COMANCHE PEAK STEAM ELECTRIC STATION
SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP)
Report 50-445/97-99; 50-446/97-99

I. BACKGROUND

The SALP Board convened on June 11, 1997, to assess the nuclear safety performance of the Comanche Peak Steam Electric Station for the period November 25, 1995, through June 7, 1997. The Board was conducted in accordance with Management Directive 8.6, "Systematic Assessment of Licensee Performance." The Board members included: T. P. Gwynn (Board Chairperson), Director, Division of Reactor Projects, Region IV; D. D. Chamberlain, Deputy Director, Division of Reactor Safety, Region IV; and W. D. Beckner, Director, Project Directorate IV-1, Office of Nuclear Reactor Regulation. This assessment was reviewed and approved by the Regional Administrator.

Functional Areas and Ratings

	Current	Previous
Plant Operations	1	1
Maintenance	1	1
Engineering	1	2
Plant Support	1	1

II. PLANT OPERATIONS

Operations performance remained superior and continued to strengthen during the assessment period. Operations were characterized by a strong safety focus, effective command, control, and communications, and excellent response to events. However, plant equipment continued to challenge plant operations during the first half of the assessment period. Although the personnel error rate has improved, operations has continued to experience isolated self-verification and attention-to-detail errors. In response to the previous assessment, operations has become a demanding customer and has effectively established ownership and teamwork across different disciplines. Operations training continued to exhibit superior results with excellent feedback based on operational experience.

Management involvement in day-to-day activities was a strength. The shift manager exercised day-to-day leadership and was effectively supported by shift operations management. Management provided excellent oversight of routine activities. Postevolution critiques were effectively used to further improve performance. Problems were promptly identified and corrective actions were usually comprehensive. However, there were instances, such as the elevated pressure in the safety injection system piping and the reactor over-power transient, that indicated the need for continued attention to maintaining a strong, questioning attitude at the facility.

The licensee has continually demonstrated an improving, conservative approach to operations that was supported by senior management at the facility. Of note were actions taken to minimize the risk of planned evolutions, including reducing power when

appropriate, to avoid the potential for unplanned transients. Day-to-day operations and infrequently performed evolutions were characterized by a professional, safety-conscious approach, including effective command, control, and communications. Operators consistently exhibited a conservative approach during both routine surveillance and emergent work activities. Although the rate of human performance errors continued to improve, the unplanned deenergization of a safety bus during emergency diesel generator operations and the improper loading of the main generator during a plant startup indicated the need for continued emphasis on attention to detail and use of self-verification techniques.

Overall, procedure quality has improved as a result of streamlined change processes and additional attention to procedure adherence. Nevertheless, there remained instances, such as the emergency core cooling system swap-over emergency procedure guideline, where problems involving procedure inaccuracies and procedure usage by the operations staff occurred.

Operators responded well to plant transients. Each unit experienced multiple operational transients as a result of equipment reliability problems during the first half of the assessment period. Significant action to improve overall plant reliability, including the replacement of aging inverters, enhanced lightning protection, and improved feedwater pump speed control system redundancy, reduced challenges to operations during the latter portion of the assessment period.

Operations has transitioned from a reactive to a proactive organization, in essence, a demanding customer of the support organizations. This transition was facilitated by the integration of operations into other organizations. An increased team effort was evident and a positive effect on the material condition of the plant has resulted.

The training program was considered to be superior with comprehensive examinations, high quality remedial training, and an excellent operational experience feedback process. Isolated weaknesses with licensed operator simulator training were identified and the licensee took appropriate corrective actions.

Overall performance in the Plant Operations area was rated Category 1.

III. MAINTENANCE

Overall safety performance in the maintenance functional area was maintained at a superior level. Maintenance backlogs were effectively controlled with significant backlog reductions achieved over the SALP period. Control room annunciator and instrument deficiencies were effectively controlled. Although some equipment problems continued to cause plant challenges during the SALP period, overall material condition continued to improve and was very good with observable material conditions considered outstanding. Management has taken an aggressive approach to resolving equipment deficiencies, including major activities such as the refurbishment of inverters that caused plant challenges. Performance improvements were observed in the areas of valve maintenance, personnel and equipment

performance, and communications. The development of a valve maintenance team and extensive training resulted in an overall reduction in check valve problems, although some problems remained. Continued licensee emphasis in this area is encouraged.

The use of the Professional Maintenance Performance Team (PROMPT team) for 24-hour maintenance coverage was a significant strength and a major contributor to the overall very good material condition. The PROMPT Team has been effective in improving ownership and coordination between operations, engineering, and maintenance in resolving plant problems. The use of the PROMPT Team was effectively controlled so that minor work items could be completed with little administrative burden. More complex work was generally effectively planned and controlled, as required.

Senior management support of maintenance activities was excellent and conservative decision making was demonstrated in addressing equipment problems. Overall maintenance program and procedure quality was considered very good. Program and procedure problems were addressed promptly when identified. The conduct of maintenance was generally very good. Some isolated problems were identified with implementation of maintenance instructions, caused by a lack of attention to detail or poor work instructions. One example involved electricians who did not perform troubleshooting on an inverter as described in the prejob briefing. The isolated problems with conduct of maintenance were more prevalent in the electrical area.

Surveillance program implementation was excellent, with only one licensee-identified missed surveillance and few surveillance performance errors noted. In general, routine surveillances were performed well and in a professional manner. The surveillance program and procedures were generally of high quality. Program and procedure problems were addressed promptly when identified.

Training and qualification of maintenance and surveillance personnel were considered to be of high quality. Personnel performance errors were effectively identified and tracked. The number of errors continued to decline over the SALP period. Self-assessment in the Maintenance area continued to be a strength, including such things as critical, formal self-assessments, effective problem identification, and very good postjob critiques.

Overall performance in the Maintenance functional area was rated Category 1.

IV. ENGINEERING

Engineering performance improved throughout the SALP period and achieved superior performance during the latter portion of the period. Significant management attention was focused on clearly establishing system engineer expectations, realigning the organization to improve operational support, and monitoring and improving plant reliability and material condition. Engineering support to operations was generally of high quality, with an appropriate focus on safety. Corrective action and safety assessments within engineering

were generally effective. Management attention should be directed toward ensuring that the improving trends seen during the latter portion of the assessment period continue.

The previous SALP report noted that engineering provided strong support in reacting to and correcting identified problems, but was not always effective in anticipating and preventing problems. Engineering management implemented both organizational and process changes that substantially addressed the challenges that contributed to the performance decline in the previous SALP. Notable improvements included implementation of a revised System Engineer's Handbook that clearly defined system engineer responsibilities; the establishment of clear management expectations for qualifications and training of systems engineers; the establishment of a Joint Engineering Team (JET) to provide immediate first point-of-contact, multi-disciplined engineering support to operations and maintenance; alignment of the organization in support of the Scheduled Maintenance Action Response Teams (SMART); and development of a comprehensive system health program. These improvements were supported by plant staff and enhanced the ability to provide consistent, timely engineering support to the plant. With these improvements, system engineers were given a clear focus on support of maintenance activities, system performance trending, support to plant operations, and monitoring long-term system health.

Engineering management was appropriately focused on safety. A well managed, declining backlog in engineering work resulted. Modifications to address recurring problems and to improve plant reliability were implemented during the period. These modifications included the installation of digital controllers for the main feedwater pumps, replacement of Unit 1 electrical inverters and the addition of a swing inverter, the installation of a lightning deterrent system, and improved steam quality control for the Unit 1 turbine driven auxiliary feedwater (AFW) pump steam supply system. While these modifications had not been implemented for a sufficient duration to fully judge the overall effect on plant operations, they appeared to have corrected a number of long-term reliability problems. Additional plant modifications to further improve reliability were planned.

The system health program provided excellent system status information to engineering, maintenance, and operations support activities. It also served as an integrated tool for monitoring of system performance and for prioritizing plant maintenance and modification work.

Engineers provided high quality support to operations and maintenance and during plant modifications. The success of the AFW pump turbine steam supply modification, the resolution of repeated diaphragm failures in air-operated AFW turbine steam supply valves, the thorough investigation of the safety injection system relief valve simmering phenomenon, and the installation and testing of a redundant main feedwater pump digital controller are a few examples. However, there were minor examples of lack of rigor and attention to detail in some engineering work activities.

Problem identification and resolution were generally strengths of the organization during the latter portion of the assessment period. The threshold for initiating corrective action within the engineering organization was improved. Early in the period, there were

instances where engineering did not initiate a corrective action document (ONE form) until prompted by the NRC. Engineering management responded with enhanced oversight and guidance on when ONE forms should be initiated. As a result, only one similar instance was identified in the latter portion of the SALP period.

Self-assessments performed in the engineering area were both effective and self-critical. An overall engineering self-assessment in the latter portion of the SALP period identified both strengths and areas for improvement within the engineering processes, programs, and organization.

Overall performance in the Engineering functional area was rated Category 1.

V. PLANT SUPPORT

Overall performance in the Plant Support area continued at a superior level. Performance in the radiological controls area was excellent, with only isolated performance problems noted over the SALP period. Security performance continued to be outstanding. Emergency Preparedness performance was generally good, although performance problems continued to be identified during both the biennial emergency exercise and the simulator walkthrough inspections. Housekeeping was considered outstanding and the fire protection program continued to be effectively implemented. Self-assessment and corrective action effectiveness were noteworthy strengths.

Excellent performance in the radiological controls area continued during the assessment period. Isolated performance problems identified during the period were aggressively addressed and corrected. Effective methods were utilized during the refueling outage to reduce person-rem exposure. The 3-year average person-rem exposure placed the facility among the top performers in the industry. Personnel exposure goals for the 1996 Unit 1 refueling outage were met as a result of effective reactor coolant system cleanup at the beginning of the outage. Controls of radioactive materials, surveys, and personnel monitoring were excellent. The postaccident sampling systems were properly maintained. Excellent performance was noted in the chemistry, radiological waste effluents management, radiological environmental monitoring, solid radioactive waste management, and transportation of radioactive materials programs. Staffing, training, qualifications, and experience of personnel was considered very good.

Security program performance continued to be outstanding. Senior management support for the security program continued to be strong. The effectiveness of security management was outstanding. The relationship between security management and the contract officer force was excellent. The staff was proactive and continued to look for ways to improve performance. Security systems performed well and security received excellent support from operations, engineering, and maintenance. The access authorization program was strong and effectively implemented. The design and installation of the vehicle barrier system was a notable success.

Emergency preparedness performance was generally good, although performance problems continued to be identified during both the biennial emergency exercise and simulator walkthrough inspections. Weaknesses were identified in implementing procedures for protective action recommendations and site evacuation and in implementing repair priorities. Emergency response facilities were appropriately maintained. The control room crew's performance during the biennial exercise was excellent. The technical support center functioned well. The emergency facility performance in the areas of command and control, dose assessment, and news release preparation was good. Overall, self-assessments and critiques were thorough and effectively identified areas in need of improvement.

Housekeeping was a notable strength and was considered outstanding. The fire protection program continued to be effectively implemented. Self-assessment processes in the Plant Support area continued to be a notable strength, including such things as critical self-assessments and audits and effective problem identification and correction.

Overall performance in the Plant Support functional area was rated Category 1.