TUELECTRIC

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August 28, 1989

William J. Cahill, Jr.
Executive Vice President

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
ADVANCE FSAR SUBMITTAL: UPDATED RESPONSE TO Q022.2
CONCERNING CONTAINMENT REANALYSIS

Gentlemen:

Amendment 76 to the CPSES FSAR was transmitted to the NRC in TXX-89201, dated May 1, 1989. As part of that amendment, the TU Electric response to NRC Question 022.2 was updated to make it consistent with previously transmitted FSAR changes (Amendment 69) resulting from the containment reanalysis using the LOCTIC computer code. A portion of the changes for the update to the response to Q022.2 was not included in Amendment 76. The enclosure to this letter provides these changes, along with related supporting documentation. These changes will be included in a future FSAR amendment.

In order to facilitate NRC staff review of these changes, the enclosure is organized as follows:

1. Draft revised FSAR pages, with changed portions indicated by a bar in the margin, as they are to appear in a future amendment (additional pages immediately preceding and/or following the revised pages are provided if needed to understand the change).

2. A line-by-line description/justification of each item revised.

3. A copy of related SER/SSER sections.

4. An index page containing the title of "bullets" which consolidate and categorize similar individual changes by subject and related SER/SSER section.

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5. A discussion of each "bullet" which includes:

- The Line-by-line description/justification for each item related to the "bullet" which has been screened as a group 1 or 2 item or a group 3 or 4 item which impacts the existing SER/SSER's. (The discussion of these groups is contained in TU Electric letter TXX-88467, dated June 1, 1988)

- The bold/overstrike version of the revised FSAR pages referenced by the description/justification for each item identified above. The bold/overstrike version facilitates review of the revisions by highlighting each addition of new text in bold type font and overstriking with a slash (/) the portion of the text that is deleted.

Sincerely,

William J. Cahill, Jr.

BSD/bsd
Enclosure

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (3)

Advance FSAR Change to Response for Question 022.2
and
Supporting Documentation

pressure setpoint of HI-3 (20 psig) was reached for large breaks. For small breaks the spray delay time is 38 seconds. | 76

f. Identification of most severe environment | 5

Among the MSLB's analyzed, the 0.908 ft^2 split rupture at 70-percent power results in the maximum Containment temperature. The Containment vapor temperature for this break is shown in Figure 6.2.1-15. | 5

2. Safety Related Component Thermal Analysis | 5

The peak containment vapor temperature for the design basis MSLB was calculated to be 345°F. | 76
Component thermal analyses are required only if the environmental qualification test conditions are less than those calculated from the Containment pressure-temperature transient response analysis. | 5

a. Transmitters | 5

All transmitters located inside containment and required to operate for a design basis MSLB, to mitigate the accident consequences, are qualified by testing or by a combination of testing and thermal analysis in accordance with IEEE 323-1974 requirements. | DRAFT

b. Electrical cables | 5

The cables are qualified by testing/analysis to a maximum temperature of 345°F. The | DRAFT

qualification method is in accordance with IEEE 383-1974 and IEEE 323-1974. | DRAFT 5

c. Containment electrical penetration | DRAFT

The Containment electrical penetrations and their header plate assemblies are qualified by testing to temperatures exceeding 345°F. The qualification method is in accordance with IEEE 317-1976 and IEEE 323-1974. | DRAFT

d. Valves/Valve Operators | DRAFT

The valves located inside containment consist of two groups: | 5

(i) Target Rock and ASCO solenoid valves are qualified by testing to temperatures above 345°F, and | DRAFT

(ii) Valcor solenoid valves are qualified by testing/analysis to a maximum temperature of 346°F. | DRAFT

The Limitorque operators of all valves located inside containment are qualified by testing to a maximum temperature significantly above 345°F. The qualification method for valves/valve operators is in accordance with IEEE 323-1974. | DRAFT

| DRAFT

3. Evaluation of Environmental Qualification | 5

The test temperature profiles used for environmental qualification are included in the Equipment Qualification Documentation referenced in Section 3.11. | 5

In the case of electrical cables, containment electrical penetration assemblies and valves, the peak temperatures are maintained for periods well in excess of 10 minutes. | 5

FSAR Page (as amended)	Group	Description
Q&R 022-16	2	Revises maximum qualification temperature for cable inside containment. Revision: Qualification temperature revised from 346 degrees F to 345 degrees F. The qualification is still consistent with the previously revised (Amendment 76) peak containment vapor temperature of 345 degrees F. FSAR Change Request Number: 89-308.1 Related SSER Section: SSER6 3.11 SER/SSER Impact: No
Q&R 022-16	3	Revises response to describe finalized qualification plan for containment transmitters. Update: Revised response part B.2.a to state that all transmitters located inside containment and required to operate for a design basis MSLB are qualified by testing/analysis in accordance with IEEE 323-1974. This change provides additional information concerning the finalized qualification plan for transmitters. FSAR Change Request Number: 89-308.2 Related SSER Section: SSER6 3.11 SER/SSER Impact: No
Q&R 022-16, 17	2	Deletes statement that no thermal analysis is required from response parts B.2.a, B.2.b and B.2.c. Revision: Deletes wording indicating that no thermal analysis is required from question response parts B.2.a, B.2.b and B.2.c. Qualification of electrical cables, containment electrical penetration assemblies, and valves/ valve operators are performed in accordance with the requirements of IEEE 323-1974. Where appropriate, thermal analyses are performed. FSAR Change Request Number: 89-308.3 Related SSER Section: SSER6 3.11 SER/SSER Impact: No
Q&R 022-16	2	Adds word "analysis" to discussion of cable qualification. Revision: Adds the word "analysis" to indicate that cables inside containment are qualified by testing and/or analysis. Where analysis is required, it is performed in accordance with IEEE 323-1974. FSAR Change Request Number: 89-308.4 Related SSER Section: SSER6 3.11 SER/SSER Impact: No

FSAR Page (as amended)	Group	Description
Q&R 022-17	4	Deletes the word "assemblies" from response part B.2.c. Clarification: Deletes the word "assemblies" from response part B.2.c to clarify that the entire penetrations are qualified. FSAR Change Request Number: 89-308.5 Related SSER Section: SSER6 3.11 SER/SSER Impact: No
Q&R 022-17	3	Revises discussion of containment electrical penetrations to provide specific information on qualification temperatures. Revision: Revises response to part B.2.c. to note the increase in containment electrical penetrations and header plate assemblies maximum qualification test temperature from 340 to in excess of 345 degrees F. FSAR Change Request Number: 89-308.6 Related SSER Section: SSER6 3.11 SER/SSER Impact: Yes SSER 6 Section 3.11.3 discusses old temperatures.
Q&R 022-17, 18	3	Deletes discussion on thermal analysis for valve qualification. Revision: Deletes discussion on thermal analysis for valve qualification to be consistent with addition of current valve qualification data from testing. All valve qualification tests were performed in excess of conditions determined from containment pressure-temperature response analysis and thus no thermal analysis is required for valves. FSAR Change Request Number: 89-308.8 Related SSER Section: SSER6 3.11 SER/SSER Impact: Yes SSER 6, Section 3.11.3 contains old qualification data.
Q&R 022-17	3	Adds maximum qualification temperature for Limitorque operators. Addition: Indicates that the maximum qualification temperature, by test, for Limitorque operators is well above the peak containment vapor temperature for a design basis MSLB. FSAR Change Request Number: 89-308.9 Related SSER Section: SSER6 3.11 SER/SSER Impact: Yes SSER 6, Section 3.11.3 contains old qualification data.

FSAR Page (as amended)	Group	Description
Q&R 022-17	3	See Page No(s):18 Provides valve specific information to response part B.2.d. Update: Revises response part B.2.d to provide valve-specific information, as follows: (i) Target Rock and ASCO solenoid valves qualification test temperatures exceed the maximum postulated temperature envelope inside containment (i.e. 345 degrees F), and (ii) the Valcor solenoid valves maximum qualification test/analysis temperature also exceeds 345 degrees F. FSAR Change Request Number: 89-308.7 Related SSER Section: SSER6 3.11 SER/SSER Impact: Yes SSER 6, Section 3.11.3 has old values for valves.

which the analysis shows that the component or structure is not capable of withstanding the load, the applicant will provide the necessary protection. Protection will consist of either relocating the target or installing jet shields or barriers to protect the target. The staff finds these provisions to be acceptable.

3.6.2.4 Conclusions

The protection afforded essential equipment at Comanche Peak against the effects of pipe breaks is described in Section 3.6B of the FSAR (Amendment 45) and in the applicant's letters dated September 13, 1983, and January 5, 1984. Based on its evaluation of this material, the staff concludes that the plant design for protection against postulated piping failure in fluid systems outside containment is in compliance with the requirements of GDC 4 and the guidelines of BTP ASB 3-1 and is, therefore, acceptable. The design of the plant for providing protection against postulated piping failures meets the acceptance criteria of SRP Section 3.6.1.

3.11 Environmental Qualification of Electric Equipment Important to Safety and Safety-Related Mechanical Equipment

3.11.1 Introduction

Equipment that is used to perform a necessary safety function must be demonstrated to be capable of maintaining functional operability under all service conditions postulated to occur during its installed life for the time it is required to operate. This requirement, which is embodied in GDC 1 and 4 of Appendix A and Sections III, XI, and XVII of Appendix B to 10 CFR 50, is applicable to equipment located inside as well as outside containment. More detailed requirements and guidance relating to the methods and procedures for demonstrating this capability for electrical equipment have been set forth in 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants"; NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," which supplements IEEE Standard 323; and various NRC regulatory guides and industry standards.

3.11.2 Background

NUREG-0588 was issued in December 1979 to promote a more orderly and systematic implementation of equipment qualification programs by industry and to provide guidance to the NRC staff for its use in ongoing licensing reviews. The positions contained in that report provide guidance on (1) how to establish environmental service conditions, (2) how to select methods which are considered appropriate for qualifying equipment in different areas of the plant, and (3) other areas such as margin, aging, and documentation. In February 1980, the NRC requested certain near-term operating license (OL) applicants to review and evaluate the environmental qualification documentation for each item of safety-related electrical equipment and to identify the degree to which their qualification programs complied with the staff positions discussed in NUREG-0588.

IE Bulletin 79-01B, "Environment Qualification of Class IE Equipment," which was issued January 14, 1980, and its supplements dated February 29, September 30,

and October 24, 1980, established environmental qualification requirements for operating reactors. This bulletin and its supplements were provided to OL applicants for consideration in their reviews.

A final rule on environmental qualification of electrical equipment important to safety for nuclear power plants became effective on February 22, 1983. This rule (10 CFR 50.49) specifies the requirements to be met for demonstrating the environmental qualification of electrical equipment important to the safety located in a harsh environment. In accordance with 10 CFR 50.49, electrical equipment for Comanche Peak may be qualified in accordance with the acceptance criteria specified in Category I of NUREG-0588.

The qualification requirements for mechanical equipment are principally contained in Appendices A and B of 10 CFR 50. The qualification methods defined in NUREG-0588 can also be applied to mechanical equipment.

To document the degree to which the environmental qualification program complies with the NRC environmental qualification requirements and criteria, the applicant provided equipment qualification information by letters dated January 24, 1983, February 3, 23, and 24, 1983, May 5, 1983, June 7 and 28 1983, September 13, 1983, January 5, 1984, February 7, 1984, June 26 and 29, 1984, July 20, 1984, and August 10, 21, and 23, 1984.

The staff has reviewed the adequacy of the Comanche Peak environmental qualification program for electrical equipment important to safety as defined in 10 CFR 50.49 and for safety-related mechanical equipment. The scope of this report includes an evaluation of (1) the completeness of the list of systems and equipment to be qualified, (2) the criteria they must meet, (3) the environments in which they must function, and (4) the qualification documentation for the equipment. It is limited to electrical equipment important to safety within the scope of 10 CFR 50.49 and safety-related mechanical equipment.

3.11.3 Staff Evaluation

The staff evaluation included an onsite examination of equipment, audits of qualification documentation, and a review of the applicant's submittals for completeness and acceptability of systems and components, qualification methods, and accident environments. The criteria described in SRP Section 3.11, Rev. 2 (regarding NUREG-0588 Category I), and the requirements in 10 CFR 50.49 form the bases for the staff evaluation.

The staff performed an audit of the applicant's qualification documentation and installed electrical equipment on August 30 through September 3, 1983. The audit consisted of a review of 19 files containing information regarding the equipment qualification. The staff's findings from the audit are discussed in detail in Section 3.11.3.4 of this supplement. The staff's evaluation of the mechanical equipment qualification program is discussed in Section 3.11.4.2.

3.11.3.1 Completeness of Equipment Important to Safety

The three categories of electrical equipment that must be qualified in accordance with the provisions of 10 CFR 50.49 are

(1) safety-related electrical equipment (i.e., equipment relied on to remain functional during design basis events)

(2) nonsafety-related electrical equipment whose failure under the postulated environmental conditions could prevent satisfactory accomplishment of the safety functions by the safety-related equipment

(3) certain postaccident monitoring equipment (RG 1.97, Rev. 2, Category 1 and 2 postaccident monitoring equipment)

A list of equipment that is classified as Class 1E and is included in the qualification program is provided in Comanche Peak FSAR Table 17A-1 and is designated as Class 1E in that table. Table 3.1 of this report lists the systems identified and their safety functions, as well as mechanical systems that have no Class 1E components and their function.

To address conformance with 10 CFR 50.49(b)(2) of the rule concerning nonsafety-related equipment whose failure under postulated accident conditions could prevent the satisfactory accomplishment of safety functions, the applicant referred to staff reviews of IE Information Notice 79-22, "Qualification of Control Systems," and RG 1.75, "Physical Independence of Electric Systems." The staff review and evaluation of the IE Information Notice 79-22 response is described in Section 7.7.2 of NUREG-0843. No design changes or additional equipment qualification are necessary to ensure that HELBs do not cause control system failures to complicate events beyond the FSAR analysis.

Section 8.4.5 of the Comanche Peak SER describes the applicant's conformance with the guidelines in RG 1.75. On this basis, the staff concludes that the applicant's conformance to 10 CFR 50.49 (b)(2) is acceptable.

The applicant has also addressed, in FSAR Section 7.5, compliance with RG 1.97, Revision 2. However, the applicant has taken exception to the qualification requirements for certain Category I and II equipment. The staff will determine the acceptability of these exceptions as part of its review for conformance with RG 1.97. This review may result in the addition of equipment to the environmental qualification program.

The applicant has also identified the equipment required by NUREG-0737, "Clarification of TMI Action Plan Requirements," and their qualification status has been established.

3.11.3.2 Qualification Methods

3.11.3.2.1 Electrical Equipment in a Harsh Environment

Detailed procedures for qualifying safety-related electrical equipment in a harsh environment are defined in NUREG-0588. The criteria in this report are also applicable to other equipment important to safety defined in 10 CFR 50.49. Type testing of equipment in a sequence consisting of pre-aging (thermal, radiation, and mechanical), seismic and dynamic loading, and exposure to LOCA/HELB conditions (where applicable) is the preferred method of qualification. However, in a number of cases, the applicant has extrapolated partial test data to establish equipment qualification.

3.11.3.2.2 Safety-Related Mechanical Equipment in a Harsh Environment

Although there are no detailed requirements for mechanical equipment, GDC 1 and 4 and Appendix B to 10 CFR 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" (Sections III and XVII), contain the following requirements related to equipment qualification:

(1) Components shall be designed to be compatible with the postulated environmental conditions, including those associated with LOCAs.

(2) Measures shall be established for the selection and review for suitability of application of materials, parts, and equipment that are essential to safety-related functions.

(3) Design control measures shall be established for verifying the adequacy of design.

(4) Equipment qualification records shall be maintained and shall include the results of tests and materials analyses.

The staff review is concentrated on materials which are sensitive to environmental effects; for example, seals, gaskets, lubricants, fluids for hydraulic systems, and diaphragms. The staff's findings on qualification documentation are discussed in Section 3.11.4.2.

3.11.3.3 Service Conditions

NUREG-0588 defines the methods to be used for determining the environmental conditions associated with LOCAs or HELBs inside or outside containment. The review and evaluation of the adequacy of these environmental conditions are described below. The staff has reviewed the qualification documentation to ensure that the qualification conditions envelop the conditions established by the applicant.

3.11.3.3.1 Temperature, Pressure, and Humidity Conditions Inside Containment

The applicant provided the LOCA/main steam line break (MSLB) profiles used for equipment qualification. The peak values resulting from these profiles are as follows:

	Maximum Temperature, °F	Maximum Pressure, psig	Humidity, %
LOCA	268	48.1	100
MSLB	334	37.5	100

The staff has reviewed these profiles and finds them acceptable for use in equipment qualification; i.e., there is reasonable assurance that the actual pressures and temperatures will not exceed these profiles anywhere within the specified environmental zone (except in the break zone).

3.11.3.3.2 Temperature, Pressure, and Humidity Conditions Outside the Primary Containment

The applicant has provided the temperature, pressure and humidity conditions associated with HELBs outside containment. The criteria used to define the location of HELBs are described in FSAR Section 3.6. The following areas outside containment are subjected to a harsh environment following an HELB:

(1) safeguards building
(2) electrical and controls building
(3) auxiliary building
(4) turbine building

The applicant has established that the postulated environmental conditions associated with moderate-energy line breaks (MELBs) are enveloped by the conditions associated with HELBs. The HELB conditions are described in Section 3.6 of the FSAR, and the staff's review findings are given in SER Section 3.6.

3.11.3.3.3 Submergence

The maximum submergence levels have been established by the applicant in the environmental qualification program. The inside containment flood level established by the applicant is elevation (el) 817½ ft. The applicant has provided evaluations for any equipment located below the submergence level. These evaluations, based on operability requirements and failure mode effects analysis (FMEA), have been reviewed and approved by the staff. The applicant has established flood levels outside containment and has relocated safety-related equipment above these levels.

3.11.3.3.4 Chemical Spray

Chemical spray is available for containment heat removal following a design basis accident. The specified composition of the spray is 2300 ppm H_3BO_3 buffered with NaOH to a pH of 8.6 to 10.0. Equipment inside containment was reviewed for qualification under the above conditions.

3.11.3.3.5 Aging

NUREG-0588, Category I, outlines the aging program requirements. The degrading influences of temperature, radiation, vibration and mechanical stresses should be considered and included in the aging program. Any justification for excluding pre-aging of equipment in type testing should be established based on equipment design and application, or on state-of-the-art aging techniques. This requires the establishment for a qualified life for each equipment item. In addition, a maintenance/surveillance program should be implemented to identify and prevent significant age-related degradation in electrical and mechanical equipment.

The applicant has committed to follow the recommendations in RG 1.33, Revision 1, "Quality Assurance Program Requirements (Operation)," which endorses American National Standard ANSI N18.7-1972, "Administrative Controls for Nuclear Power Plants." This standard defines the scope and content for a maintenance/

surveillance program for safety-related equipment. Provisions for preventing or detecting age-related degradation in safety-grade equipment are specified and include the following:

(1) Development of a maintenance program to maintain safety-related equipment at the quality required for it to perform its intended function.

(2) Evaluation of causes of equipment failures and review of experience with failed equipment and similar components to determine whether a replacement component of the same type can be expected to perform its function reliably.

(3) Inspection and performance testing to ensure an appropriate quality level.

(4) Development of preventive maintenance schedules that describe the frequency and type of maintenance to be performed. A preliminary schedule should be developed early in plant life and it should be refined and changed as experience is gained with the equipment.

(5) Surveillance testing related to the results of reliability analyses, frequency and type of service, or age of the item or system, as appropriate.

These guidelines apply to equipment located in both harsh and mild environments. The applicant has described a program that incorporates the preceding guidelines, and has stated that this program has been implemented.

3.11.3.3.6 Radiation (Inside and Outside Containment)

The applicant has provided values for the radiation levels postulated to exist following a LOCA. The application and methodology employed to determine these values were presented to the applicant in NUREG-0588 and NUREG-0737. The staff review determined that the values to which equipment was qualified enveloped the requirements identified by the applicant.

The value specified for use in equipment qualification in the containment is 1.92×10^8 rads gamma plus beta. In the auxiliary and safeguard buildings, a value of 8.11×10^6 rads gamma has been used in areas with recirculating fluid lines. These values are acceptable for use in the qualification of equipment.

3.11.3.4 Environmental Qualification Audit

The staff conducted an audit of the applicant's qualification documentation and installed equipment on August 30 through September 3, 1983. There were 19 items of equipment that were reviewed if the test data and analysis in the files supported the qualification status determined by the applicant.

The staff's findings during the audit were documented in a memorandum from H. C. Garg, NRC, to Z. R. Rosztoczy, NRC, dated October 14, 1982. Since then the applicant has resolved all open items, unless otherwise noted elsewhere in the SER.

3.11.3.5 Outstanding Equipment

For safety-related items not having complete qualification documentation, the applicant has provided commitments for corrective action and schedules for completion of documentation. For items identified to date that will not have full qualification before an operating license is issued, analyses have been performed in accordance with 10 CFR 50.49(i) to ensure that the plant can be operated safely pending completion of environmental qualification. These analyses have been submitted for consideration. The staff has reviewed the justifications for interim operation and has concluded that reasonable assurance has been provided that Comanche Peak can be operated safely pending completion of environmental qualification.

3.11.4 Qualification of Equipment

The following subsections present the staff's assessment of safety-related electrical equipment based on the applicant's submittal, audits of documentation at the plant site, information in the NRC Equipment Qualification Data Bank, and previous staff evaluations of equipment in other plants.

3.11.4.1 Electrical Equipment Important to Safety

The staff has separated the electrical equipment in a harsh environment into three categories: (1) equipment requiring replacement before plant startup, (2) equipment requiring additional qualification information or corrective action, and (3) equipment considered acceptable. An appendix listing equipment in each of these categories is provided.

3.11.4.1.1 Equipment Requiring Replacement Before Plant Startup

There is no equipment in this category for Comanche Peak.

3.11.4.1.2 Equipment Requiring Additional Information and/or Corrective Action

The staff has reviewed the equipment identified in Table 3.2. The equipment deficiencies have been determined on the basis of all the information available to the staff, and do not necessarily mean the equipment is unqualified.

The applicant has submitted justifications for interim operation for some of the equipment listed in Table 3.2. The applicant must submit analyses for the remaining equipment on this table, or confirm that the equipment has been qualified before fuel loading. This item is being added as a confirmatory issue in Section 1.8 of this supplement.

3.11.4.1.3 Equipment Considered Acceptable

On the basis of the staff's review, the items in Table 3.3 have been determined to be acceptable.

3.11.4.2 Safety-Related Mechanical Equipment

The staff selected three items from the applicant's master parts list of safety-related mechanical equipment from the master list of equipment to determine if the program described in the environmental qualification submittal

was satisfactorily implemented. Purchase specifications, drawings, material analyses and partial test data were provided by the applicant to demonstrate that nonmetallic age-sensitive components would withstand the conditions associated with the design-basis accidents (DBAs).

Although review of this material showed satisfactory evaluations of the three safety-related mechanical equipment items submitted, the applicant must perform a review and evaluation of all remaining safety-related mechanical equipment located in harsh environment areas and provide the results of the review, the corrective actions identified, and justifications for interim operation for any mechanical equipment whose qualification cannot be established before power ascension above 5% full power. The applicant has committed to perform this review and evaluation.

3.11.5 Conclusions

The staff has reviewed and evaluated the Comanche Peak program for the environmental qualification of electrical and mechanical equipment. This review has included the systems selected for qualification, the environmental conditions resulting from design-basis accidents, the methods used for qualification and the documentation for specific items of equipment. Based on these considerations, the staff concludes that satisfactory completion of the confirmatory item discussed in Section 3.11.4.1.2 must be documented before fuel loading.

In addition, the staff's review has determined that the following license conditions must be imposed:

(1) All electrical equipment within the scope of 10 CFR 50.49 must be environmentally qualified by the deadline in that rule.

(2) Before power ascension above 5% of full power, the applicant must complete the safety-related mechanical equipment qualification program for all safety-related mechancial equipment located in a harsh environment and establish qualification or submit a justification for interim operation for each equipment item.

Considering the confirmatory item and license conditions above, the staff concludes that Comanche Peak is in compliance with the requirements of 10 CFR 50.49 and relevant parts of GDC 1 and 4 of Appendix A; Sections III, XI, and XVII of Appendix B, 10 CFR 50; and the criteria specified in NUREG-0588.

3.11 Environmental Qualification of Safety-Related Electrical Equipment

SPLB 27. The FSAR has revised the response to Q022.2 to concerning the qualification of safety-related equipment inside containment.

CPSES FSAR AMENDMENT
DETAILED DESCRIPTION

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Q&R 022-16	2	Adds word "analysis" to discussion of cable qualification. Revision: Adds the word "analysis" to indicate that cables inside containment are qualified by testing and/or analysis. Where analysis is required, it is performed in accordance with IEEE 323-1974. FSAR Change Request Number: 89-308.4 Related SSER Section: SSER6 3.11 SER/SSER Impact: No
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pressure setpoint of HI-3 (20 psig) was reached for large breaks. For small breaks the spray delay time is 38 seconds. | 76

f. Identification of most severe environment | 5

Among the MSLB's analyzed, the 0.908 ft^2 split rupture at 70-percent power results in the maximum Containment temperature. The Containment vapor temperature for this break is shown in Figure 6.2.1-15. | 5

2. Safety Related Component Thermal Analysis | 5

The peak containment vapor temperature for the design basis MSLB was calculated to be 345°F. | 76
Component thermal analyses are required only if the environmental qualification test conditions are less than those calculated from the Containment pressure-temperature transient response analysis. | 5

a. Transmitters | 5

~~The qualification plan for transmitters has not yet been finalized.~~ **All transmitters located inside containment and required to operate for a design basis MSLB, to mitigate the accident consequences, are qualified** ~~The qualification will be~~ by testing or by a combination **of** testing and thermal analysis **in accordance with IEEE 323-1974 requirements.** ~~The thermal analysis, if required, will employ currently established methods.~~ | 5

b. Electrical cables | 5

The cables are qualified by testing/**analysis** to a maximum temperature of 345~~346~~°F. The | 5

qualification method is in accordance with IEEE 383-1974 and IEEE 323-1974. ~~Therefore, no thermal analysis is required.~~ | 5

c. Containment electrical penetration ~~assemblies~~ | 5

The Containment electrical penetrations **and their header plate** assemblies are qualified by testing to ~~a maximum~~ temperatures **exceeding 345°F** ~~of 340°F~~. The qualification method is in accordance with IEEE 317-1976 and IEEE 323-1974. ~~Therefore, no thermal analysis is required.~~ | 5

d. Valves/**Valve Operators** | 5

The valves located inside containment consist of two groups: | 5

(i) **Target Rock and ASCO solenoid** valves **are** qualified by testing to ~~a maximum~~ temperatures ~~of~~ **above 345** ~~346~~°F, and

(iii) valves qualified by testing to a maximum temperature of 280°F, and | 5

(ii) Valcor solenoid valves are qualified by testing/analysis to a maximum temperature of 346°F.

The Limitorque operators of all valves located inside containment are qualified by testing to a maximum temperature significantly above 345°F. The qualification method for valves/valve operators is in accordance with IEEE 323-1974.

No thermal analysis is required for valves that are qualified to 346°F.

No detailed thermal analysis is considered necessary for the valves qualified to 280°F for the following reason:

The Containment vapor temperature exceeds the qualification temperature only for a short period of time. (See Figure 6.2.1-15).

The valve parts are relatively thick. Consequently their thermal response is expected to be slow approximating that of the Containment steel liner.

The peak temperature of the containment steel liner, calculated as part of the containment pressure/temperature response to the design basis MSLB (using Uchida heat transfer correlation) and shown in Figure 6.2.1-17, is below 280°F.

3. Evaluation of Environmental Qualification | 5

The test temperature profiles used for