APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-445/92-56
50-446/92-56

Operating Licenses: NPF-87

Construction Permit: CPPR-127

Licensee: TU Electric
Skyway Tower
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Facility Name: Comanche Peak Steam Electric Station

Inspection At: Glen Rose, Texas

Inspection Conducted: November 9-13, 1992

Inspector: L. T. Ricketson, P.E., Senior Radiation Specialist
Facilities Inspection Programs Section

Approved: Blaine Murray 12/17/92
B. Murray, Chief, Facilities Inspection Programs Section — Date

Inspection Summary

Areas Inspected: Routine, announced inspection of radiation protection activities in support of the Unit 1 refueling outage (1RF02), including program changes, planning and preparation, training and qualifications, external exposure controls, internal exposure controls, controls of radioactive materials and contamination, the program for maintaining occupational exposures as low as reasonably achievable (ALARA), and solid waste management and transportation of radioactive materials.

Results:

Unit 1

- The licensee prepared well for the refueling outage (paragraph 2.2).
- Contract personnel supplementing the permanent staff met qualification requirements (paragraph 2.3).

- External exposure controls were good but were hampered in some cases by poor communications within the radiation protection organization and between the radiation protection organization and other work groups (paragraph 2.4).

- Internal exposure controls were also generally good, but this program was also hampered by communication problems. A violation was identified involving the failure to perform airborne surveys. The licensee identified a number of internal contaminations; none exceeded regulatory limits. Some of the contaminations may have been prevented if better communications existed between the radiation protection organization and other work groups (paragraph 2.5).

- The number of personnel contaminations was low, and housekeeping within the radiological, controlled area was generally good (paragraph 2.6).

- A challenging person-rem goal was set, and a variety of advanced techniques were used to reduce total exposure (paragraph 2.7).

- The radwaste interim storage situation was improved (paragraph 3.2).

- Waste shipments were prepared and conducted properly (paragraph 3.2).

Unit 2

No inspection activities were performed in Unit 2.

Summary of Inspection Findings:

Violation 445/9256-01 was opened (paragraph 2.5).

DETAILS

1 PLANT STATUS

Unit 1 was in the 18th day of the 1992 refueling outage (1RF02) at the start of the inspection.

2 OCCUPATIONAL EXPOSURE DURING EXTENDED OUTAGES (83729, 83750)

The licensee's program was inspected to determine compliance with Technical Specifications 6.11 and 6.12 and the requirements of 10 CFR Part 20, and agreement with the commitments of Chapter 12.5 of the Final Safety Analysis Report.

2.1 Changes

The radiation protection organization lost 5 people (from a staff of 54) as a result of the recent voluntary severance plan actions. Licensee representatives stated that management had authorized the replacement of the individuals with contract personnel.

The licensee will implement new 10 CFR Part 20 on January 1, 1993.

2.2 Planning and Preparation

The licensee supplemented its permanent staff in preparation for the refueling outage with approximately 63 senior radiation protection technicians, 23 junior radiation protection technicians, and 33 decontamination technicians. Through interviews with radiation protection personnel and observations of work activities, the inspector determined that sufficient staff was added to the radiation protection organization to support outage activities.

The inspector also determined through observation and interview with workers that the licensee provided appropriate amounts of protective clothing, respiratory protection equipment, radiation survey instrumentation, air sampling equipment, portable ventilation, temporary shielding, and decontamination supplies.

In preparation for the outage, the ALARA group drafted approximately 100 radiation work permits. By 30 days prior to the outage, the ALARA group had reviewed approximately 90 percent of the proposed work packages, indicating sufficient time was allotted for reviewing and planning of work activities to incorporate dose saving measures.

The inspector attended work control meetings in which the status of outage work was discussed and noted that the meetings were orderly and resulted in a free exchange of information among the licensee organizations involved.

The inspector attended pre-job briefings for Radiation Work Permit 1600, Task 13, conducted on November 10, 1992, and noted that members of the radiation protection surveillance and control group were not in attendance.

Consequently, as the workers entered the radiological, controlled area, a disagreement occurred between members of the surveillance and control group and the ALARA group concerning actions taken to evaluate airborne radiation levels in the reactor cavity where work was to be performed. The work was stopped by the lead surveillance and control technician on duty, and the matter was discussed. This action indicates that a conservative approach was taken, but it also demonstrated a need to improve communication within the radiation control department.

The inspector observed a second pre-job briefing for Radiation Work Permit 1600, Task 13 on November 11, 1992, and noted that the surveillance and control group was represented.

The inspector reviewed computer generated lists of containment entries by radiation protection managers, supervisors, and ALARA technicians. The information indicated that managers and most supervisors made sufficient entries to remain knowledgeable of changing conditions. However, the inspector noted that some relief lead technicians and ALARA technicians, as well as one supervisor, had made few, if any, entries into the reactor containment building to review radiological working conditions.

2.3 Training and Qualifications

The licensee had written guidance to aid in evaluating the experience of contract radiation protection technicians. Screening tests were used in the selection process for contract radiation protection technicians. Once selected, the contract radiation protection technicians were required to demonstrate proficiency in the licensee's procedures through a practical examination and qualifying process.

The inspector reviewed selected resumes of contract radiation protection technicians and determined that they met qualification requirements.

2.4 External Exposure Control

The licensee had sufficient supplies of thermoluminescent dosimeters and issued approximately 600 additional monitoring devices for the outage. Dosimetry processing was performed on site.

The licensee implemented the use of electronic alarming dosimeters for individuals having to enter high radiation areas. The dosimeters were programmed to alarm at a preset dose and/or dose rate. The dosimeters provided results in close agreement with the thermoluminescent dosimeters, also worn by the radiation workers, and were easy to read, eliminating some human error in recording dose.

The inspector reviewed selected radiation work permits for the higher dose jobs and determined that they provided appropriate controls. The radiation work permit packages included ALARA pre-job checklists and survey information. The inspector noted that the packages also included detailed instructions outlining the topics to be discussed during pre-job briefings.

On tours of the radiological, controlled area, the inspector noted that areas were posted properly with highly visible signs and that locked high radiation areas were controlled properly.

The inspector reviewed the circumstance surrounding the hot particle exposures of two individuals working in the fuel building on October 23, 1992. The licensee's review of the occurrences was comprehensive, and the methodology of evaluating the exposures was good. The licensee identified potential sources of the hot particles but was not able to state conclusively the origin of the particles, although extensive surveys were performed. Using VARSKIN, Revision 2, the licensee calculated that the skin doses to the individuals were 6.21 rems and 0.41 rems, respectively. The largest particle was 0.86 microcuries, and the exposure time was 2 1/2 hours. Regulatory limits were not exceeded.

While observing supplemental shielding operations of the upper reactor internals on November 12, 1992, the inspector identified another example of difficulties caused by a communication problem. Three workers were waiting in the reactor cavity for lead shielding blankets and racks on which to hang them. During lifting operations, a crane operator and rigger on the 905-foot elevation observed one or more of the individuals in the cavity gesturing and apparently attempting to signal them. Unable to understand what was wanted by the workers, the crane operator contacted a radiation protection representative who, in turn, went from the 905-foot elevation to the 860-foot elevation to use the radio headphones to discuss the meaning of the signals. The resulting delay was approximately 10 minutes. During this time, the workers continued to wait in a high radiation area. Additional sets of radio headphones would likely have eliminated the confusion caused by the failure to communicate and would have prevented additional, unnecessary radiation exposure.

2.5 Internal Exposure Control

The inspector reviewed the circumstance surrounding an event, occurring on November 7, 1992, involving workers performing in service inspection preparation work in containment. As the workers looked for a specific valve on which to work, they were left without radiation protection coverage when the radiation protection technician went on break. (The radiation work permit governing this work did not require continuous radiation protection coverage.) The workers moved to a different elevation looking for the valve and, evidently through a failure in communication within the radiation protection group, were not provided additional coverage.

Before leaving the workers, the radiation protection technician had given them instructions to take smear samples prior to conducting work. (The exact instructions were in dispute.) The workers performed the smear samples, removed piping insulation, and wirebrushed contaminated components. This caused radioactive material to become airborne and the workers inhaled or ingested some of the radioactive materials. The situation was identified as the workers attempted to pass through the personnel contamination monitors when exiting the reactor containment building. Whole-body counting confirmed the uptakes of radioactive material.

The failure to survey the components prior to allowing work to commence was a violation (445/9256-01) of 10 CFR 20.201(b) which requires that the licensee evaluate the extent of radiation hazards that may exist.

The inspector reviewed Radiation Work Permit 92001404, "ISI Inspections in Containment," and noted that Special Instruction 7 required that radiation protection personnel be contacted prior to starting insulation removal. The workers thought they had complied with this instruction. The inspector determined that one of the contributing causes of the incident was a failure by radiation protection personnel to communicate instructions to the workers and to communicate changes in coverage assignments among themselves.

Assessment of individual intakes through whole-body counting indicated that the highest value was less than 12 maximum permissible concentration-hours (MPC-hrs) and, therefore, no regulatory limits were exceeded.

In response, the licensee took the following actions to prevent recurrence:

- All radiation protection job coverage within the reactor containment building was initiated from only one control point (on the 832-foot elevation). This was to eliminate possible confusion as to which radiation protection technician had responsibility for job coverage assignments when workers started on one elevation and moved to another. Radiation protection technicians were required to report to that control point for a meeting and briefing with the work group. Radiation protection personnel at that point were required to monitor ongoing work activities to ensure that proper radiation protection resources were available to support the work load on a continual basis.

- Instructions were given to radiation protection personnel regarding the taking of contamination samples for survey purposes. The instructions stated that a craft person could take a smear sample (for ALARA purposes) only if he were under the direct supervision of a radiation protection technician watching to see the exact location of the smear.

- Breaks could only be taken when work conditions allowed. The radiation technicians were instructed to escort workers to the control point for coverage turnover.

The corrective actions were implemented by November 9, 1992.

Normally, the NRC would consider the use of discretion in this matter. However, because the corrective actions for Violation 445/9208-02 discussed in your letter of May 26, 1992, and further discussed in your November 3, 1992, letter to the Citizens Association for Sound Energy failed to prevent a similar communication problem which contributed to the violation, a citation is being issued.

The inspector reviewed respirator issue records and respiratory protection qualification records and determined that workers receiving respirators met qualification requirements. Use of respiratory protection equipment was light.

Engineering controls such as portable ventilation units with high efficiency particulate filters were used to limit concentrations of airborne radioactive materials and reduce the need for respiratory protection equipment.

2.6 Controls of Radioactive Materials and Contamination, Surveys, and Monitoring

Through the first 21 days of the outage, the licensee identified 22 personnel contaminations. (The number included both skin and clothing contaminations.)

In order to reduce the amount of personnel traffic, the licensee required workers entering the reactor containment building to enter the radiological, controlled area through one access control point and workers entering the balance of the plant to enter through another. A lead technician was assigned to discuss work assignments and radiation precautions with workers entering containment. The lead technician provided written entry authorization which was presented to personnel at a radiation protection control point inside containment. The technique aided radiation protection personnel in tracking and providing coverage for work activities.

During several tours of the radiological, controlled area, the inspector observed that contaminated areas were controlled with appropriate rope barriers. Housekeeping within the radiological, controlled area was generally good.

The inspector observed radiation protection technicians as they performed radiation surveys in the reactor containment building and contamination checks prior to releasing items from contaminated areas and determined that they used proper health physics practices.

In order to identify potential contamination problems, the licensee located additional personnel contamination monitors for early screening of individuals exiting the reactor containment building. These monitors were located near the undressing area and thus were closer than the personnel contamination monitors at the exit of the radiological, controlled area.

2.7 Maintaining Occupational Exposures ALARA

The licensee's total exposure goal for the outage was 145 person-rem. During the inspection, the inspector noted that the total dose was below what was projected for that point in time.

Dose saving measures used by the licensee included the use of telemetric dosimetry equipment on individuals working in high radiation areas such as on steam generator platforms. The dosimetry system's information display showed stay times, cumulative doses for individuals, and dose rates for the areas entered. Communications with the individuals were via radio headphones.

Other dose saving measures included the use of video equipment to monitor workers in high radiation areas thus reducing the number of support workers necessary.

ALARA personnel tracked the doses for major work activities on a daily basis by reviewing computer printouts of exposures associated with those jobs and comparing the exposures with projected values.

2.8 Conclusions

In preparation for the refueling outage, the licensee sufficiently supplemented the permanent radiation protection staff with qualified contract personnel. To ensure that the contract personnel were qualified, the licensee used proper screening and evaluating techniques.

The licensee prepared well for the outage by conducting suitable ALARA reviews of work orders and incorporating dose saving measures and instructions into the radiation work permits, providing appropriate amounts of radiation protection equipment and supplies needed for the outage, and conducting good work control meetings and pre-job briefings.

External radiation exposure controls were good but were hampered in some by cases by poor communications, as observed in the conduct of pre-job briefing and during work activities in the reactor cavity. New technology, in the form of electronic alarming dosimeters, helped to reduce human error in monitoring and recording radiation exposures.

Internal exposure control was generally good, but several low-level internal contaminations were identified. Although none of the internal contaminations exceeded regulatory limits, at least some could have been avoided by improved communications between the radiation protection department and radiation workers. A violation involving a failure to evaluate a radioactive contamination hazard adequately was identified.

The number of personnel contaminations was relatively low, and housekeeping within the radiological, controlled area was generally good.

A challenging goal was set for radiation exposure accrued during the outage. New technologies were utilized to reduce total exposure.

3 SOLID RADIOACTIVE WASTE MANAGEMENT AND TRANSPORTATION OF RADIOACTIVE MATERIALS (86750)

The licensee's program was inspected to determine compliance with Technical Specification 6.11, the requirements of 10 CFR Part 71, and Department of Transportation Regulations 49 CFR Parts 171 through 178; and agreement with the commitments of Chapter 11 of the Final Safety Analysis Report

3.1 Shipping of Low-Level Waste for Disposal and Transportation

The inspector reviewed the new low-level radwaste interim storage area and noted that it was secured properly and that it provided ample short-term storage space.

The inspector reviewed shipping documentation packages for shipments of radioactive waste made during the outage and identified no problems.

3.2 Conclusions

The licensee took action to eliminate the shortage of interim storage space for radioactive waste noted in previous inspections. Waste shipments were prepared and conducted properly.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

S. Bradley, ALARA Supervisor
*J. Curtis, Radiation Protection Surveillance and Control Supervisor
R. Fishencord, Radioactive Materials Control Supervisor
*N. Harris, Licensing Engineer
*R. Prince, Radiation Protection Manager
*C. Welch, Senior Quality Assurance Specialist

1.2 CASE

*O. Thero, Consultant

1.3 NRC Personnel

*J. Jaudon, Deputy Director, Division of Reactor Safety and Safeguards
*W. Jones, Senior Resident Inspector
G. Werner, Resident Inspector

*Denotes personnel that attended the exit meeting. In addition to the personnel listed, the inspector contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on November 13, 1992. During this meeting, the inspector reviewed the scope and findings of the report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspector.