UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

AFFIDAVIT OF MARVIN DUNENFELD REGARDING MAINTENANCE OF SUBCRITICALITY

I, Marvin Dunenfeld, do depose and state as follows:

1. My name is Marvin Dunenfeld. I am a Senior Reactor Physicist in the Core Performance Branch, Division of Systems Integration, U.S. Nuclear Regulatory Commission ("NRC"). In that capacity, I am responsible for core performance evaluations in nuclear power plant licensing actions. I performed the core physics evaluations for the Comanche Peak Steam Electric Station ("CPSES") CP and OL reviews. A statement of my educational and professional qualifications is attached to my affidavit.

2. My affidavit discusses the measures to prevent inadvertent criticality during the proposed fuel loading and precritical testing program at CPSES.

3. To ensure that inadvertent criticality during initial fuel loading and refueling cannot occur, the Staff generally requires that the boron concentration in the reactor be maintained such that the more-restrictive of the following reactivity conditions is met: (a) k_{eff} of .950 or less, or (b) boron concentration equal to or greater than 2000 ppm. For these proposed operations at CPSES, the 2000 ppm boron concentration requirement is more restrictive than the requirement for k_{eff} to be .950 or less. The Staff also generally requires that a minimum of two source range neutron flux monitors be operable with visual and audible indication. Applicants indicate that these refueling requirements, as contained in the proposed Technical Specifications for CPSES, will be complied with during the proposed initial fuel loading and precritical testing activities. The Staff will require Applicants to comply with the Staff's requirements if a license to load fuel and conduct precriticality testing at CPSES is granted.

4. The Applicants' calculations indicate that the maximum predicted k_{eff} for any planned condition in the proposed program is 0.894. The conditions associated with this prediction are a boron concentration of 2000 ppm, a coolant temperature of 68°F, and withdrawal of the most reactive control rod bank. The Staff's experience with the predictions and startup test results for the large number of Westinghouse reactors which are in operation indicates that the

Applicants' predicted k_{eff} is reasonable. The coolant temperature of 68°F is a reasonable lower bound, and the system will become less reactive (i.e., k_{eff} will decrease) as the temperature is increased. The boron concentration of 2000 ppm will prevent criticality even in the highly unlikely event that all of the control rods are fully withdrawn. According to Applicants, in that situation the predicted k_{eff} is .932.

5. Applicants state that the source range nuclear instrumentation will be in operation during both fuel loading and precritical testing. This instrumentation will provide an accurate indication of reactivity conditions in the CPSES Unit 1 reactor, since the instrumentation is designed to detect and alert the operators to any increase in the neutron count rate and a consequent increase in k_{eff} long before an approach to criticality would occur. Thus, the source range nuclear instrumentation provides an additional safeguard to ensure that inadvertent criticality will not occur.

6. In conclusion, based on the foregoing, it is not possible for the reactor to become critical with a specified boron concentration of 2000 ppm. In addition, nuclear instrumentation will provide an indication of increases in k_{eff} to further ensure that inadvertent criticality cannot occur.

The above statements are true and correct to the best of my knowledge and belief.

Marvin Dunenfeld
Marvin Dunenfeld

Subscribed and sworn to before me
this 31st day of October, 1984

Malinda L. McDonald
Notary Public

My commission expires: 7/1/86

MARVIN S. DUNENFELD

DIVISION OF SYSTEMS INTEGRATION
U.S. NUCLEAR REGULATORY COMMISSION

PROFESSIONAL QUALIFICATIONS

I am employed as a Senior Reactor Physicist in the Core Performance Branch of the Division of Systems Integration, U.S. Nuclear Regulatory Commission.

I graduated from the University of Michigan with a B.S. in Physics in 1951 and a M.A. in mathematics in 1953. Following four years of employment with the Ford Motor Company as an electrical project engineer, I have been continuously employed in the nuclear engineering profession since March 1957.

Prior to joining the NRC (AEC) in June 1967, I was employed as a physicist by the Allison Division of General Motors. In this position, I was responsible for safety evaluations of the Mobile Compact Reactor under development for the Army. My tenure at Allison was from 1963 to 1967.

From 1957 to 1963, I was employed at Atomics International. My work there involved two years as an analyst in reactor shielding, and four years as a physicist in the analysis of reactor kinetics problems.

In my 17 years of employment at the NRC and AEC, I have been a reviewer of licensing actions concerned with reactor physics. I have worked on reactor physics evaluations of light water reactor construction permits, operating licenses, technical specifications, reload applications, and topical reports. For most of the 17 years of my employment, I have also supervised a group of consultants at Brookhaven National Laboratory who perform physics calculations for NRC.