INITIAL SALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBERS

50-445/90-46
50-446/90-46

TU Electric

Comanche Peak Steam Electric Station
Units 1 and 2

September 1, 1989, through January 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 March 7, 1991, to review the observations and data on performance and to assess licensee performance in accordance with Chapter NRC-0516, "Systematic Assessment of Licensee Performance."

This report is the NRC's assessment of the licensee's safety performance at Comanche Peak Steam Electric Station for the period September 1, 1989, through January 31, 1991.

The SALP Board for Comanche Peak Steam Electric Station was composed of:

Chairman

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

Members

D. D. Chamberlain, Chief, Project Section B, DRP, Region IV
J. W. Clifford, Project Manager, Unit 1, NRR
C. I. Grimes, Acting Assistant Director for Region IV and V Reactors, NRR
J. P. Jaudon, Acting Director, Division of Reactor Safety (DRS), Region IV
W. D. Johnson, Senior Resident Inspector, Unit 1, DRP, Region IV
R. L. Latta, Senior Resident Inspector, Unit 2, DRP, Region IV
L. A. Yandell, Deputy Director, Division of Radiation Safety and Safeguards (DRSS), Region IV

The following personnel also participated in the SALP Board meeting:

C. L. Cain, Chief, Nuclear Materials and Safeguards Inspection Section, DRSS, Region IV
D. N. Graves, Resident Inspector, Unit 1, DRP, Region IV
C. E. Johnson, Project Engineer, Reactor Project Section B, DRP, Region IV
S. L. McCrory, Operator Licensing Examiner, Operator Licensing Section, DRS, Region IV
T. O. McKernon, Reactor Inspector, Operational Programs Section, DRS, Region IV

II. SUMMARY OF RESULTS

A. Overview

During this assessment period, the licensee completed construction of Unit 1 and commenced licensed operation of the unit. Late in the period, construction was resumed on Unit 2.

Licensee management involvement was evident in all functional areas and was a noted strength in several areas. Overview programs such as quality assurance and quality control were functioning well. Administrative and technical programs were well developed and maturing. Staffing was a general strength with personnel well trained and well qualified. Excellent interdepartmental cooperation and mutual support were observed. The licensee demonstrated an improved capability to identify and report problems and to resolve problems with potential safety significance through the Operations Notification and Evaluation (ONE) Form program, dedication of sufficient levels of management attention, and formation of special evaluation teams. The Unit 1 startup and power ascension program, the security program, and the emergency preparedness program demonstrated superior overall performance. An improving trend was observed in the areas of plant operations and safety assessment/quality verification. The operations staff displayed a high level of professionalism and competence. The radiation protection staff handled routine health physics activities in an excellent manner. The involvement of system engineers in problem solutions was considered a strength. In general, training programs and facilities were considered to be a strength. Weaknesses were seen in the adequacy of some technical evaluations, the material condition of the secondary plant, implementation of the safety clearance/tagout program, implementation of the surveillance testing program, and the failure to identify and correct the causes of weaknesses in the initial operator license training program.

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

Functional Area	Rating Last Period 9/1/88-8/31/89	Rating This Period 9/1/89-1/31/91	Trend
Plant Operation	2	2	*Improving
Radiological Controls	2	2	
Maintenance/Surveillance	2	2	
Emergency Preparedness	2	1	
Security	2	1	
Engineering/Technical Support	2	2	
Safety Assessment/ Quality Verification	2	2	*Improving
Unit 1 Startup Program	#N	1	
Construction Activities	2	#N	

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

#N - Not rated.

III. CRITERIA

The evaluation criteria, category definitions and SALP process methodology which 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 April 18, 1991.

IV. PERFORMANCE ANALYSIS

A. Plant Operations (2420 Inspection Hours, 18 Percent of Total Inspection Effort)

1. Analysis

The assessment of this functional area consists primarily of the control and execution of activities directly related to operating the plant.

NRC inspection effort consisted of the core inspection program with regional initiative inspections, including two operational readiness assessment team (ORAT) inspections, a 50 percent power assessment team inspection, an augmented inspection team (AIT) for the single train safety injection event, and a special inspection following two other safety injection events which occurred while the unit was in hot shutdown.

The violations noted by NRC in this area have been minor with the exception of the case involving a containment personnel air lock equalizing valve which was left open because of weak communications,

operator error, and a poorly written procedure which resulted in a Level 3 violation. Licensee identification and reporting of the error and effective corrective actions resulted in no civil penalty being assessed for this violation. Corrective actions have generally been prompt and effective with violations not recurring.

The previous SALP report recommended that management ensure effective implementation of the operational readiness program and related corrective action efforts, such as procedure corrections. During this assessment period, significant management involvement was evident as TU Electric implemented their operational readiness program effectively, including completion of the operations preparation period, a period of preparation of the plant, the personnel, and the procedures for initial plant operation. During this period most operating and surveillance procedures which could be performed under the existing plant conditions were performed to identify any discrepancies and implement corrective actions where necessary.

Late in the previous SALP period an emergency operating procedure (EOP) inspection was conducted, concluding that the CPSES EOPs were generally strong and clearly provided for adequate direction to mitigate the consequences of an accident. The EOPs have proved to be good guidance for transient response and the performance of the operators during transients has demonstrated that EOP training has been effective.

Several operational events occurred during this period, and operator response has been excellent. Operators have consistently used excellent communications, with effective coordination of operator activities by the unit supervisors and the shift supervisors. This was an improvement over the observation during the requalification examination which was conducted during the previous SALP cycle. During routine operations, the operations staff consistently displayed a high level of professionalism and competence.

The licensee has developed good quality operating procedures, although they were found to be inadequate to ensure the operability of the anticipated transient without scram (ATWS) mitigation system actuation circuitry during one inspection. Adherence to procedures by operators has generally been good with a few errors having adverse consequences, such as a plant trip or actuation of engineered safety features. In response, the licensee carefully reviewed the errors (such as the inadvertent bumping of the source range reactor trip reset/block switch and an inadvertent automatic start of an auxiliary feedwater pump) and took appropriate corrective actions.

Annunciator response procedures were well written with generally complete and clear guidance for operators. Operator response to alarms has been good, although weaknesses were seen in early 1990 such as those following flux doubling actuations. Performance in this area improved and, later in the assessment period, it was considered to be excellent.

Shift turnover procedures have been effective. A policy of conducting a meeting of the oncoming and offgoing shift supervisors with various site work group representatives prior to the briefing of the oncoming operations shift crew is noteworthy and has been effective for coordination of the next shift's activities. This meeting has been in addition to the normal shift turnover activities.

Several incidents during this assessment period indicated that the safety clearance/tagout program had weaknesses. Examples include an inadvertent opening of a main steam isolation valve in Mode 3 and premature removal of a service water freeze seal without restoring the rest of the clearance. The licensee task team review of the safety clearance program resulted in procedure revisions and improved implementation. Licensee response to this problem and to other technical issues has routinely exhibited a conservative safety approach.

The licensee has developed and implemented an effective Technical Specification limiting condition for operation tracking program which has functioned well with a few exceptions. System configuration control has been a strength with periodic system lineup verifications being performed on systems important to safety. System lineup checks by NRC inspectors have identified no significant discrepancies. The licensee tracks control room deficiencies on a daily basis with review by management and the responsible work organizations at the plan-of-the-day meetings. This management attention has resulted in minimizing the backlog of control room deficiencies. The licensee monitors illuminated annunciators on the main control board in the control room to provide emphasis on reducing the number of alarms while operating at power. In addition, the licensee has been developing instrumentation changes as a part of their efforts toward achieving a goal of operating with a "dark board." These efforts have had some positive results, but approximately 25 annunciators out of a total of about 1050 have typically been illuminated during power operations.

The general material condition of the plant has been maintained at an excellent level in areas of the plant other than the turbine building. At times during this assessment period, housekeeping in the turbine building was considered to be poor and numerous steam leaks were present. Several transients were initiated by secondary plant equipment problems, including main feedwater flow control valves and heater drain tank level controls. Management attention paid to the secondary plant was increased and a task team review resulted in a number of recommendations for improvement of the secondary plant reliability. The licensee implemented some of these recommendations and scheduled the implementation of others. The material condition and housekeeping of the secondary plant improved as a result of the licensee's actions, but further improvement was still needed at the end of this assessment period.

Plant labeling was a weakness early in this assessment period, but implementation of the upgraded plant labeling program was turning this into a strength toward the end of the period. The labeling program was

scheduled to be completed for Unit 1 by the end of the first refueling outage in late 1991.

Management involvement in operational activities has been a strength. In addition to detailed discussions of operational performance at plan-of-the-day meetings, management personnel frequently toured the plant and discussed current operational activities and/or problems with shift operations personnel. Senior management has sought real-time independent feedback on operational performance. The quality assurance (QA) surveillance group within the Independent Safety Engineering Group (ISEG) of the nuclear overview department started providing shift coverage (20 hours per day) in January 1991. The results of these surveillances were documented in daily field notes which were provided to management in a timely manner. Support for operations by other departments has been excellent, with problems being addressed in a coordinated manner by the affected departments. Staffing has been a strength, with authorities and responsibilities well defined and effective use of contractors to supplement operational experience. Operators have stayed on a six-shift rotation and all of the shift technical advisors have been designated as unit supervisors.

In summary, licensee management exhibited a commitment to quality in plant operations and decisionmaking has been consistently at a level that assures adequate management review. The approach to resolution of potential safety issues has demonstrated a conservative safety philosophy. Staffing and training effectiveness for licensed operators has been a strength. Corrective actions for identified problems have generally been prompt and effective. While several operational events occurred during this period, operator response has been excellent and events have been properly identified and analyzed. Further improvement in secondary plant material condition and housekeeping is needed.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

Inspection effort in this functional area should be consistent with the core inspection program with a regional initiative inspection in the balance of plant area.

b. Licensee Actions

Licensee's management should continue to implement initiatives to improve the general condition and overall reliability of the secondary plant.

B. Radiological Controls (485 Inspection Hours, 4 Percent Total Inspection Effort)

1. Analysis

This functional area consists primarily of activities related to radiation protection, radioactive waste management, radiological effluent controls and monitoring, radiological environmental monitoring, water chemistry control, and transportation of radioactive materials.

The previous SALP report did not include any specific recommendations and the report concluded that this functional area was in a proper state of readiness to support plant operations.

The radiation protection area was inspected three times by radiation specialists along with day-to-day reviews by the resident inspectors. No significant radiation protection problems have been identified. Enforcement history in this area has been excellent with no violations being identified by the NRC during this appraisal period. Excellent performance was observed during the thimble tube cleaning evolutions. The licensee has the essential elements in place for a good quality radiation protection program. However, the radiation protection department has not been challenged with intensive radiation protection activities such as those encountered during a refueling outage.

The radiation protection program received good support from management and good working relationships and coordination existed between the radiation protection department and other departments, such as maintenance and operations. The onsite radiation protection department received technical support from the corporate health physics staff. Management oversight was evident by the performance of comprehensive QA audits with technical expertise provided by the corporate office and consultants. The radiation protection department responded to the audit findings in a timely manner with good technical resolutions for the identified problem areas. The radiation protection department had implemented an effective radiological occurrence report/radiological awareness program to identify, correct, and trend problem areas.

The licensee maintained an appropriate number of qualified radiation protection personnel to support plant operations with a low personnel turnover rate experienced in the department. The radiation protection department placed heavy reliance on contract radiation protection technicians with the licensee's in-house staff consisting of 43 individuals supported by about 20 contractors. The licensee was evaluating the long-term staffing needs in order to determine the appropriate number of permanent positions.

A good training and qualification program had been implemented for both technicians and supervisors in the radiation protection department. The radiation protection department received support from the training department which was responsible for conducting the majority of the

scheduled training. A good program had also been established for screening and training contractor personnel brought on site to support the licensee radiation protection staff. There was active support for the professional development of technicians by encouraging and preparing them to take the 1991 National Registry of Radiological Protection Technologists certification examination.

The radiation protection department had developed good health physics procedures, and thorough surveys of various plant areas were performed from initial startup through full power operation. Radiological housekeeping conditions had been well maintained with less than one percent of the plant designated as contaminated controlled areas. An ALARA program had been implemented and was integrated into the planning and work control group. Radiation workers routinely demonstrated an awareness of and compliance with radiation protection procedures. The ALARA suggestion program was supported and mockups were available for ALARA training in preparation for work on steam generators and contaminated valves. A modified elevated PH reactor coolant program had been initiated to reduce the buildup of radioactivity in the piping systems. The total exposure for 1990 was about 5.1 person-rem.

The radioactive waste management and radioactive effluent control and monitoring programs were inspected twice during the assessment period. The licensee had implemented a program that demonstrated compliance with the radiological effluent Technical Specifications and the Offsite Dose Calculation Manual. Two unplanned releases occurred in the period, which were properly documented in the semiannual effluent reports, but no Technical Specification limits were exceeded. Radioactive effluent sample analyses and controls were adequately defined in plant procedures. An effective liquid and gaseous waste release permit program was in place to assure that planned releases to the environment receive proper review and authorization. Testing and surveillance for plant engineered safeguard feature air cleaning systems were properly conducted. Staffing, training, and qualifications of personnel responsible for this area were found to be appropriate. Management oversight was evident by the performance of comprehensive, technically adequate QA audits. The results of the radioactive effluent program were properly documented in semiannual effluent reports.

The radiochemistry and water chemistry programs were inspected twice during the assessment period. The last inspection was conducted in July 1990 and involved confirmatory measurements using the Region IV mobile laboratory for samples collected from operating radwaste systems. The confirmatory measurement results indicated a high quality program in this area with the licensee's results in 98 percent agreement for radiochemistry measurements and the water chemistry results in 100 percent agreement. Westinghouse and (EPRI) guidelines and recommendations had been incorporated into the plant chemistry procedures to ensure that water chemistry parameters were properly maintained. Comprehensive QA audits were performed in the radiochemistry and water chemistry areas using audit personnel with the necessary technical expertise. An appropriate,

well-trained staff has been maintained with a low personnel turnover rate. Early in the assessment period, heavy reliance was placed on contract technicians; however, contractor positions have been gradually eliminated and filled with licensee personnel, with plans for all positions to be filled with licensee personnel by early 1991.

The radiological environmental monitoring program was inspected once during the assessment period with no significant problems identified. A good quality monitoring program was in place and was being conducted in accordance with regulatory requirements. An appropriate staff of qualified personnel was assigned to handle this area. A training and qualification program had been implemented for personnel responsible for the radiological environmental monitoring program. Routine QA audits were performed by audit teams with technical expertise in the areas reviewed. Audits were also conducted on the vendor who performed the radiological analyses of the environmental samples. The results of the monitoring program were properly documented in annual environmental monitoring reports.

The transportation of radioactive materials and processing of solid radioactive waste program areas were inspected in July 1990. At the time of this inspection, no solid waste had been processed nor had the licensee made any radioactive waste shipments. The inspection identified that work remained to be completed concerning the registration of NRC and Department of Transportation certified packages, emergency response information for shipments, and updating the Updated Safety Analysis Report to reflect actual radwaste storage areas. An appropriate staff of well-trained personnel was in place to handle solid radwaste and transportation activities. A comprehensive audit program had been implemented to review this program area. Procedures were established to address the classification and characteristics of radwaste and the preparation and shipping of radioactive waste.

In summary, the licensee had in place the essential elements for effective programs in the radiological controls area. During the assessment period, the radiation protection group handled routine health physics activities in an excellent manner. However, the radiation protection group had not been challenged with intensive radiation protection activities such as those encountered during a refueling outage.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

The inspection effort in this area should be consistent with the core inspection program with regional initiative inspections in the areas of

outages, organization and management controls, and transportation of radioactive materials.

b. Licensee Actions

The licensee should continue their program for the self identification of problem areas, focus on the implementation of a proper radiation protection program for the upcoming refueling outage, and complete implementation of all aspects of the transportation program.

C. Maintenance/Surveillance (2141 Inspection Hours, 16 Percent Total Inspection Effort

1. Analysis

This functional area consists of activities associated with maintenance of plant structures, systems, and components; procurement, including qualification controls; installation of plant modifications; and maintenance of the plant physical condition. It includes conduct of surveillance testing and inservice inspection activities.

NRC inspection effort consisted of the core inspection program with regional initiative inspections including two ORAT inspections, a 50 percent power assessment team inspection, and a maintenance team inspection (MTI).

Enforcement history in this functional area has been generally good and not indicative of any programmatic weaknesses. Violations have been minor and corrective actions have been timely and effective.

The MTI identified several strengths in the maintenance program and some weaknesses which were not safety significant in nature. The implementation of the overall maintenance process was considered to be good. The inspection identified some weaknesses related to root cause analysis, control of temporary modifications, and work control, such as the nonconservative use of nonsafety-related work functions on safety-related equipment. Some of the strengths in the maintenance process included a high degree of management involvement in multiple levels of the maintenance process, good technical support of maintenance, and well developed programs and procedures. Management was also aggressive in taking initiatives to improve the overall control, coordination, and implementation of maintenance and other programs. Examples include performance of an in-house maintenance self-assessment and support of future-sighted programs, such as the plant reliability integrated system of management (PRISM). Additionally, the licensee has implemented a predictive maintenance program which appeared to be a strong diagnostic tool to reduce unplanned corrective maintenance. Overall, the licensee was considered to have well developed programs not yet challenged by the demands of a major outage.

The maintenance backlog has been held to a manageable level, and work prioritization has resulted in prompt corrective action where needed. The initial preventive maintenance (PM) program has been properly implemented, with typically less than 2 percent of PM items being delinquent. The balance between preventive maintenance and corrective maintenance performed is good for a newly licensed facility.

Maintenance staffing and training were strong, with excellent training facilities including ALARA mockups. Personnel performing maintenance appeared to have been well trained, with the average craftsman receiving 5 weeks of training in 1990. The administrative controls over maintenance activities were effective and the maintenance procedures were of good technical quality. There have been a few maintenance personnel errors which resulted in adverse consequences. A maintenance error led to a reactor trip because of a loss of main feedwater pump speed control and another error caused actuation of the blackout sequencer. In addition, one violation resulted from two examples of failure to follow maintenance procedures.

The licensee has implemented a process of performing thorough reviews of work packages after completion of the work in the field. These reviews are performed by the responsible work organization prior to subsequent reviews by quality control (QC), and they have been effective in identifying discrepancies in the work documentation. The number and type of discrepancies identified during this process indicate a possible need to place more emphasis on the accuracy and completeness of the work planning process.

The 50 percent power assessment team inspection noted strengths in the program for observation of field activities by instrumentation and control (I&C) supervisors. Since that assessment, the electrical and mechanical groups initiated similar observation programs. QC coverage has been provided for most safety-related work activities with hold points being incorporated into the work order and/or procedure. First line supervisors have often been observed at the job sites, and the presence of higher management at job sites has not been unusual.

The licensee has formed an outage planning group which coordinates the planning and scheduling of outages. Outage risk assessment is an integral part of this planning. The planned maintenance outage conducted in November 1990, primarily to enhance secondary plant reliability, was well planned with work packages and safety clearances being prepared in advance. Maintenance observed during the outage was properly conducted, and the material condition of the turbine building equipment was improved following the outage.

The licensee had good programs and implementation for surveillance procedures, records, and control of surveillance and calibration. Staffing of personnel performing surveillance testing was appropriate. Surveillance activities observed were conducted with appropriate procedures and personnel were well trained, exhibiting excellent

performance. An example of this was the containment integrated leak rate test. QC coverage was provided for important surveillance activities. Occasional weaknesses were noted in the quality of surveillance procedures, including an inadequate surveillance procedure which contributed to the inadvertent actuation of an auxiliary feedwater pump. Some surveillance test procedures were found to be lengthy and cumbersome which may complicate their completion. To address this problem, the licensee was in the process of breaking some of the procedures into several simpler procedures. While surveillance scheduling and performance were generally very good, some instances of missed surveillances were noted, particularly in the area of testing required by special conditions. Licensee event reports addressed several missed surveillance tests. All but one of these problems were identified by the licensee's program and corrective actions were timely and effective in most cases. The system for control of measuring and test equipment (M&TE) was comprehensive and provided assurance that test equipment used to satisfy Technical Specification surveillance requirements was in calibration. The licensee has established a good M&TE program with well-trained personnel and impressive calibration facilities.

In summary, management involvement in this area was evident with well developed programs. Staffing and training effectiveness was a strength with excellent training facilities. Program implementation was generally good with some problems noted with procedural compliance, missed surveillance tests, and overly complex surveillance procedures. Technical support of maintenance and surveillance was good and corrective actions for identified problems were timely and effective in most cases.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

The NRC inspection effort should be consistent with the core inspection program with regional initiative inspections of maintenance during a refueling outage.

b. Licensee Actions

The licensee should take the necessary actions to eliminate instances of missed surveillance tests.

D. Emergency Preparedness (189 Inspection Hours, 1 Percent Total Inspection Effort)

1. Analysis

This functional area includes activities related to the establishment and implementation of the emergency plan and implementing procedures and interactions with onsite and offsite emergency response organizations during exercises and actual events.

The previous SALP report noted significant findings identified in the emergency preparedness appraisal report involving: assignment of responsibilities, qualification requirements, completion of emergency facilities, personnel accountability, and protective action recommendations. In response to the previous SALP and appraisal reports, the licensee implemented an aggressive program during this assessment period and corrected all significant findings addressed in the appraisal report.

During this assessment period, four emergency preparedness inspections were conducted. No violations were identified during these inspections. There were no actual events during this SALP period that caused activation of the licensee's emergency response facilities (alert or higher). The licensee's response to notifications of unusual events was appropriate. The licensee has maintained an excellent working relationship with state and local officials.

The licensee had properly processed changes to the emergency plan and its implementing procedures. There was a sufficient number of trained personnel in place to implement the emergency preparedness program and maintain the emergency plan. The licensee's program included training for emergency responders and updated emergency facilities, equipment, and supplies. Management oversight was also evident by the performance of effective quality assurance audits of the emergency preparedness program. Audit findings were resolved in a timely manner and the licensee's responses demonstrated a clear technical understanding of the issues. Management demonstrated strong support for the emergency preparedness program.

Although overall results from walkthrough examinations with operating staff members were acceptable, some instances of personnel error and potential proficiency weaknesses were noted. The licensee approach to these concerns and other issues was technically thorough and sound and demonstrated a conservative safety philosophy. Corrective actions were prompt and effective when needed.

During the 1990 annual emergency exercise, the licensee responded quickly by staffing and activating emergency facilities, establishing adequate protective actions to protect emergency workers, promptly notifying offsite authorities of emergency events, recommending adequate protective actions, and pursuing effective mitigating actions. The scenario used in

the annual exercise was considered challenging and realistic. The simulator was used in the interactive mode which provided an enhanced realism and freeplay opportunities for the operators. The evaluation of this exercise identified several minor exercise weaknesses. Licensee personnel responsible for evaluating the scenario also properly identified and characterized the exercise weaknesses.

In summary, the licensee has made excellent progress in improving the emergency preparedness program. The weaknesses and concerns identified during the previous assessment were corrected. The licensee performed in a superior manner during the 1990 exercise. The licensee maintained proper procedures and facilities along with an appropriate staff of well trained personnel to implement the emergency preparedness program.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

Inspection effort in this functional area should be consistent with the core inspection program.

b. Licensee Actions

Management should continue to provide strong support for the emergency preparedness program.

E. Security (245 Inspection Hours, 2 Percent Total Inspection Effort)

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.

During the assessment period, security inspectors conducted five inspections. Three of these consisted of preoperational inspections prior to issuance of the operating license for Unit 1. The licensee successfully closed all open items prior to the issuance of the license. An inspection in January 1991 evaluated the operation of the new materials inspection building, the modified and expanded alternate access point, and the protected area boundary modifications. Enforcement history in this area has been excellent with no violations being identified.

Licensee management has demonstrated an excellent commitment and sensitivity to the security program requirements. Security management is

professional, knowledgeable, well organized, and competent to provide maximum support for the security force. All technical issues have been quickly resolved and approaches have been technically sound and thorough in almost all cases. The security force has been found to be appropriately staffed, well trained, and dedicated, and it was performing its security function in a superior manner. Security force morale appeared to be excellent.

The security program has demonstrated a steady improvement during the SALP period. The licensee has significantly enhanced the security program since licensing by installing innovative modifications to security equipment that exceed regulatory requirements. The licensee has also upgraded the control of materials and persons entering the protected area since commencing operations. The licensee has outstanding perimeter detection capabilities and state-of-the-art search devices. The licensee has installed a materials inspection building and has expanded the alternate access point for more effective and efficient security and operational use. The security program has continued its high performance level after the reinitiation of Unit 2 construction activities.

The licensee conducted a comprehensive audit of the security program during the current SALP period, and all findings requiring action were promptly corrected. The testing and maintenance program for security equipment was found to be outstanding. The licensee has developed a portable microwave tester to detect stray microwave transmissions which cause false alarms. The licensee has purchased and used a computerized multiplexor tester which has rarely been found in use elsewhere. The licensee has developed unique visual annunciator devices for contingency use and state-of-the-art computer equipment which includes simulators and report generators. The licensee has identified root causes of security problems and equipment malfunctions and has promptly initiated effective action to correct deficiencies.

In summary, licensee management has demonstrated superior support of the security program and has measured its effectiveness through comprehensive audits. The licensee has outstanding security equipment and resolves technical issues promptly and thoroughly. The security force demonstrated excellent morale, and was adequately staffed, well trained, and dedicated.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

Inspection effort in this functional area should be consistent with the core inspection program.

b. Licensee Actions

None.

F. Engineering/Technical Support (527 Inspection Hours, 4 Percent Total Inspection Effort)

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; engineering and technical support for operations; training; procurement of safety-related and commercial-grade items; vendor interface activities; and fire protection and prevention.

NRC inspection effort consisted of the core inspection program with regional initiative inspections, including two CRAT inspections and a 50 percent power assessment team inspection. Enforcement history in this functional area has been generally good and not indicative of any programmatic weaknesses. Violations have been minor, and corrective actions have been timely and effective.

The previous SALP report recommended that licensee management ensure that adequate engineering and technical support for operations exists in order to resolve technical issues such as the auxiliary feedwater (AFW) check valve failures. The thoroughness and depth of technical resolutions developed were considered to be of particular importance. Licensee management implemented actions to address the previous SALP report recommendations, including response to an escalated enforcement action relative to AFW check valve failures which occurred in the previous SALP period.

Technical support for operations and maintenance has been generally effective and timely. System engineers have been heavily involved in problem solutions and the system engineering program was considered to be a strength. This program includes approximately 35 system engineers working within the nuclear operations organization on site. The system engineers are assigned responsibility for specific systems, and there is a supervisor for each of six groups.

Management has been involved in analyzing technical problems and in coordinating resources to assure timely resolution. Reactor engineering personnel have provided excellent support to operators during reactor startups. These evolutions have been well coordinated with excellent communications used by the operators and reactor engineering personnel supporting the startups. Technical support for maintenance activities appeared effective and timely. Control of materials, including staging of tools, separation of quality (Q) and non-Q materials, and separation/dedication of storage areas for incompatible materials was effective, and this was considered to be a strength.

While overall technical support of operations and maintenance was generally good, there continued to be some individual technical evaluations that were weak, incomplete, or untimely, especially during the first half of the assessment period. Improvement in the quality of technical evaluations was observed during the second half of the assessment period.

Several licensee event reports discussed engineering problems. The licensee's approach to resolution of these problems was generally thorough and timely. The licensee's rapid completion of corrective actions concerning environmental qualification of RCS RTDs was considered a strength.

The Unit 1 inservice testing (IST) program was well defined and effectively implemented. The licensee's program for the inspection, testing and maintenance of the service water (SW) system was found to be comprehensive in nature and consistent with the requirements of the Technical Specifications and commitments made in response to Generic Letter 89-13. The licensee has installed ATWS mitigation system actuation circuitry (AMSAC) to meet the provisions of 10 CFR Part 50.62. The licensee has fulfilled the commitments to comply with the requirements of Regulatory Guide (RG) 1.97, "Post Accident Monitoring Instrumentation," for Unit 1. Exemplary performance was exhibited by the licensee to meet this commitment, as evidenced by the completeness of the documentation with only minor discrepancies being identified. In addition, the engineering staff was found to be knowledgeable of the requirements of the RG and familiar with the equipment used to meet their commitments.

The licensee has made improvements in the training area during this appraisal period. Training guidelines are complete and well written and have been used by the licensee's training staff. There are well prepared procedures, lesson plans, and materials. The training department performed a self-assessment. Management support and oversight appeared to have created an environment of good instructor morale, commitment, and dedication to training. The ALARA training facility was a strength. During this assessment period, the licensee became a full member of the National Academy for Nuclear Training following accreditation of its training programs. The licensee is using consultants to supplement their training staff, positions have been well defined, and they have established a long-range goal to replace the consultants with experienced plant personnel.

One concern with the licensee's training efforts has been the poor performance on NRC administered operator license examinations. During this SALP cycle the NRC administered one set of initial license examinations at Comanche Peak and three of the six senior reactor operator candidates failed the written examination. Changes made to the facility training program over the last 24 months to address this concern have not been effective.

While no comprehensive design control inspection was performed during this assessment period, observations of the design change process at work were made. These observations indicated that the design modification process was effective. Postmodification testing and timely updating of design documents, such as vital station drawings and design basis documents, were considered to be strong points.

One area where significant technical support interface with operations and maintenance was required involved a problem with back leakage through certain AFW check valves. This leakage did not affect the safety function of the valves, but it was an operational inconvenience for short periods during plant startups. Technical support included instructions for system venting, monitoring of pipe temperatures, improved valve maintenance practices, and a design modification to add a weight to the valve discs. These actions resulted in improved valve performance and a reduction in the operational inconvenience during plant startups conducted later in the period.

In response to identified weaknesses in implementation of the temporary modification procedure, the licensee revised the procedure and effectively implemented it. A weakness in the revised program, involving failure to provide marked drawings in the control room and the work control center to reflect temporary modifications, was later corrected by again revising the controlling procedure. The temporary modification program appeared to be functioning effectively at the end of the SALP period.

The licensee has maintained an effective fire protection program. The thoroughness and detail of the technical evaluations to support the fire protection program were considered to be a strength. The fire brigade training program was found to be thorough and comprehensive. Late in this assessment period, the licensee identified irregularities in the logs maintained by the roving firewatches. Inadequate training and inadequate supervisory and oversight controls of contractor activities led to failure to properly implement the roving firewatch program.

In summary, staffing in this area has been a strength, with a strong system engineering group highly involved in problem solutions. While overall technical support of operations and maintenance was generally good, there were individual technical evaluations that were weak, incomplete, or untimely. Improvement was noted in the quality of technical evaluations during the second half of the assessment period. Management commitment to a strong training program was evident with a strong staff and excellent facilities. One training concern continues with the apparent failure to determine and correct the causes of poor performance of initial operator license training. An effective fire protection program has been maintained with the exception of problems with implementation of the roving firewatch program.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

Inspection effort in this functional area should be consistent with the core inspection program with regional initiative inspections of engineering evaluations.

b. Licensee Actions

The licensee should evaluate and correct the root causes of weaknesses in the initial operator training program.

G. Safety Assessment/Quality Verification (1573 Inspection Hours, 12 Percent Total Inspection Effort)

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.

NRC inspection effort consisted of the core inspection program with regional initiative inspections, including two ORAT inspections and a 50 percent power assessment team inspection. Enforcement history in this functional area has been generally good and not indicative of any programmatic weaknesses. Violations have been minor with the exception of a case early in the period for which a civil penalty was assessed. This case involved apparent intimidation of inspectors responsible for receipt inspection of Thermo-Lag fire barrier material. Corrective actions for violations have been timely and effective in most cases.

The previous SALP report recommended that licensee management should develop ways to improve the effectiveness of the QA/QC organizations in early problem identification.

Licensee management involvement in the area of safety assessment and quality verification has been evident, including actions to enhance early problem identification by QA/QC. The existence of the Senior Quality Assurance Overview Committee and its senior management membership indicate

a high level of management interest in quality. The offsite Operations Review Committee (ORC), the onsite Station Operations Review Committee (SORC), and the Independent Safety Engineering Group (ISEG) have functioned effectively. The ORC and SORC operations have been considered a strength. In late 1990 the QA, QC, ISEG, and plant evaluation groups were reorganized into a nuclear overview department to increase the coordination and efficiency of the overview functions and improve organizational effectiveness to provide a more structured assessment of licensee performance and early identification of problems. As discussed in the plant operations section of this report, the QA surveillance group has been covering shift activities on a 20-hour-per-day basis and providing prompt feedback to management.

The QA program was adequately defined and requirements were satisfactorily identified in lower tier procedures. The QA and QC programs have been effective and have improved over this assessment period. During this assessment period, QC initiated inspections of balance-of-plant activities. QA audits and surveillances were performed as required and were generally technically comprehensive and performance based. Implementation of the audit program was found to be effective. The identification of deficiencies in engineering contractor performance for Unit 2 which resulted in a stop work notice being issued by the licensee, was a noted strength.

One of the licensee's strengths noted during this assessment period has been the formation and use of special task teams to investigate incidents and recommend corrective actions to management. The task teams were comprised of personnel with interdisciplinary backgrounds from various departments. The licensee's investigations of the safety injection events were both prompt and thorough. Through the use of these teams, the licensee developed a thorough understanding of the sequence of events and appropriately identified items requiring completion prior to startup and also longer-term actions intended to prevent recurrence. A significant task team effort was performed to assess secondary plant reliability improvements and another performed a maintenance self-assessment. Other significant initiatives included the operational readiness team and the operational quality assessment. These teams assessed the readiness of Unit 1 programs and procedures to provide assurance that they were adequate to support fuel loading and plant operations.

A centralized corrective action program, the ONE Form program, was developed and implemented during this assessment period. This program provides a consolidated or centralized system for reporting of problems and documenting corrective actions. The program was found to be effectively functioning with respect to problem identification, proper prioritization of problems, and assignment and timely implementation of appropriate corrective actions for safety-significant issues. This program also provides for necessary support to the shift supervisor for operability determinations. Although instances were noted where generic implication reviews were not broad enough and root cause evaluations were not fully executed, the licensee has demonstrated consistently the ability

to identify and report problems and to correct problems with potential safety significance. An example of good performance in the area of problem identification and resolution was the licensee's handling of oscillations in the main feedwater flow control valves. ONE Forms are also the documents which initiate the preparation of licensee event reports. These reports have been timely and well written.

During the startup testing and power ascension program, QA personnel were actively involved in monitoring operational activities and testing. The QA personnel were well qualified and had an appropriate degree of independence. The major self-assessment of performance which the licensee conducted at the 50 percent plateau was detailed and complete.

The licensee's use of industry experience has been a strength during this assessment period. For example, the timely review of an information notice resulted in identification of a potentially significant design error in the system for venting the suction of the charging pumps. The licensee's review of NUREG 1410, dealing with a loss of power at another plant, was timely and comprehensive. This review led to the establishment of a program to perform a risk assessment review of planned outage schedules.

The licensee generally provided timely, consistent, and ultimately adequate technical justifications for licensing submittals and responses to NRC staff requests for information. In some individual cases prior to licensing, repetitive licensee submittals were required to fully address the technical issues. After licensing, individual licensee submittals for a few issues and license amendments required additional justification to completely address the issues involved, and to provide the full extent of the licensee's available information on the subject. The licensee demonstrated significantly improved communication with the NRC over the latter stages of the assessment period, providing open and frank discussion on regulatory issues.

In summary, management involvement has been a noted strength in this area and this is reflected throughout the other functional areas. Strong staffing and training effectiveness was evident with continuing improvement noted in self-assessment capabilities. The effective use of task teams for problem investigation and corrective action recommendations and the use of industry experience were noted strengths. Emphasis on thoroughness and comprehensiveness of technical evaluations supporting root cause evaluations and licensing actions will allow for continued improvement in this area.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

NRC inspection effort should be consistent with the core inspection program, with regional initiative inspections of the corrective action process.

b. Licensee Actions

Licensee's management should continue their efforts to improve the thoroughness and comprehensiveness of the technical evaluations supporting root cause analyses and licensing actions.

H. Unit 1 Startup Program (1017 Inspection Hours, 8 Percent Total Inspection Effort)

1. Analysis

This area includes licensee activities related to the Unit 1 initial startup and power ascension testing program.

This area was inspected by the resident staff on a shift basis during the periods of heaviest activity, supplemented by regional inspectors who observed selected tests and reviewed test results. Enforcement history was very good, with only one minor violation being identified.

Management involvement and administrative controls contributed to excellent performance in completing the startup testing program. Staffing in this area was a strength and test personnel exhibited a high level of competence and professionalism. In that many of these individuals were contractors, licensee management had outstanding success at integrating permanent plant staff and contract personnel to achieve startup goals. Startup QA personnel were found to be knowledgeable and made a positive contribution to startup testing activities. Their activities were well planned, comprehensive, and effectively implemented.

Considering the large number of procedures and test results packages reviewed by the inspectors, there were few negative comments with only minor safety significance. The test logs found in completed test result packages were detailed and precise and facilitated understanding of test results by both assigned reviewers and inspectors. The licensee's resolution of deficiencies identified during startup testing was appropriate and technically sound.

The startup program was managed and executed in a superior manner. It included good test procedures, excellent test performance and coordination, and effective communications between the test engineers and the operators. Initial fuel loading, low power testing, power ascension testing, and major transients were conducted proficiently and in accordance with procedures. An example of a major complex test which was

well coordinated was the remote shutdown test. Operators were well briefed prior to each test by the test engineers. Training on major test transients was conducted in the simulator for operators and test engineers. In addition to personnel training, these evolutions provided a check on the adequacy of the procedures to be used during the transients. Operator performance during all major transients was excellent.

2. Performance Rating

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

3. Recommendations

a. NRC Actions

None.

b. Licensee Actions

The licensee should ensure that lessons learned during the Unit 1 startup program are implemented in the Unit 2 program.

I. Construction Activities (3865 Inspection Hours for Unit 1, 1050 for Unit 2, 29 Percent Total Inspection Effort for Unit 1, 8 Percent for Unit 2)

1. Analysis

Construction activities for Comanche Peak Unit 1 were essentially completed in early February 1990. Prior to the completion of Unit 1, extensive evaluations were performed by Region IV personnel, members of the Comanche Peak Project Division (CPPD), and NRR staff in order to assess TU Electric's implementation of their Corrective Action Program (CAP). The CAP was the utility's self-initiated program to address and resolve identified Comanche Peak Response Team and other external source issues. The NRC assessment process included the review of the utility's Post-Construction Hardware Validation Program (PCHVP), as well as the evaluation of construction completion activities involving the erection of structures and the installation of those systems and components required for the safe operation of Unit 1.

Inspection activities in this area included the evaluation of safety-related electrical equipment and raceways; installation of mechanical components; piping and pipe supports; heating, ventilation, and air-conditioning systems; structural steel and supports; concrete structures; and other safety-related items. In general, the construction activities and the corrective actions associated with this program were performed well and the supporting documentation and quality organization involvement were determined to be acceptable.

NRC inspection programs at CPSES provided a comprehensive assessment of the utility's activities for the construction completion of Unit 1, and concluded that TU Electric's construction programs and CAP were satisfactorily completed for Unit 1 and common areas.

Unit 2 construction activities, which were approximately 85 percent complete, were suspended in April 1988 in order for the utility to concentrate its resources on the completion of Unit 1. Accordingly, the construction work in the Unit 1 and Unit 2 common areas was limited to those systems required to support Unit 1 operation. Unit 2 systems have been maintained in accordance with the licensee's lay-up program and the required PM program was reviewed by NRC. This review process resulted in the identification of several examples of delinquent and deferred PMs. However, the corrective actions established by the licensee's startup organization subsequent to their taking custody of the PM program in February 1990 adequately addressed this problem.

In preparation for the resumption of construction, Unit 2 project management established a completion schedule which included the resumption of engineering efforts in June 1990. This effort included the awarding of contracts for the three primary work scope areas.

In order to assess the licensee's plans and processes for the completion of design activities on Unit 2, an initial team inspection was performed in August 1990. The results of this inspection effort were generally favorable in that they identified a well controlled and integrated project organization for completion of Unit 2, with the onsite engineering contractors working to a common program for design control and reporting of deficiencies.

During the completion phase of Unit 1 construction activities and as result of operational demands, a significant number of parts from Unit 2 were transferred to Unit 1. This process has resulted in the permanent equipment transfer (PET) of approximately 2300 items. In order to accurately identify replacement components and to correct incomplete PET forms, extensive reviews have been performed by the licensee during the engineering walkdown/system configuration confirmation program. The program for controlling PET items is functioning adequately, and continued emphasis on this process may be expected to minimize its potential impact on Unit 2 construction completion and support engineering requisitions and startup activities.

A notable enhancement to the Unit 2 project has been the development and implementation of the lessons learned from Unit 1. These lessons learned were typically the result of issues which had significant impact on Unit 1 construction completion activities including recovery programs such as the Comanche Peak response team findings, the CAP, and the PCHVP. As currently described in the licensee's program for the completion of CPSES, Unit 2, equivalent corrective actions which were taken with respect to Unit 1 hardware will take into account the lessons learned in the Unit 1 programs. This approach is intended to facilitate the design of Unit 2

based on the availability of the technical methodologies, procedures, and experience gained during the implementation of the CAP for Unit 1 and common.

In part, the implementation of the PCHVP program for the incorporation of Unit 1 results into the Unit 2 required field verifications and the implementation of Unit 1 CAP commitments for the control of design activities were evaluated during the team inspection of Unit 2 design activities. The results of this initial assessment indicated that the utility' process included equivalent corrective actions and verification methodologies for Unit 2 activities and that the process for translating Unit 1 CAP commitments to Unit 2 design activities was appropriately established.

Additionally, since the resumption of engineering efforts in June 1990, the coordinated project management approach, which was developed to control Unit 2 completion activities, has effectively structured and staffed the requisite organizations. To date, the project milestones which established the phased engineering restart, project staffing requirements, and construction resumption have been effectively implemented.

The majority of inspection effort in this functional area was related to resolution of open items for Unit 1 prior to licensing. Only minimal inspection effort was expended on Unit 2 construction primarily because of the extended suspension of construction on Unit 2 and because construction activities were not resumed until very late in the SALP period. For these reasons, insufficient inspection information exists to provide a basis for assessment and assignment of a performance rating.

2. Performance Rating

No Performance Category has been assigned in this functional area (Category N).

3. Recommendations

a. NRC Actions

Perform inspections in accordance with the established Unit 2 master inspection program. No adjustments to this approved inspection program are recommended at this time.

b. Licensee Actions

Provide for periodic status meetings with NRC to review construction status and assess oversight activities and findings.

V. SUPPORTING DATA AND SUMMARIES

A. Major Licensee Activities

1. Major Milestones

02/08/90 Unit 1 low power license issued
02/14/90 Unit 1 completed fuel loading
04/03/90 Unit 1 initial criticality
04/17/90 Unit 1 full power license issued
04/24/90 Unit 1 main generator on grid
07/13/90 Unit 1 power at 100 percent
07/23/90 Unit 1 completed 100 percent warranty run
08/13/90 Unit 1 commenced commercial operations
01/02/91 Unit 2 construction restarted

2. Major Outages

A maintenance outage was conducted June 6-20, 1990, following the 50 percent plateau testing. Major jobs included repairs on the turbine generator primary water pump and cleaning of the incore instrument thimble tubes.

A maintenance outage was conducted from July 26 through August 7, 1990, following the trip test from 100 percent. Major efforts during this outage included investigation of the cause of a steam generator atmospheric relief valve failure and other safety injection event follow-up activities.

A maintenance outage was conducted from November 2-14, 1990. Major jobs included a design modification on the main feedwater flow control valves, secondary plant leak repairs, and cleaning of the incore instrument thimble tubes.

3. License Amendments

The original and two amendments to the Unit 1 license were issued during this assessment period.

4. Significant Modifications

During the November 1990 outage the main feedwater flow control valves were modified to eliminate flow induced oscillations.

B. Direct Inspection and Review Activities

NRC inspection activity, including several major team inspections and assessments, during this SALP cycle included 79 inspections performed with approximately 13,500 direct inspection hours expended.