Attachment 4

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-445
TEXAS UTILITIES ELECTRIC COMPANY, et al.	)	50-446
	)	
	)	(Application for
(Comanche Peak Steam Electric Station, Units 1 and 2)	)	Operating Licenses)
	)	

AFFIDAVIT OF EDWARD J. KREH, JR.

I, Edward J. Kreh, Jr., being duly sworn, state that I am Senior Consultant to O'Donnell and Associates. In that capacity I have consulted for utilities, NSSS vendors, and other industries in support of their quality assurance programs. I am also Chairman of the ASME Nuclear Quality Assurance Subcommittee on Design and Procurement which is responsible for establishing Industry Standards for control of Nuclear Design and Procurement activities. Prior to joining O'Donnell and Associates, I worked as Manager of Product Assurance for Westinghouse Pressurized Water Reactors Division for seven years. In previous Westinghouse assignments at Bettis Atomic Power Laboratory, I held positions involving both design and quality assurance responsibilities over a period of 21 years. A statement of my experience and professional qualifications is attached. In my

professional activities, I have become intimately familiar with the requirements of 10 C.F.R. Part 50, Appendix B and with the applicable industry standards.

The purpose of my efforts was to evaluate whether, and if so, when, TUGCO's QA program should have detected programmatic breakdowns in TDI's QA program. I have recently examined the nonconformance reports ("NCRs"), test deficiency reports ("TDRs"), 10 C.F.R. Part 21 reports made by Transamerica Delaval, Inc. ("TDI"), disassembly and inspection reports and other documentation of deficiencies which have arisen with the TDI diesel generators at Comanche Peak. I have discussed these deficiencies with personnel at the site who are knowledgeable of these deficiencies. In addition to examining the deficiency documentation, I also examined the audit reports and inspection reports of TUGCO QA and discussed these reports with personnel who are knowledgeable of the activities reported.

Based upon the foregoing examination of QA-related documentation and discussions, I have formed the following opinion:

1. TUGCO, through its architect/engineer Gibbs and Hill, conducted pre-award evaluations of TDI. As is normal in most vendor evaluations, deficiencies were detected in TDI's QA program, which TDI committed to correct. This activity occurred during 1975-76.
2. TDI was placed on the Approved Vendors List ("AVL") and awarded the contract for the diesel generators, following which the order was placed with TDI.

3. TUGCO's actions in evaluating TDI, placing TDI on the AVL, awarding the contract and placing the order for the diesel generators from TDI comported with industry practice during the 1975-76 time frame. TUGCO was justified in its actions based upon the source evaluation of TDI capability in accordance with applicable regulations and industry standards and the vendor's commitment to implement an adequate QA program. TUGCO's actions during the pre-award and placement stages were in compliance with 10 C.F.R. Part 50, Appendix B.

4. During the period from 1975-83, TUGCO audited the implementation of TDI's QA program four times, which was sufficient to comply with industry audit frequency standards. In addition, during this period, approximately 35 inspections were conducted at vendor sites. This period covered the time from contract award to the shipment of the diesel generator assemblies and components.

5. The TUGCO involvement with these machines included both factory and field testing to demonstrate power output, fuel consumption, vibration, and other performance characteristics to verify that the diesel generators met all pertinent requirements. The testing program is divided into two parts. The first part includes shop tests using the manufacturer's facility cooling, fuel, and related support systems while loading the engine with a shop test tool. In

a similar manner, the performance characteristics of the electrical generators were proven at the generator manufacturing site by driving them with a shop dynamometer.

6. The second part of the testing program involves testing of the fully assembled diesel generator at the plant site. With the performance of the basic components and assemblies proven by shop test, the second part of the test program was implemented at the Comanche Peak site by assembling the engine and generator together with their supporting systems, components, and auxiliaries. The testing of the diesel generator system at Comanche Peak is necessary to demonstrate that the assembled unit with its supporting auxiliaries and systems meets specified performance requirements.

7. Testing of major components to establish their performance at the point of fabrication followed by testing of the complete system with the major components assembled together with the required auxiliaries, supporting systems, controls, and related instrumentation is the logical and only truly effective way of establishing the performance of highly complex, large-scale equipment which is supported by extensive auxiliary equipment and controls.

8. As in the case of other nuclear utilities, TUGCO relied upon TDI for the design of the diesel generators. This constituted a situation in which the technology for a highly complex system resided entirely with the vendor. TUGCO was

justified in relying upon TDI for the design of the diesel generators. Furthermore, until receipt of the equipment on site, TUGCO's oversight of the TDI program comported with industry standards at all pertinent times.

9. Throughout the manufacturing process of the major components, including the diesel engines and generators, TUGCO took corrective action when the need arose. This included refusal to release equipment for shipment and communications between TUGCO's management and TDI's management to resolve discrepancies.

10. During the period from the time the machines were ordered until the major components were received on-site at Comanche Peak, there were no indications that the TDI QA program was not acceptable. The last diesel generator was landed on its foundation in October of 1979. A significant deficiency in the fabrication of the auxiliary skid and its supports was detected in July of 1980. While TUGCO QA did not respond by formally questioning the adequacy of the TDI QA program, this had no effect on the quality of the major diesel generator components, which had already been received on site by that time. TUGCO addressed this problem by devoting its resources to resolving the deficiencies in the auxiliary skids.

11. There are approximately 69 deficiencies which were detected during the assembly, preparation for preoperational testing, and actual preoperational testing. These deficiencies

occurred in the turbocharger lubrication system, pumps and associated equipment, valves and associated equipment, the auxiliary skids, various mechanical components and systems, and various electrical components. There also were calibration problems with a number of electrical components. Of the deficiencies which were detected, approximately 12 were initially reported to TUGCO by TDI. Aside from the auxiliary skids noted above, the types and quantity of deficiencies lacked the significance and repetitive nature to suggest that there was a QA breakdown at TDI.

12. TUGCO disassembly and inspection of the Unit No. 1 diesel engines in the 1984 time frame disclosed several deficiencies in various components. These are sufficiently repetitive to question the adequacy of the TDI QA program.

13. It is noted that the auxiliary skid deficiencies and the defects disclosed during TUGCO disassembly and inspection following preoperational testing were found well after all major components had been delivered by TDI.

14. Based on my experience in the establishment and implementation of QA Programs for complex systems such as diesel generators and on my review of the pertinent documentation, it is my opinion that there was no indication that the TDI QA Program was not acceptable prior to discovery of the auxiliary skid deficiency in July of 1980, well after the major components had been delivered to TUGCO.

Edward J. Kreh, Jr.

Subscribed and sworn to
before me this 24th day
of August, 1984.

Mildred E. Stahlman
Notary Public

My commission expires:

EXPERIENCE AND PROFESSIONAL QUALIFICATIONS OF EDWARD J. KREH, JR.

Edward J. Kreh, Jr., is an O'Donnell Senior Consultant in manufacturing, design, and quality assurance. he has more than 45 years' experience as an engineer, manager, and consultant.

Mr. Kreh received his undergraduate training in engineering at Carnegie Institute of Technology and studied economics at the University of Pittsburgh. He is a registered Professional Engineer in Pennsylvania.

He has consulted for utilities, NSSS vendors, and other industries in support of manufacturing, design, design assurance, and product integrity. He has participated in the evaluation of nuclear plant system and component designs and in reviews of management controls applied to the construction and the operation of nuclear plants.

As a manager of Product Assurance for the Westinghouse Pressurized Water Reactors Division, Mr. Kreh was responsible for design review and manufacturing controls to ensure that Nuclear Plant specifications and regulations were met. He is Chairman of the ASME Nuclear Quality Assurance Subcommittee on Design and Procurement which is responsible for establishing Industry activities. He was also responsible for resolution of a number of technical problems associated with Westinghouse Nuclear Reactor design.

As Central Laboratories Manager at Bettis Atomic Power Laboratory, he was responsible for activities in support of Naval Nuclear Programs in such areas as materials irradiation, fuel development, and water chemistry. He has also managed programs to develop and qualify methods of manufacturing, processing, and joining of various materials used in commercial and Naval nuclear reactors. In addition, he was responsible for development of control rod drive mechanisms, instrumentation, valves, and steam generators utilized in the Naval Nuclear Program.

In prior Westinghouse experience, Mr. Kreh was a principal designer of large electrical equipment, including turbine generators, reversing mill motors, marine drives, and large wind tunnel electrical drive systems.

Mr. Kreh has patents for shrink ring commutators and for the omega seal weld configuration used in the nuclear industry. He is a member of Pi Tau Sigma, and Tau Beta Pi, and is listed in Who's Who in Engineering.

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(Comanche Peak Steam Electric Station, Units 1 and 2)	)	(Application for Operating Licenses)

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "Applicants' Response to June 15, 1984, Board Request for Additional Information Concerning TDI Diesel Generators" in the above-captioned matter were served upon the following persons by deposit in the United States mail, first class, postage prepaid, this 25th day of August 1984:

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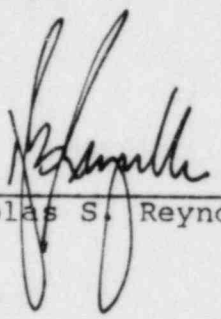

Nicholas S. Reynolds

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