism housing.

#### 2. License Amendments

Six license amendments were issued.

#### 3. Significant Modifications

Two spare control element drive mechanism housings were replaced with blank flanges.

Air conditioning units were installed on the stator exciter cabinets for both diesel generators.

### B. Direct Inspection and Review Activities

NRC inspection activity included 29 inspections, 2 of which were major team inspections, with an expenditure of approximately 5178 direct inspection hours.