

Wolf Creek SALP
Report No. 50-482/94-99

I. Introduction

The SALP process is used to develop the NRC's conclusions regarding a licensee's safety performance. The SALP report documents the NRC's observations and insights on a licensee's performance and communicates the results to the licensee and the public. It provides a vehicle for clear communication with licensee management that focuses on plant performance relative to safety risk perspectives. The NRC utilizes SALP results when allocating NRC inspection resources at licensee facilities.

This report is the NRC's assessment of the safety performance at the Wolf Creek Generating Station, covering the period October 11, 1992, through April 9, 1994.

An NRC SALP Board, composed of the individuals listed below, met on April 13, 1994, to review and assess performance in accordance with the guidance in NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance." The Board developed this assessment for approval of the Region IV Administrator.

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Board Members

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II. PERFORMANCE RATINGS

This SALP was conducted under the revised SALP process that was implemented by the NRC on July 19, 1993. Under the current SALP process, performance in four functional areas instead of the previous seven was assessed. The four areas are plant operations, maintenance, engineering, and plant support. Safety assessment/quality verification was considered for each of the four functional areas rather than as a separate functional area. Under the plant support functional area, radiological controls, emergency preparedness, security, housekeeping, and fire protection were assessed. Three category ratings (1, 2, and 3) continue to be used in the assessment of licensee performance in each functional area. Performance trends, improving or declining, have been eliminated as a part of the ratings.

Current Functional Areas and Ratings:

<u>Functional Area</u>	<u>Rating This Period</u>
Plant Operations	2
Maintenance	2
Engineering	2
Plant Support	2

Previous Functional Areas and Ratings:

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

III. PERFORMANCE ANALYSIS

A. Plant Operations

Overall, performance in the area of plant operations remained strong. This assessment period was characterized by a decline in operator performance followed by noted improvements during the last 6 months. These improvements were due to improved management oversight and accountability, increased sense of ownership of ongoing activities by operations personnel, and critical self-assessments. Operators demonstrated an improved understanding of the corrective action process and an increased willingness to use it.

Operators responded in an outstanding manner to transients that included three reactor trips and a main generator load decrease. In particular, during the main generator load decrease, excellent plant operator response limited the decrease in coolant system temperature and minimized the load loss. During this assessment period, improved operator performance and capabilities confirmed the good results demonstrated during initial license and

requalification training. Overall control room decorum and shift turnovers improved significantly during the last 6 months of the assessment period. Shift briefings conveyed the necessary and pertinent information. The licensee generally performed shift turnovers well and had developed aids to ensure operators remained cognizant of abnormal equipment conditions. Operators routinely referenced alarm response procedures when responding to control room annunciators. Licensee management had upgraded the control room environs and implemented the necessary corrective actions to achieve a black board. Operator communications were good throughout the period; more formality was observed near the end of the period.

Concerns regarding operator errors and inattention to detail continued throughout the assessment period. However, the significance and number of occurrences decreased during the last 6 months. Examples of operator errors and inattention to detail included an operator's failure to follow procedure, which resulted in a loss of letdown and charging flow for a short period, and a failure to perform all required procedural steps, which resulted in the potential for an unmonitored, unfiltered release of air from the fuel building. Operator inattention during shift turnover and control panel walkdowns resulted in an improper mode change which caused the motor-driven auxiliary feedwater pumps to be inoperable for 13 hours. Also, operators failed to notice annunciator indications on the control boards that the steam dumps had been armed for over 2 hours. Although improvement was observed during the last 6 months, a number of personnel errors during that period indicated that sustained improvement had not been achieved. The operators failed to notice that control board steam generator blowdown valves were misaligned for 3 days, failed to notice that an essential service water supply valve was misaligned for 9 hours, and began a containment purge after the permit had expired.

Operations staffing improved during this period with the addition of new hot licensed personnel. The licensee increased the number of personnel on the operations support staff. It placed an extra reactor operator on shift to supplement emergency response capabilities, created a shift engineer position to provide onshift engineering expertise and to perform analyses of the critical safety function status trees, and developed a central authority for processing work requests to relieve the shift supervisor of the administrative burden. The licensee established a permanent representative within the training group to monitor and critique crew performance in the simulator to ensure that management expectations for supervisor oversight, panel awareness, control panel manipulations, and communications were being implemented. The writers' guides and the procedure that covers procedure adherence developed by the procedure upgrade group addressed the weaknesses identified during the previous assessment period.

Numerous weaknesses in the implementation of clearance orders existed during the assessment period, but an improvement was noted during the last 6 months because of increased management attention. During the spring 1993 outage, as a result of a sequencing error in a clearance order, the reactor coolant system was drained to below mid loop, and missed communications and improper

use of a valve as a clearance order boundary resulted in a containment purge isolation. A sequencing error and delays in placing the clearance order resulted in the collapse of an ammonia supply tank. During the last 6 months of the assessment period, there was only one minor clearance order implementation error. The licensee increased its use of the self-checking process and stressed increased attention to detail, resulting in the identification of most deficiencies in clearance orders before their implementation.

The performance rating is Category 2 in this area.

B. Maintenance

Overall safety performance in the maintenance functional area was good, and major improvements were noted in the areas of safety assessment and integrated plant scheduling. The material condition of the plant was generally very good with the exception of numerous minor fluid leaks that needed attention in safety-related systems. The skill of the craft remained a strength; however, problems with providing good maintenance work instructions and employee adherence to procedures still existed.

Self-assessment activities in the maintenance area during 1993 resulted in a comprehensive review of personnel, program, and system performance. These assessments, including the use of third parties, were a significant departure from past practice at Wolf Creek and provided an excellent self-critical overview of program implementation concerns and personnel performance issues. Of particular note was the prompt action taken in response to an assessment of the American Society of Mechanical Engineers (ASME) program, resulting in successful ASME and National Board surveys. Notwithstanding that success, a number of self-identified, longstanding performance issues remained that require continuing management attention to achieve resolution. During the latter portion of the assessment period, management attention and involvement in addressing the self-assessment results were apparent.

Implementation of the integrated plant scheduling program, which was initiated during this assessment period, resulted in significantly improved coordination between various work groups at the station. This was particularly evident in the improved availability of important safety systems and in the conduct of daily planning and scheduling meetings, during which the shift supervisor provided important input to the priorities and scheduling of safety-related work activities. The scheduling and performance of surveillance testing remained a strength during this assessment period. Although the integrated plant scheduling function had not yet been tested during a refueling outage, it was viewed as an important contributor to improved safety performance and, in the long term, could prove to be a significant strength.

The material condition of the plant was generally very good with the exception of numerous minor fluid leaks in safety-related systems. The maintenance work backlog improved during the assessment period. Appropriate priorities had been assigned to maintenance work activities, resulting in no significant

safety impact from the backlog. Management attention was appropriately focused on eliminating the backlog and achieving performance goals at the conclusion of the assessment period.

The skill of the craft and the inservice inspection program remained strengths. There were numerous examples of excellent work performance by all the maintenance groups. However, licensee self-assessments, licensee performance monitoring, and NRC inspection results all indicated that both maintenance procedures and adherence to procedures by the craft continued to need improvement. The licensee had completed some work process improvements and others were planned. Human performance enhancements and procedure upgrades were being actively addressed by most maintenance work groups, although supervisory involvement in addressing human performance issues could be improved. Continued management attention to these areas is warranted.

The performance rating is Category 2 in this area.

C. Engineering

The functional area of engineering addresses technical and engineering support for all plant activities. The licensee has maintained a good level of performance in this area. Several notable improvements have been achieved, and other ongoing efforts have the potential to result in additional improvements in licensee performance.

A significant improvement during this assessment period was the increased support provided to routine plant operations by the engineering and technical support organizations. This included the reduction of the backlog of outstanding engineering tasks, the resolution of emergent plant problems, and the development of the systems engineering organization.

The licensee made significant progress in trending the status of engineering products and reducing the backlog of aging work items. Increased management coordination of work activities and scheduling was apparent within the engineering departments and with the interfacing organizations such as operations. Dedicated resources were provided to reduce the backlog and significant reductions were achieved in areas such as procurement activities, industry technical information program, and engineering evaluation requests. Goals have been established and were continually compared against the status of engineering efforts. The licensee has also revised the prioritization system in order to identify and address aging work assignments.

The response of the engineering organization to several significant issues that arose during the assessment period was strong. In May 1993, the unit experienced a sudden movement of the reactor coolant system during plant heatup that was similar to the thermal expansion events that occurred in 1992. The licensee performed a timely and thorough analysis to demonstrate that the integrity of the reactor coolant system was not challenged and to determine a probable root cause of the most recent thermal expansion events. The licensee's response to multiple fuel failures during the fifth and sixth

operating cycles was also commendable. Operating problems with instrument air and emergency diesel generator systems were also handled in a timely and thorough manner. Improved awareness by the engineering organization of plant problems and its involvement in the resolution of issues were evident.

The systems engineering organization improved significantly during the assessment period. Management showed strong support for the development of systems engineering and staffed the organization with well-qualified personnel. Systems engineering personnel became routinely involved in resolving operational issues. The systems engineers were accepted by other licensee organizations as the appropriate contacts to obtain prompt evaluations and solutions to operating problems. For projects requiring more detailed design efforts, the systems engineers have also become the point of contact between operations and maintenance personnel and the engineers in the design engineering organizations. A noteworthy practice undertaken by the systems engineering organization was its routine participation in plant activity planning meetings and the routine review of work requests. These practices ensure that system engineers are aware of activities affecting their systems and that safety issues are not overlooked during the initial processing of work activities.

The quality of engineering products as well as the knowledge and experience level of the engineering staff was a strength. Design packages, safety evaluations, license submittals, and other engineering products were thorough and well written. The licensee's program related to motor-operated valves continued to improve during this assessment period and reached a superior level of performance. The Industry Technical Information Program (ITIP) provided a comprehensive review of industry operational events. It was evident that the licensee had also increased communications with other licensees and this had a positive effect on performance. The licensee did a good job of incorporating risk management practices into the planning for the sixth refueling outage. Licensee personnel performed many of the analyses that supported the seventh operating cycle core design and justified an increase in Wolf Creek's rated thermal power. The NRC staff reviewed and approved the analyses and found that they were high-quality license submittals.

The completion of engineering organization and process changes and the attainment of consistent quality in all areas constitute continuing challenges for the licensee. Although the systems engineering organization has been staffed, trained, and has become well integrated into routine plant activities, the licensee has not reached the goals for the organization in terms of becoming proactive and ensuring maximum availability and performance for plant systems. Continuing changes intended to streamline the design process combined with recent organizational changes and the relocation of personnel from Wichita to the site will present short-term challenges to engineering personnel and management. The licensee has expended significant resources in developing tools such as the design-basis notebooks that have not been integrated into routine engineering activities. Several instances of engineering errors and documentation problems occurred during the assessment

period. The examples were of minor safety significance and the licensee implemented specific process and procedure changes to address the issues.

The performance rating is Category 2 in this area.

D. Plant Support

This functional area is new, representing a significant change from previous SALPs. The plant support functional area covers all activities related to plant support functions, including radiological controls, emergency preparedness, security, chemistry, fire protection, and housekeeping controls.

Overall, performance in the areas of radiological control and security was excellent. Significant weaknesses including repetitive concerns existed in the emergency preparedness area. Overall, the licensee's efforts resulted in good plant support; however, several areas need improvement.

During this assessment period, performance in the radiation protection area was excellent. Collective person-rem exposures continued to be low. Significant improvement was noted in water chemistry confirmatory measurements. Performance was excellent in the following areas: water chemistry, radiochemistry, liquid and gaseous effluent controls, solid radioactive waste, and transportation of radioactive materials. In response to previous concerns, an effective program was implemented to identify and track radiological occurrence events.

The ALARA suggestion program received good support from management and workers. Licensee management approved a 5-year plan that established challenging ALARA goals.

Radiation protection personnel were sometimes not aggressive in establishing radiation work permit requirements, and a potential planning and scheduling problem was identified in that work packages might not reach the ALARA group in time for it to perform a comprehensive review. This was viewed as a planning and scheduling challenge that was beyond the control of the radiation protection organization.

Performance was mixed in the emergency preparedness area. A repeat weakness, which resulted in a notice of violation, and seven other exercise weaknesses were identified. Corrective actions for most previously identified weaknesses showed improvement; however, several new weaknesses were identified in other areas. Performance was strong in the following areas: emergency facilities, emergency response organization, and processing changes to the emergency plan and operating procedures.

During the September 1993 operational status inspection, two weaknesses were identified during walkthroughs conducted with operating crews. One repeat weakness involving classification of emergency events was identified as a violation because of ineffective corrective actions. A second weakness was the failure to follow procedures in making notifications to the NRC Operations Center.

During the December 1993 annual exercise, numerous weaknesses were identified, including misclassification of the ALERT and errors in recognizing initiating conditions; poor communications and information flow in the operational support center, technical support center, and control room; inability of operational support center personnel to locate items in the warehouse to mitigate the emergency; and poor radiation protection practices by operational support center personnel. Additionally, personnel in the emergency operations facility had problems with radiological assessment, which resulted in the issuance of information to offsite authorities that contained significant inconsistencies relative to recommended protective actions. Overall these weaknesses and repeat concerns indicate the need for additional management attention to emergency preparedness and the evaluation of past corrective action initiatives.

Management provided strong support for the security program. Effective management within the security organization along with a highly qualified security staff and appropriate staffing levels also contributed to a quality security program. The level of performance in the following areas was excellent: access authorization and control of personnel, packages, and vehicles; audits and corrective actions; testing and maintenance of security systems; security lighting systems; protected area barriers; lock and key control program; records and reports system; security force staffing, training, and training records; protected area barriers; alarm stations; and assessment aids. Overall, the security program continued to function at a high performance level.

Excellent audits were performed in the radiological controls, emergency preparedness, and security areas. The audits were comprehensive and included a team member with technical expertise in the specific areas audited. The responses to audit findings were timely and technically correct.

Overall, an excellent housekeeping program was maintained. Strong controls were established for loose objects around the refueling pool. Housekeeping in the radiological controlled area during routine operations was very good, and a low percent of the plant was maintained as a contamination controlled area.

The licensee's fire protection program received limited review during the assessment period.

The performance rating is Category 2 in this area.