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May 6, 1988

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RE: Texas Utilities Electric Company, et al. (Comanche Peak Steam Electric Station, Units 1 and 2), Dkt. Nos. 50-445-OL, 50-446-OL

Lady and Gentlemen:

Pursuant to an agreement reached with the minority owners regarding discovery in this proceeding, we have received the following documents:

Technical Analysis Corporation, The Quality Assurance Program at the Comanche Peak Steam Electric Station (4/30/88)

Tex-La Electric Cooperative of Texas, Inc., Brazos Electric Power Cooperative, Inc., Analysis and Evaluation of the Project Management Services Provided by Texas Utlities in the Construction of the Comanche Peak Steam Electric Station (2/15/88)

D503

Whitfield Russell Associates, Damages to Brazos Electric Power Cooperative, Inc., and Tex-La Electric Cooperative of Texas, Inc., Related to Participation in Comanche Peak Steam Electric Station (February 1988)

Victor Gilinsky, Comanche Peak Licensing Delay, A Report to Brazos Electric Power Cooperative, Tex-La Electric Cooperative of Texas (2/15/88)

Southern Engineering, Report on Rural Electric Cooperatives (February 1988)

Randel Associates, Inc., Addendum to Review & Analysis of Engineering, Construction & Testing at the Comanche Peak Nuclear Project (4/29/88)

Inasmuch as the contents of these documents, which we understand were delivered to the Applicants some time ago, bear directly on the issues in this proceeding, we wish to advise you of their existence. We will send copies under separate cover as soon as practicable.

We have not had time to review all the documents but we do believe it important for the Board to see the attached summary and conclusions of the Technical Analysis Corporation document as soon as possible.

Sincerely,

Anthony Z. Roisman
Counsel for CASE

AZR/bp
enclosure
cc (w/enc.): see attached list

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TECHNICAL ANALYSIS CORPORATION

THE QUALITY ASSURANCE PROGRAM
AT THE COMANCHE PEAK STEAM ELECTRIC STATION

REPORT SPONSORED BY

DON H. BECKHAM
TECHNICAL ANALYSIS CORPORATION

April 30, 1988

THE QUALITY ASSURANCE PROGRAM AT THE COMANCHE PEAK STEAM ELECTRIC STATION

1. Summary

In 1973, Texas Utilities (TU)[1] filed a request with the U. S. Atomic Energy Commission for a Permit to construct a two unit nuclear power plant at Comanche Peak. The units were to be known as the Comanche Peak Steam Electric Station (CPSES). The AEC granted the Construction Permit in December 1974. One condition on the permit was that the plant was to be constructed in accordance with the Quality Assurance (QA) requirements established by the Commission and adopted by TU as described in the Preliminary Safety Analysis Report (PSAR) that accompanied the application for the Construction Permit.

In the early stages of the project, even before the Construction Permit was issued, the AEC staff had been critical of the development and implementation of the QA program for CPSES. Only a last minute push by TU and the Architect/Engineer for the project, Gibbs and Hill (G&H), resolved the AEC staff's criticism of the written program. Over the next few years the AEC and NRC[2] staff would identify several deficiencies in the implementation of that written program. The TU QA staff attempted to bring the contractors' programs into compliance with the NRC requirements.

By 1976, TU was experiencing difficulty maintaining the pace of construction necessary to complete the first unit by the planned date of 1980. The Constructor for the units, Brown and Root (B&R), was critical of the TU QA staff for being too rigid in its enforcement of the QA requirements. By mid 1976 B&R was becoming more vocal in its criticism and was being joined in the criticism by TU project officials. At the same time, TU was being criticized by the NRC for apparent deterioration of the QA Program. In the fall of 1976, the TU QA Manager was appointed

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1 Except where necessary to distinguish between different organizations, the term TU will be used to refer to any of the major organizations (e.g. TUGCO, TUSI or TUEC) within the Texas Utilities organization.

2 In 1975 the Atomic Energy Commission was disbanded by Congress in the Energy Reorganization Act. The regulatory responsibilities of the AEC were transferred to the newly created Nuclear Regulatory Commission (NRC). The regulatory and inspection staff of the AEC was transferred to this new agency, so there was little loss of continuity during the transition. In this report we will use NRC to mean the AEC or NRC unless a distinction is required for clarity.

Project Manager of CPSES. The position of QA Manager was filled by an individual with no previous nuclear or QA experience. A short time later, the TU executive in charge of design and construction of CPSES was replaced. After this new executive was briefed on B&R and Project complaints about TU QA, the Site QA Supervisor was replaced. Some months later the Project Manager (and former QA Manager) was assigned to a position not involved with construction or QA. The new CPSES Project Manager stressed that <u>everyone</u> must cooperate with construction to maintain the project cost and schedule.

By mid 1977, the cost and schedule goals were continuing to elude the project managers. A major source of delay was resolving field originated design changes. These changes are required when the design of a building or system cannot be built the way the drawings produced by G&H indicate that it should be. This could be because another component had already been installed in the designated location (called an Interference), because the drawing was in error, because required material was not available, or because the component was not built in accordance with the approved design drawing. These field originated changes are supposed to be reviewed by the original design organization (G&H) and approved as a change to the design before construction continues on the affected system. In an effort to maintain the construction schedule, TU directed that field originated design changes be given a preliminary review on site and approved for construction. A full design review of the change was to be conducted by G&H at a later date after the changed design had been constructed. This practice became know as the "after-the-fact" or "at risk" design review. The names stemmed from the fact that the review took place after construction instead of before, and if the design change is not approved by G&H then the work that was done to the revised drawings would have to be removed or reworked. Hence the work is done at risk of future rework.

TU was warned several times by G&H, by consultants hired by TU to advise them, and by the NRC staff that the "at risk " method at worst does not meet the NRC QA requirements and at best was a poor QA and construction practice. TU repeatedly acknowledged that it was willing to accept the risk to maintain the construction schedule.

The QA program was being implemented under a QA Site Supervisor characterized as dictatorial and brusque. Indeed the TU management style was characterized as "top down" communication with little opportunity to communicate upwards. In this atmosphere there were repeated incidents of allegations to the NRC that TU was not properly implementing the QA Program. Finally, the allegations were taken before the Atomic Safety and Licensing Board (ASLB). The ASLB is a part of the process through which a utility's application for a license to operate a

facility is reviewed. TU had applied in 1978 for a license to operate CPSES. The three member Board reviews the technical information prepared by TU and the review conducted by the NRC staff. The Board also allows members of the public, whose interests might be affected if the facility gets licensed, to participate in the hearings conducted by the Board. If after holding hearings and considering the evidence presented on the record, the ASLB determines that the utility has met the applicable requirements, it will issue an "initial decision" recommending that the facility be licensed.

The ASLB required TU to respond to the allegations, and in the course of these hearings, the practice of "at risk" design review was revealed. In December 1983, the ASLB ordered TU to initiate a program to provide an independent verification of the design of CPSES. The NRC staff also initiated special inspection efforts to determine if the design and as built plant met relevant design requirements. As these independent reviews identified additional deficiencies, TU expanded the program of review. In 1984 and 1985 significant changes were made in the management of the project. For the first time, personnel with significant previous nuclear experience from outside of TU were brought in to key positions. A program called the Comanche Peak Response Team (CPRT) was initiated by TU and then expanded. In 1985, TU withdrew its request for an Operating License, stating that it did not have sufficient confidence that the plant had been constructed in accordance with the NRC requirements.

As of today the CPRT effort is continuing. Significant review, analysis, verification, and rework have already been completed. More will be required to complete the effort. Whether or not the efforts will be sufficient to convince the ASLB and NRC that the project then meets all applicable regulatory requirements and can be licensed to operate remains to be seen.

8.0 Conclusions on TU Implementation of the QA Program at CPSES

In conducting our review and drawing our conclusions we were careful to evaluate the Quality Assurance program at CPSES from the earliest records of design and construction activities. From this review we determined that the history of CPSES could be classified in three phases, as described in Section 5.2. These are Phase I, Rigorous Application of QA; Phase II, The Cooperative Phase; and Phase III, The Response Team Phase. We concluded that TU management priorities in Phase II were overwhelmingly concerned with completing construction in the most expeditious manner. Part of the result of these priorities was ensuring that the QA organization adopted an attitude of "cooperation" with construction to maintain schedule and hold down costs.

These management priorities were manifested in several ways, but the most significant in terms of QA were replacement of the QA Manager and QA Site Supervisor, dissolution of the Quality Surveillance Committee, and the decision to implement a process to review field generated design changes after the changed design had all ready been constructed (after-the-fact design review.) The new QA management was determined to cooperate with construction to maintain schedule. When deficiencies were noted by internal audits, NRC inspections, or third party reviews, the response of the QA managers was either to fix only the specific deficiency, or if pushed to resolve the growing problems associated with changing designs in the field, to postpone review and resolution until the "final design review and verification."

These practices led to three types of deficiencies: actual hardware deficiencies that had to be reworked; designs that did not meet the applicable requirements but which could be reanalyzed and used without modification; and hardware and designs for which sufficient documentation could not be located and actual measurement and testing of installed equipment and components had to be made to verify that the installed equipment was adequate.

From the point of view of protecting health and safety there are no significant differences between these three deficiencies. Before a nuclear power plant can be operated there must be positive evidence that it meets rigorous safety standards. The consequences of an accident are too great to permit any other approach. Not only must the hardware be correct, but the utility must be able to demonstrate that it is right. By adopting the "after-the-fact" design review, TU intentionally delayed the review and verification of the conformance between the as-built hardware and the design specifications as required by the NRC.

In 1984 the Atomic Safety and Licensing Board required TU to prove that the plant did indeed meet these requirements. The

investigations by the NRC, TU and independent contractors led to the formation of the Comanche Peak Response Team. In carrying out the review of design documentation and as-built verifications within the scope of CPRT, TU is finally performing the "after-the-fact" design review that had been promised since 1977. The attendant cost, delay, and rework that is the direct result of this program stems directly from the liability that TU specifically accepted repeatedly in 1977, 1978, 1982 and 1983.

We conclude that TU subordinated the Quality Assurance program to the priority of maintaining project schedules and holding down costs. As a result of this Quality Assurance managers adopted a "cooperative" attitude toward construction and implemented a program of "after-the-fact" design review. The evaluation, rework and delay are attributable to the liability accepted by TU management as a result of the QA approach during the "cooperative" phase.