

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION  
SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE  
Report 50-498/96-99; 50-499/96-99

**I. BACKGROUND**

The SALP Board convened on April 5, 1996, to assess the nuclear safety performance of South Texas Project Electric Generating Station for the period September 25, 1994, through March 23, 1996. The Board was conducted in accordance with Management Directive 8.6, "Systematic Assessment of Licensee Performance." The Board members included: A. T. Howell (Board Chairman), Deputy Director, Division of Reactor Projects; K. E. Brockman, Deputy Director, Division of Reactor Safety; and Dr. 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
Operations	2	2
Maintenance	1	2
Engineering	2	2
Plant Support	1	2

**II. OPERATIONS**

Overall safety performance in the operations area was good, with improvements noted in several areas. Significant enhancements to programs, procedures and training resulted in overall improved performance in the operations area. Operator professionalism and communications remained at a high level. Planning and scheduling activities were superior. Operator response to events was consistently good, with one notable exception. Operator performance during routine operations was generally good; however, a number of operator performance problems continued to be identified.

The facility was operated in a conservative manner, and the operators demonstrated a good level of involvement in and ownership of the identification and resolution of operational problems. For example, operations took prompt action to minimize unnecessary risk associated with having a component cooling water pump out-of-service for a longer period than was necessary when impeller casting flaws were identified. The use of risk insights during outages and power operations, including weekly probabilistic safety assessment calculations, enhanced plant safety during the performance of outage and on-line maintenance activities.

Operational safety performance was improved by enhancing the quality of procedures and programs. Off-normal operating procedures were upgraded following the identification of procedural weaknesses at the end of the previous SALP period. The implementation of the new work control program ("One-Stop-Shop"), during refueling outages, allowed the control room operators to focus their attention on the protected safety trains. The

operator training programs were effectively implemented by the training staff, and numerous anomalies associated with the upgraded simulator were corrected.

The on-shift operations staff conducted control room operations in a professional manner. Shift turnovers and pre-evolution briefings were thorough, as evidenced by well controlled startups and shutdowns. Communications and formality were noteworthy in most instances.

Overall, operator performance in response to several reactor trips and other off-normal events was very good. One notable exception involved the failure of the Unit 1 operators to emergency borate following a reactor trip in which three control rods failed to fully insert. This lack of conservatism demonstrated an insufficient questioning attitude, which was not initially identified by senior management as an area of concern.

Operator performance during routine operations was generally good; however, performance problems involving inadequate self-verification, log taking, procedural and Technical Specification compliance and oversight, resulted in a number of events and conditions. Several of these performance problems involved shift and unit supervisors. For example: (1) During a reactor coolant system fill and vent evolution, a valid actuation of the Unit 2 cold overpressure mitigation system occurred because a unit supervisor failed to exercise proper command and control; (2) Two main feedwater isolation valves in Unit 2 were rendered inoperable at the same time because differing views between the shift supervisor and the work control supervisor regarding the operability implications of the planned work were not adequately resolved; and (3) Earlier in the SALP period, a Unit 1 shift supervisor directed licensed operators to align the low head safety injection system in a nonstandard configuration without written instructions and without documenting the activity.

Self-assessments were conducted on a continual basis throughout the SALP period. The licensee's assessment of human performance errors was comprehensive and insightful. Although the previous SALP report noted human performance weaknesses, overall operator performance improved. During this SALP period, there was a considerable reduction of the more significant types of events, such as reactor trips, which were caused by personnel errors.

The performance rating is Category 2 in this area.

### III. MAINTENANCE

Overall safety performance in the maintenance area improved to a superior level. Physical improvements to the facilities, the resolution of a number of long-standing hardware problems, and the overall high level of emphasis placed on plant material condition were noteworthy strengths. Superior planning and scheduling capabilities contributed to effective and efficient refueling outages. The conduct of maintenance and surveillance activities was typically

very good. Maintenance programs were strong, and the quality of procedures, particularly surveillance procedures, were significantly improved during the SALP period.

The overall material condition of the plant was considered to be superior. The licensee implemented a number of initiatives which resulted in: (1) Improved station facilities; (2) Enhanced general material condition of balance-of-plant and safety-related hardware; (3) A relatively low corrective maintenance backlog; and, (4) The resolution of a number of long-standing and repetitive equipment problems. For example, problems affecting the emergency lighting diesel generator were resolved, and station facilities such as the Technical Support Center and the Secondary Chemistry Laboratories were upgraded. Additionally, the number of inoperable automatic functions and control room deficiencies were maintained at a low level. In contrast, some balance-of-plant equipment problems (e.g., the steam generator feedwater system and main turbine/generator) continued to challenge the units throughout the SALP period.

Extensive management involvement in maintenance and surveillance activities was noted throughout the period. Management expectations were effectively communicated and were reinforced on the job by first line supervisors. One reactor trip was caused by an electrical maintenance supervisor error, but this was an isolated occurrence.

Early in the SALP period, many procedural inadequacies were identified; however, the quality of procedures, particularly surveillance procedures, were significantly improved during in the SALP period. Maintenance work packages and program descriptions also reflected improved quality.

The effectiveness of the planning and work control processes were especially evident. Scheduling effectiveness improved to a high level. The completion of the work scope for two refueling outages well within the planned schedule demonstrated the effectiveness of the work control and scheduling processes.

Throughout the SALP period, maintenance craft performance was excellent, and maintenance personnel routinely demonstrated a thorough understanding of tasks to be performed. The conduct of surveillances was, on the whole, consistent and very good.

Self-assessments in the maintenance area utilized both internal and external resources to identify problem areas and to develop corrective actions. The quality assurance department conducted audits and surveillances of maintenance activities on an ongoing basis.

The performance rating is Category 1 in this area.

#### **IV. ENGINEERING**

Overall safety performance in the engineering area was good, with improvements noted during the last SALP period continuing throughout this SALP period.

Engineering support to other organizations was generally strong, the engineering workload was well managed, and engineering programs were of a good quality. In certain instances, there were deficiencies pertaining to design changes and other engineering work activities, such as calibration data trending and setpoint control.

Engineering provided good support to operations and maintenance by addressing such issues as standby diesel generator essential cooling water flow rate requirements while the essential chillers were aligned for cold weather operations; the concerns relative to excessive degradation of boraflex material in the spent fuel pools; and the containment sump valves' susceptibility to pressure locking conditions. A long-term plan of action was developed for further evaluation and testing of control rods.

Engineering programs were of good quality and were, generally, well implemented. The training and qualification requirements for systems engineers were well structured and implemented. There was significant integration of probabilistic risk assessment insights throughout the organization to assist in the prioritization of corrective actions and to control risk associated with maintenance activities. The motor-operated valve (MOV) program established the design basis capability of MOVs that had not been tested at or near design basis conditions. However, three engineering evaluations of MOV problems were indicative of a tendency to reduce Generic Letter 89-10 design standards to establish the acceptability of MOVs.

The implementation of design changes and other engineering work activities was good; however, there were a number of deficiencies identified throughout the SALP period. For example, the replacement of the spent fuel pool seal hoses did not account for the clearance requirement for the fuel handling machine. Several problems, including a lack of a constructability review, were identified during the installation of the plant change that modified the electrohydraulic damper actuator battery packs with Class 1E DC power. The licensee's program for Rosemount transmitters lacked evaluation threshold criteria for trended calibration data, and was unable to detect a loss of fill oil in transmitters not in the enhanced monitoring program. The trip setpoints for safety-related molded case circuit breakers were nonconservative in that there was a potential for inadvertent breaker tripping under worst case MOV starting current conditions.

The engineering workload was well managed, and the corrective action program workload was appropriately prioritized. The large modification backlog was significantly reduced.

Engineering management continued to support programs that encouraged the identification and resolution of problems. Quality assurance audits and other self-assessment activities were effective in identifying concerns and recommendations for resolution. Corrective actions were appropriately implemented.

The performance rating is Category 2 in this area.



## V. PLANT SUPPORT

Overall safety performance in the plant support area improved to a superior level. Performance in the emergency preparedness and security areas was significantly improved. Radiological controls performance remained strong. Plant housekeeping was excellent and the implementation of the fire protection program was good.

Continued superior performance was noted in the radiation protection area, which was highlighted by excellent self-assessments, quality assurance audits and surveillances. The technical expertise of the staff remained at a high level. The three year person-rem average was well below the pressurized water reactor national average. Management oversight of work activities was good, and communications and coordination among the radiation protection department and other departments was evident.

The water chemistry and radiochemistry programs were effectively implemented. State-of-the-art radiological counting instrumentation was maintained. Performance in the area of radiological confirmatory measurements was strong.

During this SALP period, the emergency preparedness program attained a superior performance level. The emergency preparedness program was characterized by committed management support, a strong program staff, a comprehensive training program, and effective coordination and communication with state and local officials. Emergency response facilities were effective in supporting the emergency response mission. Of particular note was the ownership that the individual response team managers assumed for the training and qualifications of their personnel. This resulted in a response organization that performed in an excellent manner during the biennial emergency preparedness exercise.

The security program also improved significantly during this assessment period. Management effectiveness and upgrades to the physical equipment and facilities were essential contributors to improved performance. New contractor management was effective in providing a better focus to security operations. Performance problems were quickly responded to and effective compensatory measures were implemented. New closed-circuit television, video capture and emergency electrical (security diesel generator) systems were provided, and the perimeter intrusion detection system was in the process of being replaced. The integration of dedicated technicians, which occurred during the previous SALP period, resulted in increased reliability of the overall detection system.

Plant housekeeping was maintained at an excellent level throughout the SALP period. Overall, the fire protection program continued to perform at a good level. Safety objectives were met and the operators displayed a good understanding and knowledge of the program. Isolated instances of documentation deficiencies and transient combustible material control problems were identified.

Self-assessments and corrective actions were an integral part of the improvements noted in the plant support functional area. Licensee evaluations were self-critical and used both internal and external resources to provide for a comprehensive and balanced analysis of performance.

The performance rating is Category 1 in this area.