TU ELECTRIC

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10CFR50.36

C. Lance Terry
Group Vice President

December 30, 1994

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
SUBMITTAL OF LICENSE AMENDMENT REQUEST 94-022
SPENT FUEL STORAGE CAPACITY INCREASE

Gentlemen:

Pursuant to 10CFR50.90, TU Electric requests an amendment to the CPSES Unit 1 Operating License (NPF-87) and CPSES Unit 2 Operating License (NPF-89) to increase the spent fuel storage capacity by incorporating the attached changes into the CPSES Units 1 and 2 Technical Specifications. These changes revise the specification for fuel storage to authorize usage of the high density fuel storage racks, to increase the spent fuel storage capacity, and to adopt the wording, content, and format of the Improved Standard Technical Specifications. These changes apply equally to CPSES Units 1 and 2.

The current racks in Spent Fuel Pool No. 1 have a capacity for storing 556 fuel assemblies. TU Electric is applying for authorization to use high density spent fuel storage racks in Spent Fuel Pool No. 2 with a capacity for storing 735 fuel assemblies, for a total of 1291 fuel assemblies.

Attachment 2 provides a detailed description of the proposed changes, a safety analysis of the changes and TU Electric's determination that the proposed changes do not involve a significant hazard consideration. Attachment 3 provides the affected Technical Specification pages (NUREG-1468), marked-up to reflect the proposed changes. Attachment 4 provides, for information only, an advance copy of selected pages from Sections 1.2, 1.3, and 9.1 of the updated Final Safety Analysis Report scheduled for issuance in February 1995. Attachment 4 describes the existing design basis for CPSES fuel storage and does not reflect the high density racks. Enclosure 1 provides the CPSES Fuel Storage Licensing Report that supports this license amendment request. This request is consistent with the NRC Letter to All Power Reactor Licensees, from B. K. Grimes, April 14, 1978, "OT Position for Review and Acceptance of Spent Fuel Storage and Handling Applications," as amended by the NRC Letter dated January 18, 1979.

400 N. Olive L.B. 81 Dallas, Texas 75201

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TU Electric requires the new high density racks for the second refueling outage for Unit 2 (March 1996). Therefore, TU Electric requests approval by December 31, 1995.

In accordance with 10CFR50.91(b), TU Electric is providing the State of Texas with a copy of this proposed amendment.

Should you have any questions, please contact Carl B. Corbin at (214) 812-8859 or David A. Bersi at (817) 897-8134.

Sincerely,

C. L. Terry

C. L. Terry

By: Roger D. Walker
Roger D. Walker
Regulatory Affairs Manager

CBC/cbc

Attachments:
1. Affidavit
2. Description and Assessment
3. Affected Technical Specification pages (NUREG-1468)
4. Advance Copy of Selected Pages from Sections 1.2, 1.3, and 9.1 of the 1995 updated Final Safety Analysis Report

Enclosure 1. CPSES Fuel Storage Licensing Report

c - Mr. L. J. Callan, Region IV
Mr. T. J. Polich, NRR
Mr. D. D. Chamberlain, Region IV
Resident Inspector, CPSES

Mr. D. K. Lacker
Bureau of Radiation Control
Texas Department of Public Health
1100 West 49th Street
Austin, Texas 78704

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Texas Utilities Electric Company	)	Docket Nos. 50-445
	)	50-446
(Comanche Peak Steam Electric	)	License Nos. NPF-87
Station, Units 1 & 2)	)	NPF-89

AFFIDAVIT

Roger D. Walker being duly sworn, hereby deposes and says that he is the Regulatory Affairs Manager for TU Electric, the licensee herein; that he is duly authorized to sign and file with the Nuclear Regulatory Commission this License Amendment Request 94-022; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

Roger D. Walker

Roger D. Walker
Regulatory Affairs Manager

STATE OF TEXAS)
)
COUNTY OF DALLAS)

Subscribed and sworn to before me, on this 30th day of December, 1994.

Gayle R. Peck

Notary Public

NOTARY PUBLIC STATE OF TEXAS
Gayle R. Peck
Notary Public, State of Texas
My Comm. Expires 01/06/98

DESCRIPTION AND ASSESSMENT

I. BACKGROUND

The current licensing basis allows up to 1116 fuel assemblies in two storage pools with "low density" racks (nominal 16 inch center to center spacing, bolted to liner), rack $k_{eff} \leq 0.95$ with unborated water, and one additional low density rack in each containment. The current as-installed configuration has 20 low density racks installed in Spent Fuel Pool No. 1 (SFP1) (556 fuel assembly locations) and no racks installed in Spent Fuel Pool No. 2 (SFP2). The racks installed in SFP1 have no restrictions on the placement of spent fuel assemblies and will be referred to as "low density" racks.

The first refueling outage for Unit 2 (fall 1994) is complete. SFP1 currently contains 293 spent fuel assemblies. After the fourth refueling outage for Unit 1 (spring 1995) TU Electric anticipates that 389 spent fuel assemblies will be stored in SFP1. The low density racks installed in SFP1 provide adequate storage capacity through the end of the fourth refueling outage for Unit 1 (spring 1995). To ensure that sufficient spent fuel storage capacity continues to exist for a full core offload in the spring of 1996, TU Electric is requesting approval to use nine free standing, high density, non-poison spent fuel racks in SFP2.

These nine high density racks as originally purchased included a neutron absorber in the form of "Boraflex." Because of industry experience with Boraflex, TU Electric has elected to modify these racks to remove the Boraflex material.

In order to satisfy criticality limits with the Boraflex removed, TU Electric is proposing to use the high density racks in a 2 out of 4 (referred to as "high density (2/4)") storage pattern as a limiting configuration. Depending on plant specific needs (e.g. refueling outages) some of the high density racks may also be used in a more conservative 1 out of 4 (referred to as "high density (1/4)") storage pattern. Text references to "high density rack(s)" apply equally to both the (1/4) and (2/4) storage patterns.

The nine high density racks provide 1470 storage locations with a nominal 9 inch center to center spacing. Because of the restriction on storage, the high density racks will be able to store no more than 735 assemblies in a 2 out of 4 pattern.

Since no spent fuel has been stored in SFP2, the high density racks will be installed in a dry pool.

To use these high density racks for the storage of fuel, TU Electric is submitting the proposed Technical Specification changes described in Section II.

II. DESCRIPTION OF TECHNICAL SPECIFICATIONS CHANGE REQUEST

Requirements for fuel storage are specified in Technical Specifications Section 5.6. TU Electric's requested change to Section 5.6 is in the format of the Improved Standard Technical Specifications (NUREG-1431) [Reference 1]. The requested changes are summarized below.

Criticality

Section 5.6.1.1 (a): The maximum U-235 enrichment (5.0 weight percent) for the fuel assemblies was added to conform to the format and wording of the Improved Standard Technical Specifications. This addition is consistent with CPSES's current technical specification requirement 5.3.1 that states in part "Reload fuel shall be similar in physical design to the initial core loading and shall have maximum enrichment not to exceed 5.0 weight percent U-235." No technical change.

Section 5.6.1.1 (b): Minor wording changes regarding k_{eff} were made to be consistent with the format and words used in the Improved Standard Technical Specifications. No technical change.

Section 5.6.1.1 (c): The description of the nominal 16 inch center to center low density racks was clarified to show that these are the existing "low density" storage racks and to conform to the format and wording of the Improved Standard Technical Specifications. No technical change.

Section 5.6.1.1 (d): A description of the "high density" fuel storage racks (nominal 9 inch center to center spacing) was added. This Section also contains restrictions for the use of the high density racks.

Section 5.6.1.1 (e): This change states that all new or partially spent fuel assemblies are allowed unrestricted storage in the low density fuel storage racks and restricted storage in an expanded checkerboard (1 out of 4) pattern in the high density fuel storage racks.

Section 5.6.1.1 (f) and Figure 5.6-1: This change adds a figure, "Minimum Burnup vs Initial U-235 Enrichment for High Density (2/4) Spent Fuel Storage Racks," and Section 5.6.1.1 (f)) which define minimum burnup and initial enrichment requirements for restricted storage in a checkerboard (2 out of 4) pattern in the high density racks.

Section 5.6.1.2 (a), (b), & (d): The specifications for the existing storage racks for new fuel were expanded to include (a) a maximum U-235 enrichment of 5.0 weight percent, (b) a

k_{eff} ≤ 0.95 if fully flooded with unborated water (including allowance for uncertainties in Section 4.3 of Final Safety Analysis Report), and (d) a nominal 21 inch center to center distance between fuel assemblies placed in the new fuel storage racks. These changes were added to conform to the format and wording of the Improved Standard Technical Specifications. No technical changes.

Section 5.6.1.2 (c): The existing requirement that k_{eff} ≤ 0.98 if moderated by aqueous foam has been retained but has been rewritten in the format and words of the Improved Standard Technical Specifications. No technical changes.

Drainage

Section 5.6.2: The change clarified the statement to be consistent with the CPSES design that has two spent fuel storage pools. No technical change.

Capacity

Section 5.6.3: The capacity of the two spent fuel pools is changed from 1116 to 1291 fuel assemblies.

In summary, the specification for fuel storage has been revised (1) to identify the maximum U-235 enrichment of 5.0 weight percent (previously approved by Amendments 27 and 13 to Facility Operating License Nos. NPF-87 and NPF-89 respectively), (2) to describe the high density racks and the limitations on their use, (3) to identify the k_{eff} limit (≤ 0.95) for a fully flooded new fuel storage rack, (4) to identify the center to center spacing of the new fuel storage racks (nominal 21 inches), (5) to increase the storage capacity from 1116 to 1291 fuel assemblies, and (6) to use the words and format of the Improved Standard Technical Specifications (NUREG-1431). The use of the high density racks complies with a limiting configuration of a 2 out of 4 checkerboard pattern based on fuel enrichment and burnup.

III. ANALYSIS

The changes to Sections 5.6.1.1 (a), (b), (c), 5.6.1.2 (c), and 5.6.2 were editorial changes or incorporate current requirements in the CPSES Technical Specifications. These changes have no impact on the safety of plant operations. The changes to Sections 5.6.1.2 (a), (b), and (d) were editorial enhancements to the CPSES Technical Specifications. These statements reflect the existing CPSES licensing basis and do not affect the safety of plant operations.

TU Electric has evaluated the remaining changes to the Technical Specifications and the proposed storage of fuel in the high density racks according to the guidance of the NRC Letter to All Power Reactor Licensees, from B. K. Grimes, April 14, 1978, "OT Position for Review

and Acceptance of Spent Fuel Storage and Handling Applications," as amended by the NRC Letter dated January 18, 1979 [Reference 2], appropriate NRC Regulatory Guides, appropriate NRC Standard Review Plans, and appropriate Industry Codes and Standards as listed in the enclosed CPSES Fuel Storage Licensing Report [Reference 3]. In addition, TU Electric has reviewed several previous applications and NRC Safety Evaluation Reports similar to this proposal.

The analysis below evaluates the use of the high density racks (including the limitations on their use) and the increased total storage capacity. The analysis evaluates the following areas: (1) Nuclear Criticality, (2) Thermal-Hydraulic issues, and (3) Mechanical, Material and Structural considerations. In addition, a summary is provided of the impact of the changes on design basis analyses.

Nuclear Criticality

The current Technical Specifications allow the use of low density racks with a nominal 16 inch center to center spacing between the spent fuel assemblies. Fuel Assemblies stored in the high density racks will have a nominal 12.7 inch (measured diagonally) center to center spacing for high density (2/4) storage. The criticality analyses for the high density (2/4) storage pattern show that these racks meet the existing acceptance criterion for criticality, i.e. the neutron multiplication factor in the spent fuel pool storage racks shall be less than or equal to 0.95, including uncertainties.

The proper storage of spent fuel in the high density racks depends on the discharge burnup and the initial enrichment of the spent fuel assembly. Administrative controls will be implemented to assure the spent fuel assemblies are inserted in the appropriate cell.

The analyses have considered a dropped spent fuel assembly and an inadvertent placement of a spent fuel assembly in a location other than a prescribed location and pool temperature variations outside of the normal operating range. The criticality acceptance criterion remains satisfied for these events.

Thermal-Hydraulic

The use of high density racks and the added storage capacity increase the heat load in the spent fuel pools during normal operating and abnormal conditions. Evaluation has shown that the Spent Fuel Cooling system must be modified to keep the bulk water temperature within the normal maximum of 150°F. Also, the HVAC system will be modified to maintain the ability to remove the heat generated by the added storage capacity. The maximum pool temperature will be within the existing design basis for the spent fuel racks (low and high density), spent fuel pool liner, cooling system, spent fuel pool demineralizers, and the fuel cladding. An analysis has been performed to assure compliance with the ACI 318-71 Building Code Requirements for Reinforced Concrete [Reference 4].

Mechanical, Material and Structural

The main safety function of the spent fuel pool and the high density racks is to maintain the spent fuel assemblies in a safe configuration through normal and abnormal operating conditions. The mechanical, material and structural considerations of the proposed high density racks are described in the CPSES Fuel Storage Licensing Report. The high density rack materials are compatible with the spent fuel pool and the spent fuel assemblies. The high density racks have a sufficient margin of safety against tilting and deflection or movement during a seismic event. The high density racks do not impact each other or the pool walls, damage spent fuel assemblies, or cause criticality concerns during a seismic event.

Design Basis Events

This change does not affect the existing design basis events regarding the drop of a fuel cask and a tornado. Impacts of this change on the following potential design basis events were evaluated:

1) a dropped spent fuel assembly;
2) a loss of spent fuel pool cooling;
3) a seismic event; and
4) a fuel assembly inadvertently placed in a location other than a prescribed location.

(1) a dropped spent fuel assembly:

The increase in spent fuel storage capacity will not increase the probability of a dropped spent fuel assembly. The high density racks are designed such that a dropped fuel assembly cannot occupy a position in the high density racks other than a normal fuel storage location. The drop of an assembly on top or along side of a rack or in a location other than a prescribed location is addressed below in paragraph number (4).

The radiological consequences of a fuel handling accident are not changed from that described in Final Safety Analysis Report Section 15.7.4. Only the dropped assembly is damaged; the high density racks can accommodate the drop without any significant deformation that would affect other stored assemblies. Thus, the consequences of this type of accident will not be increased from previously evaluated spent fuel assembly drops.

(2) a loss of spent fuel pool cooling:

For the high density racks, the criticality acceptance criterion is not violated. Two redundant safety related cooling loops are provided, each will be capable of simultaneously servicing both of the station spent fuel pools.

In the event of a postulated complete loss of spent fuel pool

cooling system capability, a number of available sources of spent fuel pool makeup water could be successfully used to replace losses due to boiling in order to maintain the spent fuel pool (SFP) water level and thereby ensure adequate spent fuel pool cooling.

(3) a seismic event:

The high density racks have no connection with the pool walls or with each other. Time histories whose response spectra envelope the design floor response spectra at the pool floor level were used as input to the dynamic analysis of the racks. Fluid coupling was also considered as described in the enclosed CPSES Fuel Storage Licensing Report.

The high density racks are designed and fabricated to meet the requirements of applicable portions of NRC Regulatory Guides and Industry Standards. During a seismic event, the high density racks will not tip over, or collide against each other or against the pool walls.

The interaction between the fuel assemblies and the high density racks has been considered, particularly gap effects. The resulting impact loads are not capable of causing structural damage to the fuel assemblies.

Confirmatory seismic analyses of the Fuel Building were performed to determine the effect of the high density racks on the seismic response of the Fuel Building. The seismic analyses verified that the design basis floor response spectra of the Fuel Building are adequate and conservative for the design of equipment throughout the Fuel Building. The floor loading from the high density racks filled with spent fuel assemblies does not exceed the structural capacity of the Fuel Building.

Therefore, the consequences of a seismic event will not increase from previously evaluated events.

(4) a fuel assembly (either a fresh unirradiated or a partially depleted fuel assembly) inadvertently placed in a location other than a prescribed location:

The design of the high density racks is such that it is possible to insert spent fuel assemblies in locations other than prescribed storage locations. A fuel assembly could be (1) inadvertently dropped and come to rest horizontally on top of the racks, (2) inadvertently dropped and come to rest vertically on top of the racks, or (3) misloaded within the racks or adjacent to but outside the racks. Credit for borated water in accident situations is justified by the double contingency principle of ANSI N16.1-1975 [Reference 5]. Based upon this credit, the resulting k_{eff} is calculated to be less than 0.95.

Thus, in all cases, the design of the high density racks ensures that the multiplication factor is less than the 0.95 limit, including uncertainties.

Summary

The use of the high density racks provides for the safe and acceptable storage of new and spent fuel and reasonable assurance that the health and safety of the general public will not be endangered.

IV. SIGNIFICANT HAZARDS CONSIDERATIONS ANALYSIS

TU Electric has evaluated whether the proposed changes involve a significant hazards consideration. The evaluation addresses the three standards set forth in 10CFR50.92(c) and is discussed below.

1. Do the proposed changes involve a significant increase in the probability or consequence of an accident previously evaluated?

This proposed license amendment includes changes which clarify the Technical Specifications, identify existing licensing basis criteria, revise the wording and format to be consistent with the Improved Standard Technical Specifications (NUREG-1431), and provide the criteria for acceptable fuel storage in high density racks. The clarification and the revised wording and format are purely administrative changes and have no impact on the probability or consequences of an accident. The criteria for acceptable fuel storage in the high density racks are discussed below.

The high density racks differ from the low density racks in that the center to center storage cell spacing is decreased from a nominal 16 inches to a nominal 9 inches and the high density racks are free standing whereas the low density racks are bolted to the pool. The allowed storage pattern in the high density racks results in a nominal 12.7 inch center to center spacing (measured diagonally) with a two out of four storage pattern (high density (2/4)). Administrative controls are used to maintain the specified storage patterns and to assure storage of a fuel assembly in a proper location based on initial U-235 enrichment and burnup. The increased storage capacity results in added weight in the pools and additional heat loads.

The only potential impact on the probability of an accident concerns the potential insertion of a fuel assembly in an incorrect location in the high density racks. TU Electric has used administrative controls to move fuel assemblies from location to location since the initial receipt of fuel on site. Through receipt of fuel for two initial core loads and four refueling outages (each of which includes a complete core offload), TU Electric has not inserted a fuel assembly into an improper location. This record demonstrates the adequacy of the

administrative controls in place and confirms that the use of such administrative controls will not involve a significant increase in the probability of an accident previously evaluated.

The consequences of all of these changes have been assessed and the current acceptance criteria in the licensing basis of CPSES will continue to be met. The nuclear criticality, thermal-hydraulic, mechanical, material and structural designs will accommodate these changes. Potentially affected analyses, including a dropped spent fuel assembly, a loss of spent fuel pool cooling, a seismic event, and a fuel assembly placed in a location other than a prescribed location, continue to satisfy the CPSES licensing basis acceptance criteria. The analysis methods used by TU Electric are consistent with methods used by TU Electric in the past or methods used elsewhere in the industry and accepted by the NRC.

Based on the acceptability of the methodology used and compliance with the current CPSES licensing basis, TU Electric concludes that the use of the high density racks and the increase in storage capacity do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

The administrative changes to the Technical Specifications have no impact on plant hardware or operations and therefore cannot create a new or different kind of an accident.

The spacing changes between fuel assemblies, the administrative controls, the storage limitations, and the increased storage capacity do not generate new failure modes that could create a new or different kind of an accident. The change from bolted low density racks to free standing high density racks will not create the possibility of a new or different kind of an accident. Free standing racks have been commonly used at nuclear power plants to provide for high density storage of spent fuel, and their use does not entail any unproven or unusual design or technology. In this regard, a number of plants have previously changed from bolted or restrained racks to free standing racks, including Millstone 1 (amendment dated November 27, 1989) and San Onofre 2 and 3 (amendment dated May 1, 1990), and such changes have not been classified as involving a significant hazards consideration. Furthermore, CPSES is not located in an area subject to severe seismic events. A seismic event at CPSES would result in little movement of the free standing racks and would not cause the high density racks to collide with each other or the spent fuel pool walls. Therefore, use of the free standing high density racks would not

create the possibility of a new or different kind of an accident.

3. Do the proposed changes involve a significant reduction in a margin of safety?

The proposed administrative changes to the Technical Specifications have no impact on any acceptance criteria, plant operations or the actual failure of any systems, components or structure; therefore these administrative changes have no impact on the margin of safety.

The NRC guidance [Reference 2] has established that an evaluation of margin of safety should address the following areas:

1) Nuclear criticality considerations
2) Thermal-Hydraulic considerations
3) Mechanical, material and structural consideration

The established acceptance criterion for criticality is that the neutron multiplication factor in the spent fuel pool storage racks shall be less than or equal to 0.95, including uncertainties, under all conditions. The k_{eff} for the high density racks for CPSES is always less than 0.95, including uncertainties at a 95/95 probability confidence level. Because the existing acceptance criterion is shown to be satisfied, the high density racks do not involve a significant reduction in the margin of safety with respect to criticality considerations.

The thermal-hydraulic evaluation demonstrates that the temperature margin of safety will be maintained. Re-evaluation of the spent fuel pool cooling system for the increased heat loads shows, with minor modifications, that the spent fuel cooling system will maintain the abnormal maximum temperature of the spent fuel pool water within the limits of the existing licensing basis (i.e., below 212°F). Additionally, it shows that, with minor modifications, the normal maximum temperature will be within the existing design basis temperatures for the high density racks, liner, structure, and cooling system and will not have any significant impact on the spent fuel pool demineralizers. Thus, the existing licensing basis remains valid, and there is no significant reduction in the margin of safety for the thermal-hydraulic design or spent fuel cooling.

The main safety function of the spent fuel pool and the high density racks is to maintain the spent fuel assemblies in a safe configuration through normal and abnormal operating conditions. The design basis floor responses of the Fuel Building were confirmed to be adequate and conservative and the floor loading will not exceed the capacity of the Fuel Building. The high density rack materials used are compatible with the spent fuel

pool and the spent fuel assemblies. The structural considerations of the high density racks maintain margin of safety against tilting and deflection or movement, such that the high density racks do not impact each other or the pool walls, damage spent fuel assemblies, or cause criticality concerns. Thus, the margin of safety with respect to mechanical, material and structural considerations are not significantly reduced by the use of the high density racks.

Based on the evaluations above, TU Electric has determined that the activities associated with this change satisfy the no significant hazards consideration standards of 10CFR50.92 (c) and, accordingly, a no significant hazards consideration finding is justified.

V. ENVIRONMENTAL EVALUATION

TU Electric has evaluated the proposed changes and has determined that the changes do not involve (1) a significant hazards consideration, (2) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), an environmental assessment of the proposed change is not required.

VI. REFERENCES

1. NUREG 1431, Vol. 1, "Standard Technical Specifications, Westinghouse Plants," September 1992

2. Nuclear Regulatory Commission, Letter to All Power Reactor Licensees, from B. K. Grimes, April 14, 1978, "OT Position for Review and Acceptance of Spent Fuel Storage and Handling Applications," as amended by the NRC Letter dated January 18, 1979.

3. CPSES Fuel Storage Licensing Report, Comanche Peak Steam Electric Station, Expansion of Spent Fuel Storage Capacity, Revision 0, December 9, 1994

4. ACI 318 Building Code Requirements for Reinforced Concrete, 1971

5. ANSI N16.1-1975, "Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors"